DESTINO 2019-2022

TRANSPORATION IMPROVEMENT PROGRAM

El Paso Metropolitan Planning Organization

211 N. Florence, Room 202, El Paso, Texas 79901

915-212-02585 Fax: 915-212-0257 www.elpasompo.org

TABLE OF CONTENTS

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(TIP)

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Phone: (915) 212-0258 Fax: (915) 212-0257

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Public Meeting Dates
March 12th, 13th, 14th, 15th, 19th, 20th, 21st, and 26th, 2018

PARTICIPATING AGENCIES

City of Anthony, NM
City of El Paso, TX
City of San Elizario, TX
City of Socorro, TX
City of Sunland Park, NM
County of El Paso, TX
Dona Ana County, NM
Otero County, NM
Town of Anthony, TX
Town of Clint, TX
Town of Horizon City, TX
Village of Vinton, TX
New Mexico Department of Transportation, District 1
New Mexico Department of Transportation, District 2
Texas Department of Transportation, El Paso District 24

Prepared by:

El Paso Metropolitan Planning Organization

Approved by:

Transportation Policy Board (TPB), May 18, 2018

Submitted to:

FHWA and FTA

Prepared in cooperation with the Texas Department of Transportation, the New Mexico Department of Transportation, the U.S. Department of Transportation, the Federal Highway Administration and the Federal Transit Administration.

1. Metropolitan Planning Organization

Federal regulations require the creation and management of a Metropolitan Planning Organization (MPO) for every urban area having a population of more than 50,000. Federal regulations require that the TIP shall cover a period of not less than four years, and be updated at least every four years. The El Paso MPO, which was designated by the City of El Paso, Texas, in 1988, produces a fiscally constrained TIP covering a period of four years.

The El Paso's Transportation Policy Board (TPB) is responsible for transportation planning and programming for the El Paso MPO. The TPB directs MPO staff through the Executive Director of the MPO. The MPO office is located at 211 N. Florence, Room 202, El Paso, Texas. The MPO's planning area is El Paso County, Texas, southern Dona Ana County, New Mexico, and a small portion of Otero County, New Mexico. The MPO coordinates urban area-wide multi-modal transportation plans, which involve the study of present transportation regional patterns in relation to current and projected development.

The MPO is responsible for the preparation of the Metropolitan Transportation Plan (MTP), Transportation Improvement Program (TIP), Unified Planning Work Program (UPWP), and other documents as required by federal regulations. The MTP and the TIP accommodate future traffic by improving transportation facilities and programs, expanding transit services, and planning new highways and arterials.

2. Role of the Transportation Policy Board

The Transportation Policy Board (TPB) was established for the purpose of setting transportation policy to ensure that regional transportation projects and studies are developed in accordance with federal and state laws, rules and regulations. The TPB is composed of elected public officials from local governments, membership from the Texas Department of Transportation (TXDOT), the New Mexico Department of Transportation (NMDOT), Texas and New Mexico State Senators and Representatives, the City of El Paso's mass transit provider, and Sun Metro. See section six for the structure of the Transportation Project Advisory Committee (TPAC), which makes recommendations to the TPB for approval of project selection, and technical issues for planning and programming transportation projects in the region.

3. Purpose of the Transportation Improvement Program

The TIP is a short-range program of transportation improvements for the MPO's planning area, and is required by federal law. The TIP is prepared and coordinated by MPO staff with participating agencies that implement transportation projects and programs in accordance with regulations issued by the United States Department of Transportation.

Before adoption by the TPB, the draft TIP is reviewed by the implementing agencies, and is presented for public involvement for at least 30 days. Local officials, the Texas Department of Transportation, the New Mexico Department of Transportation, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) use the adopted TIP as a guide in budgeting funds for regional transportation improvements.

The Destino 2019-2022 TIP is consistent with the El Paso MPO's Destino 2045 Metropolitan Transportation Plan (MTP). The El Paso MPO's Destino documents were produced through a Comprehensive**,** Cooperative, and Continuing transportation planning process carried on by the MPO in consultation with TXDOT, NMDOT, and the public transit operator(s) in the region. The TIP contains all projects to be funded with federal transportation funds, as well as all regionally significant transportation projects funded with non-federal funds.

The inclusion of a project in the TIP reflects a consensus of priority needs among the citizens living in the MPO study area, locally-elected officials, local transportation agency representatives, transit providers, and representatives of TXDOT and the NMDOT. The TIP is, in effect, a listing of transportation priorities, estimated costs and recommended implementation dates. The TIP may be amended as transportation needs and/or funding levels change.

4. Definition of Area

The City of El Paso, as an urban area having a population of over 200,000, is classified as a Transportation Management Area (TMA). The TMA designation applies to the overall metropolitan planning area, which includes the following primary participants:

- City of El Paso
- City of San Elizario
- City of Socorro, TX
- El Paso County
- Mass Transit Provider - Sun Metro
- Town of Anthony, TX
- Town of Clint, TX
- Town of Horizon City, TX
- TXDOT-El Paso District
- Village of Vinton, TX

- City of Anthony, NM
- City of Sunland Park, NM
- Dona Ana County, NM
- NMDOT-District 1
- NMDOT-District 2
- Otero County, NM

5. Public Participation Program

The intent of the Public Participation Program (PPP) for the El Paso Metropolitan Planning Organization (MPO) is to include residents living in the MPO's Study Area, community groups, private and public agencies, and transportation providers in an effort that is proactive and that provides complete information, timely public notice, and full public access to key decisions made through the MPO. The PPP supports early and continuing involvement of the public in developing transportation

plans and programs. All documents have, as a minimum, 30 days of continuing public review and comment periods. Concerns of a wide variety of involved parties are integrated into the PPP and the plan encourages and provides for the greatest level of education on transportation issues. Opportunities for residents to contribute ideas and voice opinions early and often, both during and after the preparation of draft plans and programs is provided by the PPP.

Every effort is made to accommodate traditionally under-served audiences, including low-income and minority households, and persons with disabilities. A concerted effort is made to hold public meetings, public hearings, and open houses at locations that comply with the Americans with Disabilities Act (ADA) requirements, as well as locations in the vicinity of scheduled bus routes.

In compliance with Environmental Justice requirements, the MPO will respond to the needs of low-income and minority populations by choosing meeting locations, times and formats that are appropriate, accessible and reassuring to affected populations. All accommodations for the visual and/or hearing impaired and Spanish-speaking individuals are provided upon request prior to all public meetings. All public meeting announcements are announced on the MPO website and are published in various local periodicals and announced on regional radio stations.

The PPP applies to the MTP, TIP and may be utilized—with appropriate modifications—for any other MPO document requiring public involvement, including the Public Participation Program itself, which requires 45 days of public review. Specific Public Participation Program measures are described in:

- The Metropolitan Transportation Plan (MTP)
- The Transportation Improvement Program (TIP)
- Amendments to Adopted Documents

For a complete copy of the MPO's Public Participation Program, please contact the MPO at (915) 212-0258 or log on the MPO's web page at www.elpasompo.org.

6. Project Selection Process

The TPAC has sixteen (16) voting members. The TPAC makes recommendations to the TPB on issues related to the MTP, TIP, UPWP (Unified Planning Work Program), transportation studies, and project selection criteria. The TPAC reviews and makes recommendations to the TPB on projects for inclusion in the MPO's MTP and TIP. The TPAC has regularly scheduled monthly meetings, but holds special meetings as necessary. The TPAC members are selected by their agency. Nine (9) voting members of the TPAC (50% plus 1) constitutes a quorum.

Table 1. The Transportation Project Advisory Committee's membership as of 03/07/18:

Voting Members:	
City of El Paso	1 member
Texas Department of Transportation	1 member
El Paso County (designated by Commissioner's Court)	1 member
Town of Horizon City	1 member
Village of Vinton	1 member
Town of Anthony, TX	1 member
City of Anthony, NM	1 member
City of Socorro	1 member
City of Sunland Park, NM	1 member
City of San Elizario	1 member
Ysleta Del Sur Pueblo	1 member
Sun Metro	1 member
Town of Clint	1 member
New Mexico Department of Transportation (NMDOT)	1 member
Doña Ana County, New Mexico	1 member
University of Texas at El Paso	1 member

The El Paso MPO's Transportation Policy Board (TPB) approved a two-tier project selection process that includes requirements for both the MAP-21 National Goals and the Congestion Management Process strategies. MAP-21 requires MPOs to establish and use a performance-based approach to transportation decision making and development of transportation plans. The planning process established a cooperative, continuous, and comprehensive framework for making transportation investment decisions in metropolitan areas as defined in the MAP-21 Act. A methodology is necessary to reduce project deliverable delays and improve regional planning by the Project Selection Process (PSP). The Fixing America's Surface Transportation Act (FAST Act) maintains current program structures and funding shares between highways and transit, continues efforts of MAP-21, and includes streamlining the approval process for new transportation projects.

The phases of the project selection process begins with Phase 1 Call for projects and Phase 2 Need and Purpose. PSP Tier 1 (MTP) Phase 2.1 MAP-21 National Goals establishes national performance goals for the Federal-aid highway program in seven areas: safety, infrastructure condition, congestion reduction, system reliability, freight movement and economic vitality, environmental sustainability and reduced project delivery delays. PSP Tier 1 (MTP) Phase 2.2 MPO 2013 Congestion Management Process Strategies identified travel demand management strategies, traffic operation strategies, public transportation strategies, road capacity strategies and non-CMP strategies. PSP Tier 2 (TIP) Phases 2.3 through 2.3H evaluates a project based on information provided by the sponsoring

agency for project financing and project readiness. Phase 3 is the development of a draft Project List, Phase 4 is the TPAC Recommendation, Phase 5 is Public Involvement and Phase 6 is TPB action.

7. Performance Measures

Performance measures are quantifiable indicators of progress towards achieving the goals and objectives set forth in Destino 2045. The United States Department of Transportation has enumerated several performance measures that the El Paso MPO will report progress towards to demonstrate compliance with MAP-21 and the FAST Act. The measures set forth by the USDOT can be considered "tracking" measures, as they rely primarily on observed data to identify trends. To help the MPO position itself to be successful at reporting progress towards the targets it will either set itself or adopt through the Texas and New Mexico DOTs on the federal tracking measures, Destino 2045 and the Destino 2019-2022 TIP proposes the use of several planning-level performance measures that the MPO can estimate or forecast using its existing modeling tools. These measures provide a proxy for the relative performance of different mixes of potential TIP projects – i.e. "alternatives" – and to help the MPO select the best program of projects to help its meet the goals set forth by the community through the visioning process as well as the targets it will set under federal law.

The planning-level performance measures recommended for Destino 2045 (Table 2) can be roughly categorized within the goals of the plan, although several of these measures indicate progress towards multiple goals. Additionally, some indicators (such as crash rates) that are useful for identifying deficiencies on the existing system are not easily adaptable to forecasting tools. For these goals, Destino 2045 recommends performance measures that describe the overall program of projects' ability to introduce safety improvements at crash hotspots, replace deficient infrastructure, and address access and/or operational concerns at Ports of Entry.

Table 2. Performance Measures

GOALS	ALTERNATIVES EVALUATION PERFORMANCE MEASURES
Safety	Number of projects that include safety enhancements located near crash hotspots
Maintenance & Operations	Number of projects that repair or replace deficient bridges or pavements
Mobility	Speed Index Annual hours of delay
Accessibility & Travel Choice	Percentage of jobs, key destinations, and population within ½ mile of high-quality, rapid transit Commute times from Environmental Justice zones Percentage non-SOV trips Average trip costs Number of projects that improve operations or multimodal access at current or future POEs
Sustainability	Estimated emissions Total VMT & VMT per capita

Economic Vitality	Annual hours of delay along major freight corridors Percentage of jobs accessible within 30 minutes (by any mode)
Quality of Life	There is no specific performance measure for this goal. The indicator for this goal is a summary of performance on each goal alternative relative to the other alternatives.

8. Most Used TIP funding Sources

Table 3. The 12 Traditional federal funding sources used in Texas

CATEGORY	DESCRIPTION
1-Preventive Maintenance and Rehabilitation.	Preventive maintenance and rehabilitation of the existing State Highway System. The rehabilitation funds may be used for rehabilitation of the Interstate Highway System main lanes, frontage roads, structures, rehabilitation of signs, pavement markings, striping, etc. The Transportation Planning and Programming Division may approve the use of rehabilitation funds for the construction of interchanges and HOV lanes on the Interstate Highway System. Rehabilitation funds may not be used for the construction of new SOV lanes.
2 – Metropolitan Area (TMA) Corridor Metro Projects	Mobility and added capacity projects on major state highway system corridors, which serve the mobility needs of the Metropolitan Areas (TMA) MPOs.
3 -Non-Traditional Funding	This funding category will place all the non-traditional funding categories in Texas into Category 3.
4 – Statewide Connectivity Corridor Projects	Mobility and added capacity projects on major state highway system corridors, which provide statewide connectivity between urban areas and corridors, serving mobility needs throughout the state.
5 – CMAQ	Addresses attainment of national ambient air quality standard in the non-attainment areas (currently Dallas-Fort Worth, Houston, and El Paso). Funds cannot be used to add capacity for single occupancy vehicles.
6 – Consolidated Structure Rehabilitation	Replacement or rehabilitation of eligible bridges on and off the state highway system (functionally obsolete or structurally deficient). Replacement of existing highway-railroad grade crossings, and the rehabilitation or replacement of deficient railroad underpasses on the state highway system. Specific locations evaluated by cost-benefits derived index (benefits such as improved traffic flow, accident/fatality reduction).
7 – STP Metro-Mobility	Transportation needs within metropolitan area boundaries with populations of 200,000 or greater. Projects selected by Metropolitan Planning Organizations (MPOs).
8 – STP Safety – Federal Hazard Elimination Programs	Safety related projects – on and off state highway system. Projects are evaluated using three years of accident data, and ranked by Safety Improvement index.

8 – STP Safety – Federal Railway Highway Safety Program	Installation of automatic railroad warning devices at hazardous railroad crossing on and off state highway system, selected from statewide inventory list which is prioritized by index (# of trains per day, train speed, ADT, type of existing warning device, train-involved accidents within prior five years, etc.
9 – Enhancements	Projects above and beyond what normally is expected for transportation enhancements – twelve general activities as outlined since TEA-21. Projects recommended by local government entities, reviewed and recommended by committee, selected by Texas Transportation Commission.
9– Transportation Alternatives Program (TAP)	Transportation-related activities as described in the Transportation Alternatives Set-Aside Program, such as on and off-road pedestrian and bicycle facilities, and infrastructure projects for improving access to public transportation.
10 – Miscellaneous – State Park Roads 1992	Construction and rehabilitation of roadways within or adjacent to state parks, fish hatcheries, etc. subject to Memorandum of Agreement between TXDOT and TPWD. Locations selected and prioritized by TPWD.
10 - Miscellaneous-Railroad Grade Crossing Replanking Program 1992	Replacement of rough railroad crossing surfaces on the state highway system (approximately 140 installations per year statewide). Project selection based on conditions of the riding surface (highway, railroad and drainage) and cost per vehicle using the crossing.
10 - Miscellaneous-Railroad Signal Maintenance Program 1992	Contributions to each railroad company based on number of state highway system crossings and type of automatic devices present at each crossing.
10 - Miscellaneous-Construction Landscape Programs 1992	New landscape development projects such as typical Right of Way landscape development, rest area/picnic area landscape development, erosion control and environmental mitigation activities on the state highway system.
10 - Miscellaneous- (Federal) 1992	Federal programs such as Forest Highways, Indian Reservation Highways, Federal Lands Highways, and Ferry Boat Discretionary.
11 – District Discretionary	Miscellaneous projects on the state highway system selected at the district's discretion. A portion of these funds may be used off the state highway system.
12 – Strategic Priority	Commission selected projects, which promote economic development, provide system continually with adjoining states and Mexico or address other strategic needs as determined by the commission.
Proposition 1	Allocates money from the rainy day fund to State Highway Fund for construction, maintenance and rehabilitation.
Proposition 7	Supplies funding to the State Highway Fund from sales and use tax and state motor vehicle tax to build, maintain and restore non-tolled public roads.

FTA Section 5307	Mass Transit apportionment to urbanized areas based on population and operating performance.
FTA Section 5309	Funding for major transit capital investments, including heavy rail, commuter rail, light rail, streetcars, and bus rapid transit.
FTA Section 5339	Mass Transit discretionary funds for capital projects only.
FTA Section 5310	Provides federal funds to private nonprofit entities for the transportation of elderly and/or disabled persons.
FTA Section 5311	Rural Transit Program

9. Air Quality

The El Paso Metropolitan Planning Organization (MPO) requested the Texas Commission on Environmental Quality (TCEQ) to petition EPA for a re-designation of the Carbon Monoxide (CO) non-attainment area to attainment status, and EPA proposed approval of the re-designation request, and a maintenance plan on August 4, 2008. The proposal was a direct final, effective on October 3, 2008. The maintenance State Implementation Plan (SIP) for CO for the El Paso MPO is operating under a motor vehicle emission budget of 29.66 tons/day. The carbon monoxide (CO) limited maintenance plan was approved on September 8, 2017 (effective October 10, 2017).

For Particulate Matter 10 (PM-10) the SIP has a motor vehicle emissions budget of 12.1 tons/ day. Texas Administrative Code 30 TAC §111.147(1)(E) was developed in an effort to help develop a maintenance status for PM-10. These efforts include the pavement of new alleyways, unpaved alleyways not being used for residential garbage and recycling collection, and use of reclaimed asphalt pavement as an alternate means to pave the road. Texas Administrative Code 30 TAC §111.147(2) was developed to change the frequency of street sweeping in an effort that the City of El Paso can achieve the goal of street sweeping. In New Mexico, Doña Ana County implemented an erosion control regulations ordinance No 194-2000 to enhance the containment of PM-10 and reduction of negative health effects caused by the creation of fugitive dust. In addition, both the Texas and New Mexico developed a Natural Events Action Plan (NEAP). The NEAP provides analysis and documentation of the exceedances as attributable to uncontrollable natural events due to unusually high winds. In addition, the NEAP is designed to protect public health, educate the public about high wind events, mitigate health impacts on the community during future events, and identify and implement Best Available Control Measures (BACM) for man-made sources of windblown dust.

The MPO boundary had been expanded into a portion of Otero County and additional portions of Doña Ana County, New Mexico, a marginal PM-10 non-attainment area in Anthony, NM is within the area covered by the MTP and TIP. The New Mexico Department of Transportation (NMDOT) and their consultants may prepare a qualitative analysis of roadway projects that fall within the non-attainment area.

Before the TIP is given final approval by the Federal Highway Administration (FHWA), it must be approved for air quality conformity. The MPO prepares an Air Quality Transportation Conformity Statement for the TIP, and comments are received through the public involvement process. The conformity statement is forwarded to the Texas Department of Transportation (TXDOT) and New Mexico Department of Transportation (NMDOT), TCEQ and other state and federal agencies for review through the State Consultative Procedures.

The statement is sent to the Texas and New Mexico FHWA State Division office for review and final approval. The FHWA consults with the Federal Transit Administration (FTA), and the statement is forwarded to the EPA. The FHWA takes into account any comments received by the general public, TCEQ, FTA or the EPA concerning the advisability of constructing certain projects, and grants approval based on federal guidelines. A similar process is followed with New Mexico state agencies such as the New Mexico Environmental Department (NMED), and the New Mexico FHWA State Division office.

The Destino 2019-2022 TIP is part of the Destino 2045 MTP. Transportation Conformity for the Destino 2019-2022 TIP will be determined as part of the conforming Destino 2045 MTP. The conformity statement is evaluated according to the amount of carbon monoxide (CO) and particulate matter (PM-10) emissions that are projected from the existing transportation network along with proposed projects. Changes in conformity rules contain several important differences from previous conformity determinations. Budget tests are made for PM10 and CO.

MOVES 2014a, an emissions modeling tool to help determine the amount of emissions produced by vehicles, was be used for the Destino 2045 MTP and Destino 2019-2022 TIP. The Texas Transportation Institute (TTI) is under a TXDOT contract to run the MOVES model for El Paso.

Projects marked "Exempt" may proceed towards implementation even in the absence of a conforming transportation plan and TIP. The EPA listed certain categories of projects as being exempt from conformity requirements in the Federal Register.

El Paso County, and southern Dona Ana County, New Mexico, and a small portion of Otero County, New Mexico are included on the same traffic model for the purpose of conformity determination. Separate figures are calculated for each area for vehicle miles traveled (VMT) and emissions. The El Paso County conformity determination reports CO, and PM-10 emissions where they must conform to the motor vehicle emissions budget tests. Southern Doña Ana County (including Sunland Park, Santa Teresa, La Union and the Gadsden High School area) does not currently have any emission budget tests. No tests are run for the Anthony, New Mexico PM-10 non-attainment area, since only a qualitative analysis is required.

Once the Destino 2019-2022 TIP receives final approval by the Transportation Policy Board, this TIP is included in NM & TX Statewide Transportation Plans (STIP's), and the document will be available for distribution upon request.

10. Grouped Documentation

Under 23 CFR 450.324(i) projects proposed for FHWA and/or FTA funding that are not considered by the State and MPO to be of appropriate scale for individual identification in a given program year **may be grouped by function, geographic area, and work type** by using applicable classifications under 23 CFR 771.117(c) and (d). In non-attainment and maintenance areas, these classifications must be consistent with the exempt project classifications contained in the U.S. EPA transportation conformity requirements (40 CFR Part 51).

The El Paso MPO is participating by grouping some projects in the Transportation Improvement Program (TIP) that are covered in the Texas Statewide Transportation Improvement Program (STIP). The Texas STIP can be located at http://www.txdot.gov/government/programs/stips.html and the New Mexico STIP at http://dot.state.nm.us/content/dam/nmdot/STIP/Official_STIP.pdf Financial accountability for these projects are the responsibility of the STIP, therefore, are not accounted for in the Financial Summary for the El Paso MPO totals. These projects are "exempt" from conformity requirements. These projects do not need policy approval by the TPB for the purpose of revisions. See the following grouped project categories, and the "Definition of Grouped Projects."

Table 4. Grouped Projects Categories

PROPOSED CSJ (TXDOT)	GROUPED PROJECT CATEGORY	DEFINITION
5000-00-950	PE – Preliminary Engineering	Preliminary Engineering for any project except added capacity projects in a nonattainment area. Includes activities which do not involve or lead directly to construction, such as planning and research activities; grants for training; engineering to define the elements of a proposed action or alternatives so that social, economic, and environmental effects can be assessed.
5000-00-951	Right of Way Acquisition	Right of Way acquisition for any project except added capacity projects in a nonattainment area. Includes relocation assistance, hardship acquisition and protective buying.
5000-00-952 5000-00-957 5000-00-958	Preventive Maintenance and Rehabilitation	Projects to include pavement repair to preserve existing pavement so that it may achieve its designed loading. Includes seal coats, overlays, resurfacing, restoration and rehabilitation done with existing ROW. Also includes modernization of a highway by reconstruction, adding shoulders or adding auxiliary lanes (e.g., parking, weaving, turning, climbing, non-added capacity) or drainage improvements associated with rehabilitation.
5000-00-953	Bridge Replacement and Rehabilitation	Projects to replace and/or rehabilitate functionally obsolete or structurally deficient bridges.
5000-00-954	Railroad Grade Separations	Projects to construct or replace existing highway-railroad grade crossings and to rehabilitate and/or replace deficient railroad underpasses, resulting in no added capacity.
5800-00-950	Safety	Projects to include the construction or replacement/rehabilitation of guard rails, median barriers, crash cushions, pavement markings, skid treatments, medians, lighting improvements, highway signs, curb ramps, railroad/highway crossing warning

		devices, fencing, intersection improvements (e.g., turn lanes), signalization projects and interchange modifications. Also includes projects funded via the Federal Hazard Elimination Program, Federal Railroad Signal Safety Program, or Access Managements projects, except those that result in added capacity.
5000-00-956	Landscaping	Project consisting of typical right-of-way landscape development, establishment and aesthetic improvements to include any associated erosion control and environmental mitigation activities.
5800-00-915	Intelligent Transportation Systems Deployment	Highway traffic operation improvement projects including the installation of ramp metering control devices, variable message signs, traffic monitoring equipment and projects in the Federal ITS/IVHS programs.
5000-00-916	Bicycle and Pedestrian	Construction or rehabilitation of bicycle and pedestrian lanes, paths and facilities.
5000-00-917	Safety Rest Areas and Truck Weigh Stations	Construction and improvement of rest areas, and truck weigh stations.
5000-00-918	Transit Improvements and Programs	Projects include the construction and improvement of small passenger shelters and information kiosks. Also includes the construction and improvement of rail storage/maintenance facilities bus transfer facilities where minor amounts of additional land are required and there is not a substantial increase in the number of users. Also includes transit operating assitance, acquisition of third-party transit services, and transit marketing, and mobility management/coordination. Additionally includes the purchase of new buses and rail cars to replace existing vehicles or for minor expansions of the fleet [See Note3].

Note 1: Projects funded with Transportation Alternatives Program (TAP), Transportation Enhancement, and Congestion Mitigation Air Quality funding require a Federal eligibility determination, and are not approved to be grouped.
Note 2: Projects funded as part of the Recreational Trails Program (RTP) consistent with the revised grouped project category definitions may be grouped. RTP projects that are not consistent with the revised grouped project category definitions must be individually noted in the Transportation Improvement Program (TIP) and State Transportation Improvement Program (STIP).
Note 3: In PM10 and PM2.5 nonattainment or maintenance areas, such projects may be grouped only if they are in compliance with control measures in the applicable implementation plan.

11. Americas with Disabilities Act (ADA)

During the planning process, every effort is made to accommodate the traditionally under-served public, including low-income and minority households and persons with disabilities. Concerted efforts are made to hold all public meetings, public hearings, and open houses at accessible locations that comply with Americans with Disabilities Act (ADA) requirements, as well as locations in the vicinity of scheduled bus routes. Additionally, TIP projects must comply with ADA requirements for accessibility.

12. MPO Glossary – Project Section

Table 5.

PROJECT CODE	DEFINITION	EXPLANATION
CSJ	Control Section Job Number	TXDOT-assigned number for projects entered into the Unified Transportation Plan (UTP)
CN	Control Number	NMDOT-number assigned for projects in New Mexico State Transportation Improvement Program (STIP)
PROJ ID	Project Identification	Code assigned by the MPO for local tracking/identification; used to relate projects to the Metropolitan Transportation Plan
F. CLASS	Federal Functional Classification	Federal classification of streets and highways into functional operating characteristics. Categories: Interstate Other Urban Freeways and Expressways Other Principal Arterials
FED PROG	Federal Funding Category	PM&R: Preventive Maintenance and Rehabilitation Metro ACP: Metropolitan Area (TMA) Corridor Projects Urban ACP: Urban Area (Non-TMA) Corridor Projects State CCP: Statewide Connectivity Corridor Projects CMAQ: Congestion Mitigation and Air Quality Improvement CSREHAB: Consolidated Structure Rehabilitation STP-MM: Surface Transportation Program - Metro-Mobility SAFE: Safety Projects ENHAN: Enhancement Projects MISC: Miscellaneous Dist Discret: District Discretionary STRATEGIC: Strategic Priority FTA: Federal Transit Administration STP-TPU: New Mexico, Surface Transportation Prog Large Urban STP-FLEX: New Mexico, Surface Transportation Program-Flexible STP-TPS: New Mexico, Surface Transportation Program-Safety BOR/COR: Borders and Corridors
PHASE	Project Phase for Federal Funding	T - Transfers C – Construction E - Preliminary Engineering R - Right of Way Acquisition

1 Texas Highway Projects FHWA & Other Funds

[1] Congestion Mitigation and Air Quality (CMAQ) Analyses can be found in Appendix A provided upon request and/or attached into the electronic version of this document.

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-542**	CS	C,E	El Paso	COEP	**$1,500,260**

TIP PROJECT NAME: **Bicycle Connectivity Infrastructure Improvements Phase I**
REVISION DATE: 07/2018
LIMITS FROM: Citywide (Please see TIP history for complete street names)
MPO PROJECT ID: **M087A**
LIMITS TO: Citywide (Please see TIP history for complete street names)
MTP REFERENCE: M087A
TIP DESCRIPTION: Bicycle Connectivity Infrastructure Improvements Phase I: Construct bike facilities citywide to include: buffered bike lanes, conventional bike lanes, bike blvds, shared lane markings, and protected bike lanes.
FUNDING CATEGORY: CAT 5 CMAQ
VOC (Kg/Day): 0.82 CO (Kg/Day): 23.207
NOX (Kg/Day): 2.048 PM 10 (Kg/Day): 0.596
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019. EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$240,345
Right Of Way:	$0
Construction:	$1,259,914
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$1,500,260**

Cost of Approved Phases: **$1,500,260**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	5	CMAQ	$1,200,208	$0	$0	$300,052	$0	$1,500,260
	Fund by Share		**$1,200,208**	**$0**	**$0**	**$300,052**	**$0**	**$1,500,260**

02/2017	2019	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019. EXEMPT
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-548**	CS	C,E	El Paso	COEP	**$1,013,700**

TIP PROJECT NAME: **Chamizal Neighborhood Pedestrian Enhancements Phase I**
REVISION DATE: 07/2018
LIMITS FROM: S. Piedras (Please see remarks for complete street names)
MPO PROJECT ID: **E302X-1**
LIMITS TO: S. Gama (Please see remarks for complete street names)
MTP REFERENCE: E302X-1
TIP DESCRIPTION: Chamizal Neighborhood Pedestrian Enhancements Phase I: Construction of sidewalks, ADA pedestrian ramps and crosswalks. The purpose of the project is to provide connectivity to fix bus stop routes and rapid transit stops within neighborhood.
FUNDING CATEGORY: CAT 9 TAP, CAT 3 LC
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

PROJECT HISTORY:
Amend to program H2040 MTP, H17-20 TIP, 17-20 STIP, in FY 2019. EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$277,022
Right Of Way:	$0
Construction:	$736,678
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$1,013,700**

Cost of Approved Phases: **$1,013,700**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	9TAP	TAP	$677,743	$0	$0	$169,436	$0	$847,179
Cat	3LC	Local Contribution	$0	$0	$0	$0	$166,521	$166,521
	Fund by Share		**$677,743**	**$0**	**$0**	**$169,436**	**$166,521**	**$1,013,700**

02/2017	2019	05/2016	Amend to program H2040 MTP, H17-20 TIP, 17-20 STIP, in FY 2019 EXEMPT
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

C=Construction, E=Engineering, R=Right-Of-Way (ROW), T=Transfer, YOE=Year Of Expenditure, CSJ:Control Section Job

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0167-01-113**	US 54	C	El Paso	TXDOT	**$90,416,143**

TIP PROJECT NAME: **I-10 Connect**

LIMITS FROM: Loop 375 (Cesar Chavez Border Highway)
LIMITS TO: Yandell Dr.
TIP DESCRIPTION: I-10 Connect: US54/IH10/IH110/Loop 375 Interchange Improvements (for example improvements to existing ramps and adding auxiliary lanes).
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

REVISION DATE: 07/2018
MPO PROJECT ID: **I034X-MOD**
MTP REFERENCE: I034X-MOD
FUNDING CATEGORY: CAT 10 Earmark, CAT 7 STP, CAT 12 SP, CAT 4(3c), CAT 11B

*Project Sponsor paying for PE and/or ROW Costs, if any.

PROJECT HISTORY:
Admin amend to reduce CAT 4(3c) to $42,830,269, add $10,000,000 to CAT 11 Rider 11B, and add $7,600,000 of CAT 12

Total Project Cost Information:

Preliminary Engineering:	$4,588,721
Right Of Way:	$1,500,000
Construction:	$90,416,143
Construction Engineering:	$4,279,685
Contingencies:	$7,754,002
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$5,506,465
Total Project Cost:	**$114,045,016**

Cost of Approved Phases: **$90,416,143**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	10	Earmark	$3,724,699	$931,175	$0	$0	$0	$4,655,874
Cat	7	STP-MM	$7,200,000	$1,800,000	$0	$0	$0	$9,000,000
Cat	12	SP	$19,144,000	$4,786,000	$0	$0	$0	$23,930,000
Cat	4	4(3c)	$34,264,215	$8,566,054	$0	$0	$0	$42,830,269
Cat	11	Rider 11B	$8,000,000	$2,000,000	$0	$0	$0	$10,000,000
		Fund by Share	**$72,332,914**	**$18,083,229**	**$0**	**$0**	**$0**	**$90,416,143**

			(Former US 54 / IH 10 / IH 110 / Loop 375 Interchange Improvements) (Former I-10 To Loop 375 Border Hwy)(Former I-10 Eastbound Exit Ramp)
			Amend to deprog from FY 2014 & prog in FY 2016; Amend to add Cat 3-Lcl (EP County VRF), Cat 7, & Cat 12 TXDOT VRF Match funds w H13-16 TIP & H15-18 TIP (simultaneous submittal). Per Tim Juarez (TXDOT-TPP) found as Operational Improvement
05/2012	2015	05/2012	05/2012 Mission 2013-2016 Tip
07/2012	2015	07/2012	07/2012 Tpb (08/2012 11-14 Stip) Amend To Add To Mission 11-14 Tip
11/2012	2013	11/2012	11/2012 Stip Revision Submittal Amend To Move From 2015 To 2013 Mission 13-16 Tip With Motion To Only Use Up To $300k For Pe Only And Report Studies To Tpb When Ready.
07/2013	2014	07/2013	Amend To Move From Fy 2013 To Fy 2014; Did Not Let In Fy 2013
05/2014	2016	03/2014	Amended Name From I-10 Easbound Exit Ramp To I-10 To Border Hwy; Amended Description From Reconstruct Exit Ramp Eastbound To East To East And West To West Through Us 54 And I-110; Amend To Move From Fy 2014 To Fy 2016; Amend To Add Cat 3-lcl (ep County Vrf), Cat 7, & Cat 12 Txdot Vrf Match Funds W/ Dev. Of 2013 Epc Cmp, May 2014 H13-16 Tip Rev, & H15-18 Tip. Per Tim Juarez (txdot-tpp) Found As Operational Improvement & No Need To Amend Conformity.
07/2014	2016	05/2014	H13-16 TIP & H15-18 TIP (simultaneous submittal)
	2016	12/2014	STIP not approved, MPO replied to FHWA on 1-13-15;
03/2015	2019	03/2015	2013 EPC CMP project; Amend H2040 MTP, H15-18 TIP, and 15-18 STIP to deprogram/move from FY 2016 to FY 2019, remove Cat3-VRF, increase Cat12 TXDOT VRF Match, adjust name, limits and description and change CSJ from 2121-03-131 to 0167-01-113.
07/2016	2019	06/2016	Amend to program H2040 MTP, H17-20 TIP, 17-20 STIP, in FY 2019
01/2017	2019	12/2016	Administratively amend to adjust cost to add $4,000,000 of CAT 7 STP-MM to H2040 MTP, H17-20 TIP, 17-20 STIP, in FY 2019 NONEXEMPT
05/2017	2019	04/2017	Amend to add $54,649,045 of CAT 4(3c) into amended H2040 MTP, H17-20 TIP, 17-20 STIP in FY 2019. NONEXEMPT
02/2018	2019	01/2018	Admin amend to reduce CAT 4(3c) to $42,830,269, add $10,000,000 to CAT 11 Rider 11B, and add $7,600,000 of CAT 12.
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0374-02-107**	US 62/180	C,E	El Paso	TXDOT	**$502,914**

TIP PROJECT NAME: **Intersection Operational Improvements at Montana Ave./Airport Rd./Mescalero Dr.**
REVISION DATE: 07/2018
LIMITS FROM: Geronimo Drive
MPO PROJECT ID: **P333X**
LIMITS TO: Sioux Drive
MTP REFERENCE: P333X
TIP DESCRIPTION: Intersection Operational Improvements at Montana Ave./Airport Rd./Mescalero Dr.
FUNDING CATEGORY: Cat 5 CMAQ
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.
VOC (Kg/Day): 1.003 CO (Kg/Day): 10.772
NOX (Kg/Day): 2.766 PM 10 (Kg/Day): 0.738

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019

Total Project Cost Information:

Preliminary Engineering:	$15,595
Right Of Way:	$0
Construction:	$487,319
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$502,914**

Cost of Approved Phases: **$502,914**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	5	CMAQ	$402,331	$100,583	$0	$0	$0	$502,914
		Fund by Share	**$402,331**	**$100,583**	**$0**	**$0**	**$0**	**$502,914**

02/2017	2019	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019.
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-564**	John Hayes	E	El Paso	EP County	**$2,555,280**

TIP PROJECT NAME: **John Hayes (Darrington/Berryville) PE Phase**
REVISION DATE: 07/2018
LIMITS FROM: Pellicano
MPO PROJECT ID: **P004X-PE**
LIMITS TO: Montwood
MTP REFERENCE: P004X-PE
TIP DESCRIPTION: John Hayes (Darrington/Berryville) PE Phase: Build 6 lane divided with bike lanes
FUNDING CATEGORY: CAT 7 STP, CAT 3 LC
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Total Project Cost Information:

Preliminary Engineering:	$2,555,280
Right Of Way:	$0
Construction:	$28,744,689
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$31,299,969**

Cost of Approved Phases: **$2,555,280**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	7	STP	$1,488,000	$0	$0	$372,000	$0	$1,860,000
Cat	3LC	Local Contribution	$0	$0	$0	$0	$695,280	$695,280
		Fund by Share	**$1,488,000**	**$0**	**$0**	**$372,000**	**$695,280**	**$2,555,280**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

C=Construction, E=Engineering, R=Right-Of-Way (ROW), T=Transfer, YOE=Year Of Expenditure, CSJ:Control Section Job

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**2552-02-028**	LP 375	C	El Paso	TXDOT	**$44,663,725**

TIP PROJECT NAME: **Loop 375 (Purple Heart) Widening and Construction of Frontage Roads**
REVISION DATE: 07/2018
LIMITS FROM: Spur 601
MPO PROJECT ID: **F057X-CAP**
LIMITS TO: US 62/180 (Montana Ave.)
MTP REFERENCE: F057X-CAP
TIP DESCRIPTION: Loop 375 (Purple Heart) Widening and Construction of Frontage Roads: Widen 4 to 6 lanes on mainlanes and construct 2 lane frontage roads in each direction.
FUNDING CATEGORY: CAT 2, CAT 4(3c)
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

*Project Sponsor paying for PE and/or ROW Costs, if any.

PROJECT HISTORY:
Amend to program into amended H2040 MTP, H17-20 TIP, 17-20 STIP in FY 2019.

Total Project Cost Information:

Preliminary Engineering:	$2,421,570
Right Of Way:	$7,626,000
Construction:	$44,663,725
Construction Engineering:	$2,125,051
Contingencies:	$88,955
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$2,327,672
Total Project Cost:	**$59,252,973**

Cost of Approved Phases: **$44,663,725**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 2M	Prop 1 and/or Prop 7		$21,819,200	$5,454,800	$0	$0	$0	$27,274,000
Cat 4	4(3c)		$13,911,780	$3,477,945	$0	$0	$0	$17,389,725
	Fund by Share		**$35,730,980**	**$8,932,745**	**$0**	**$0**	**$0**	**$44,663,725**

05/2017	2019	04/2017	Amend to program into amended H2040 MTP, H17-20 TIP, 17-20 STIP in FY 2019.
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-539**	CS	C,E	El Paso	COEP	**$1,489,645**

TIP PROJECT NAME: **Paso Del Norte (PDN) Port of Entry (POE) Roundabout**
REVISION DATE: 07/2018
LIMITS FROM: El Paso St. at 6th. Ave.
MPO PROJECT ID: **C035X**
LIMITS TO:
MTP REFERENCE: C035X
TIP DESCRIPTION: Paso Del Norte PDN-POE Roundabout: Design and construct a roundabout to accommodate 1 lane and parameters as described in the FHWA NCHRP Report 672, to include but not limited to concrete and asphalt roadway intersection, signage, markings and striping.
FUNDING CATEGORY: CAT 5 CMAQ
VOC (Kg/Day): 0.044 CO (Kg/Day): 0.557
NOX (Kg/Day): 0.037 PM 10 (Kg/Day): 0.024
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019 EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$192,645
Right Of Way:	$0
Construction:	$1,297,000
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$1,489,645**

Cost of Approved Phases: **$1,489,645**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5	CMAQ		$1,191,716	$0	$0	$297,929	$0	$1,489,645
	Fund by Share		**$1,191,716**	**$0**	**$0**	**$297,929**	**$0**	**$1,489,645**

	2014	10/2013	Amend to deprogram CBI funds due to no CBI funding obligation authority and program with CMAQ. New project with New MTP/TIP (Horizon 2040 MTP/ Horizon 2013-2016 TIP)
		10/2013	New Project with New MTP/TIP (Horizon 2040 MTP/ Horizon 2013-2016 TIP)
		01/2014	01/2014 TPB Amend to deprogram 2015 CBI funds due to no funding obligation authority and program with CMAQ in 2014
	2019	08/2014	Amend To Deprog From FY 2014 in H2040 MTP & H13-16TIP and reprogram in FY 2019 In H2040 MTP (not ready to let in FY 2014)
02/2017	2019	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019 EXEMPT
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-534**	CS	C	El Paso	County EP	**$18,000,000**

TIP PROJECT NAME: **Pellicano Dr Widening/Build**

REVISION DATE: 07/2018
LIMITS FROM: Joe Battle (Loop 375)
MPO PROJECT ID: **P410X-15A**
LIMITS TO: Darrington (Berryville St.)
MTP REFERENCE: P410X-15A
TIP DESCRIPTION: Pellicano Dr. Widening/Build: Widening/Build from 2 to 6-Lanes Divided, with 5' bike lane and 5' multi-purpose path and landscaping
FUNDING CATEGORY: CAT 7 STP, CAT 5 CMAQ, CAT 10 CBI
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.
VOC (Kg/Day): 0.346 CO (Kg/Day): 12.132
NOX (Kg/Day): 1.08 PM 10 (Kg/Day): 0.746

*Project Sponsor paying for PE and/or ROW Costs, if any.

PROJECT HISTORY:
Amend to add $8,000,000 in CAT 10 CBI (please see amend history).

Total Project Cost Information:

Preliminary Engineering:	$2,700,000
Right Of Way:	$0
Construction:	$18,000,000
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$20,700,000**

Cost of Approved Phases: **$18,000,000**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	5	CMAQ	$1,424,000	$0	$0	$356,000	$0	$1,780,000
Cat	7	STP	$6,576,000	$0	$0	$1,644,000	$0	$8,220,000
Cat	10	CBI	$6,400,000	$0	$0	$1,600,000	$0	$8,000,000
		Fund by Share	**$14,400,000**	**$0**	**$0**	**$3,600,000**	**$0**	**$18,000,000**

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
07/2016	2019	06/2016	Amend to program amended H2040 MTP, H17-20 TIP, 17-20 STIP, FY 2019
02/2017	2019	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019 due to eSTIP upload error on doubling the funds to $34 million. NONEXEMPT
11/2017	2019	11/2017	Admin Amend to change project description to "Widening/Build from 2 lanes to 6-Lanes Divided, with 5' bike lane and 5' multi-purpose path and landscaping"
02/2018	2019	02/2018	Amend to add $8,000,000 Category 10 Coordinated Border Infrastructure (CBI) funds with already approved $8,220,000 of CAT 7 (STP/MM) and $1,780,000 of CAT 5 CMAQ for a total construction cost of $18,000,000 in FY 2019.
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-560**	CS	C,E	El Paso	EP County	**$2,465,500**

TIP PROJECT NAME: **Tornillo - SUP**

REVISION DATE: 07/2018
LIMITS FROM: On O.T. Smith RD/SH 20 (Alameda Ave)
MPO PROJECT ID: **E502X**
LIMITS TO: IH-10
MTP REFERENCE: E502X
TIP DESCRIPTION: Tornillo - SUP: CONSTRUCTION OF SHARED USE PEDESTRIAN AND BICYCLE FACILITY A LONG OT SMITH ROAD
FUNDING CATEGORY: CAT 9
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019. 2017 TASA state-selected; Commission approved 10/26/17 MO 115076.

Total Project Cost Information:

Preliminary Engineering:	$96,476
Right Of Way:	$0
Construction:	$2,336,865
Construction Engineering:	$32,159
Contingencies:	$25,523
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$2,491,023**

Cost of Approved Phases: **$2,465,500**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	9TAP	TASA (TXDOT)	$1,972,400	$300,148	$0	$192,952	$0	$2,465,500
		Fund by Share	**$1,972,400**	**$300,148**	**$0**	**$192,952**	**$0**	**$2,465,500**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
02/2018	2019	01/2018	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019. 2017 TASA state-selected; Commission approved 10/26/17 MO 115076.
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

C=Construction, E=Engineering, R=Right-Of-Way (ROW), T=Transfer, YOE=Year Of Expenditure, CSJ:Control Section Job

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0374-02-097**	US 62/180	C	El Paso	TXDOT	**$121,733,894**

TIP PROJECT NAME: **US 62/180 (Montana Ave.) Expressway & Frontage Roads, Phase I**
REVISION DATE: 07/2018
LIMITS FROM: On US 62/180 (Montana Ave.) Expressway & Frontage Roads, Phase I at Global Reach Dr.
MPO PROJECT ID: **F407A-CAP**
LIMITS TO: FM 659 (Zaragoza Rd.)
MTP REFERENCE: F407A-CAP
TIP DESCRIPTION: BuildWB3LN Frontage Road(FR)Global ReachDr(GR)toTierra EsteRd(TE). AncillaryWorkGR to TE to ConvertExisting3LN EB ML to 3LN EB FR.Construct6LN Exwy EB/WB MLsW/AuxiliaryLNs&GradeSeparationsAtIntersectionsLeeTrevinoDr to TE. Incidental work to Zaragoza Dr.
FUNDING CATEGORY: CAT 2M, CAT 4(3c), CAT 12
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

*Project Sponsor paying for PE and/or ROW Costs, if any.

PROJECT HISTORY:
Amend to program into amended H2040 MTP, H17-20 TIP, 17-20 STIP in FY 2019.

Total Project Cost Information:

Preliminary Engineering:	$6,366,239
Right Of Way:	$38,600,000
Construction:	$121,733,894
Construction Engineering:	$0
Contingencies:	$2,585,472
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$4,859,129
Total Project Cost:	**$174,144,734**

Cost of Approved Phases: **$121,733,894**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	2M	TMA	$12,669,827	$3,167,457	$0	$0	$0	$15,837,284
Cat	4	4(3c)	$52,717,288	$13,179,322	$0	$0	$0	$65,896,610
Cat	12	SP	$32,000,000	$8,000,000	$0	$0	$0	$40,000,000
	Fund by Share		**$97,387,115**	**$24,346,779**	**$0**	**$0**	**$0**	**$121,733,894**

05/2017	2019	04/2017	Amend to program into amended H2040 MTP, H17-20 TIP, 17-20 STIP in FY 2019. Former project P457X-CAP.
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-064**	CS	C	El Paso	UTEP	**$1,482,914**

TIP PROJECT NAME: **University Avenue Pedestrian and Bike Enhancement - Phase III**

REVISION DATE: 07/2018
MPO PROJECT ID: **E108X-3**
MTP REFERENCE: E108X-3
FUNDING CATEGORY: CAT 9, CAT 3

LIMITS FROM: Starting at a distance of 1,035 feet in a southwesterly direction on University AVE from the referenced City Monument at Kansas ST and University AVE

LIMITS TO: To a point southwesterly 450 feet long University AVE

TIP DESCRIPTION: University Avenue Pedestrian and Bike Enhancement - Phase III: Pedestrian and bike enhancements with reconstructed and widened sidewalks, bike lanes, lanscape parkways and street lanes.

REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

*Project Sponsor paying for PE and/or ROW Costs, if any.

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019.

Total Project Cost Information:

Preliminary Engineering:	$158,147
Right Of Way:	$0
Construction:	$1,190,007
Construction Engineering:	$65,000
Contingencies:	$69,761
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$1,482,915**

Cost of Approved Phases: **$1,190,007**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	9TAP	TASA	$530,645	$0	$0	$132,661	$0	$663,306
Cat	3LC	Local Contribution	$0	$0	$0	$0	$819,608	$819,608
	Fund by Share		**$530,645**	**$0**	**$0**	**$132,661**	**$819,608**	**$1,482,914**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
02/2018	2019	01/2018	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2018.
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-543**	CS	C,E	El Paso	COEP	**$1,800,412**

TIP PROJECT NAME: **Bicycle Connectivity Infrastructure Improvements Phase II**

LIMITS FROM: Citywide (Please see TIP history for complete street names)
LIMITS TO: Citywide (Please see TIP history for complete street names)
TIP DESCRIPTION: Bicycle Connectivity Infrastructure Improvements Phase II: Construct bicycle facilities citywide to include: buffered bike lanes, conventional bike lanes, bicycle boulevards, shared lane markings, and protected bicycle lanes.
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

REVISION DATE: 07/2018
MPO PROJECT ID: **M087B**
MTP REFERENCE: M087B
FUNDING CATEGORY: CAT 5 CMAQ
VOC (Kg/Day): 0.252 CO (Kg/Day): 7.663
NOX (Kg/Day): 0.649 PM 10 (Kg/Day): 0.211

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$233,592
Right Of Way:	$0
Construction:	$1,566,820
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$1,800,412**

Cost of Approved Phases: **$1,800,412**

Authorized Funding by Category/Share

		Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5 CMAQ		$1,440,330	$0	$0	$360,082	$0	$1,800,412
Fund by Share		**$1,440,330**	**$0**	**$0**	**$360,082**	**$0**	**$1,800,412**

02/2017	2020	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020. From: Lomaland from Trawood; Pellicano from George Dieter; Trawood from Springwood; Tierra Este from RC Poe; Pendale from Yermoland To: Lomaland to Pellicano; Pellicano to Lomaland; Trawood to Yarbrough; Tierra Este to Pebble Hills; Pendale to North Loop

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0167-01-115**	US 54	C,E	El Paso	TXDOT	**$730,000**

TIP PROJECT NAME: **Bluetooth Detectors and Radar Vehicle Sensing Devices (RVSDs) on US 54**

LIMITS FROM: Loop 375 (Transmountain)
LIMITS TO: FM 2529 (McCombs)
TIP DESCRIPTION: Bluetooth Detectors and Radar Vehicle Sensing Devices (RVSDs) on US 54: Installation of Bluetooth Detectors and Radar Vehicle Sensing Devices (RVSDs) along US 54 for data gathering to display travel time messages on US 54 dynamic message signs (DMS).
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

REVISION DATE: 07/2018
MPO PROJECT ID: **F201X**
MTP REFERENCE: F201X
FUNDING CATEGORY: CAT 5 CMAQ
VOC (Kg/Day): 0.081 CO (Kg/Day): 2.434
NOX (Kg/Day): 0.398 PM 10 (Kg/Day): 0.4

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$36,532
Right Of Way:	$0
Construction:	$693,468
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$730,000**

Cost of Approved Phases: **$730,000**

Authorized Funding by Category/Share

		Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5 CMAQ		$584,000	$146,000	$0	$0	$0	$730,000
Fund by Share		**$584,000**	**$146,000**	**$0**	**$0**	**$0**	**$730,000**

11/2016	2020	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

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C=Construction, E=Engineering, R=Right-Of-Way (ROW), T=Transfer, YOE=Year Of Expenditure, CSJ:Control Section Job

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-562**	CS	C,E	El Paso	COEP	**$12,016,000**

TIP PROJECT NAME: **Central Business District Phase IV (CBD 4)**
REVISION DATE: 07/2018
LIMITS FROM: Central Business District
MPO PROJECT ID: **R307D**
LIMITS TO:
MTP REFERENCE: R307D
TIP DESCRIPTION: Central Business District Phase IV (CBD 4): Reconstruction of Downtown Streets: Oregon, Mesa, Campbell & Kansas from Paisano to Border Hwy and Sixth From Campbell to El Paso St.; Conversion of Kansas and Campbell from One-Way to Two-Way
FUNDING CATEGORY: CAT 7 STP MM
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.
Cost of Approved Phases: PE $1802400 plus Const $10213600 =$12016000

PROJECT HISTORY:
Administratively amend H2040 MTP, H17-20 TIP, 17-20 STIP to change CSJ from 0924-06-190 to 0924-06-562. EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$3,680,785
Right Of Way:	$0
Construction:	$10,213,600
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$13,894,385**

Cost of Approved Phases: **$12,016,000**

Authorized Funding by Category/Share

		Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 7	STP MM	$9,612,800	$0	$0	$2,403,200	$0	$12,016,000
	Fund by Share	**$9,612,800**	**$0**	**$0**	**$2,403,200**	**$0**	**$12,016,000**

			Amend to deprog from FY 2014 Cat7 in H13-16 TIP & prog in FY 2018 w/ Cat7 in H15-18 TIP (simultaneous submittal); includes PE part 2 & construction phase 1 (for PE part 1 see R307D-PE in FY 2014)
		10/2005	When Developing The 2006-2010 Amended Tip Terry Q Noted That Project Needs To Move (non Modeled) In The 2005 Net To Fy 2009 Therefore The Project Will Need To Move To The 2015 Network So An Amendment To 2030 Was Necessary.
	2007	08/2007	
	2010	03/2009	No Exact Date, But Project Was Amended Into Fy 2010 In 2008-2011 Stip/2008-2013 Tip (transborder Mtp)
	2012	05/2012	Moved To Fy 2012 In Tb Tip 2008-2013
	2014	08/2012	Moved W/ Develop Of Mission 2035 Mtp, 2011-2014 Tip Into Fy 2014. Cmaq=$1,532,398 And Stp-mm=$9,983,602
	2014	11/2012	Stayed In Fy2014 With Develop Of M13-16 Tip
	2014	10/2013	Increased Cost By $500,000 From M2013-2016 To H2013-2016 Tip In Same Fy 2014, And Removed Cmaq Funding, Only Using Cat7 Stp
	2018	03/2014	Amend To Deprog From Fy 2014 Cat7 In H13-16 Tip & Prog In Fy 2018 W/ Cat7 In H15-18 Tip (simultaneous Submittal); Includes Pe Part 2 & Construction Phase 1 (for Pe Part 1 See R307d-pe In Fy 2014); Due To Coep Not Ready To Let In Fy 2014; During Fy 2014-2016 Tip Clean Up And Fy 2017-2018 Project Call
02/2016	2018	02/2016	Amend to deprogram from FY 2018 in the H2040 MTP, H15-18 TIP, 2015-2018 STIP
05/2016	2014	03/2016	Increased cost by $500K; Removed CMAQ funds, using STP funds only w/ new MTP/TIP (Horizon 2040 MTP/ Horizon 2013-2016 TIP)
07/2016	2020	06/2016	Amend to program into H2040 MTP, H17-20 TIP, 17-20 STIP in FY 2020. EXEMPT
2/2018	2020	02/2018	Administratively amend H2040 MTP, H17-20 TIP, 17-20 STIP to change CSJ from 0924-06-190 to 0924-06-562. EXEMPT
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020. EXEMPT

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DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-549**	CS	C,E	El Paso	COEP	**$972,830**

TIP PROJECT NAME: **Chamizal Neighborhood Pedestrian Enhancements Phase II**
REVISION DATE: 07/2018
LIMITS FROM: Various locations (Please see TIP history for complete street names)
MPO PROJECT ID: **E302X-2**
LIMITS TO: Various locations (Please see TIP history for complete street names)
MTP REFERENCE: E302X-2
TIP DESCRIPTION: Chamizal Neighborhood Pedestrian Enhancements Phase II: Construction of sidewalks, ADA pedestrian ramps and crosswalks. The purpose of the project is to provide connectivity to fix route and rapid transit.
FUNDING CATEGORY: CAT 9 TAP, CAT 3 LC
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

PROJECT HISTORY:
Amend to program H2040 MTP, H17-20 TIP, 17-20 STIP, in FY 2020 EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$256,723
Right Of Way:	$0
Construction:	$716,107
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$972,830**

Cost of Approved Phases: **$972,830**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	9TAP	TAP	$658,818	$0	$0	$164,705	$0	$823,523
Cat	3LC	Local Contribution	$0	$0	$0	$0	$149,307	$149,307
		Fund by Share	**$658,818**	**$0**	**$0**	**$164,705**	**$149,307**	**$972,830**

02/2017	2020	05/2016	Amend to program H2040 MTP, H17-20 TIP, 17-20 STIP, in FY 2020 EXEMPT
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020. From: N. Eucalyptus St. from Magoffin Ave.; Palm St. from Texas Ave.; Myrtle Ave. from Willow St.; Poplar St. from Myrtle Ave.; Pera Ave. from S. Raynor St.; S. Raynor St. from Pera Ave.; Rivera Ave. from S. San Marcial St.; S. Estrella St. from Pera Ave. To: N. Eucalyptus St. to Olive Ave.; Palm St. to S. Piedras St.; Myrtle Ave. to Poplar St.; Poplar St. to Basset Ave.; Pera Ave. to S. San Marcial St.; S. Raynor St. to Rivera Ave.; Rivera Ave. to S. Estrella St.; S. Estrella St. to Rivera Ave.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0002-12-026**	US 62/180	C,E	El Paso	TXDOT	**$595,056**

TIP PROJECT NAME: **Intersection Operational Improvements at Montana Ave./Paisano Dr.**
REVISION DATE: 07/2018
LIMITS FROM: At Montana Ave
MPO PROJECT ID: **P334X**
LIMITS TO:
MTP REFERENCE: P334X
TIP DESCRIPTION: Intersection Operational Improvements at Montana Ave./Paisano Dr.
FUNDING CATEGORY: CAT 5 CMAQ
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.
VOC (Kg/Day): 1.989 CO (Kg/Day): 22.002
NOX (Kg/Day): 5.322 PM 10 (Kg/Day): 1.552

PROJECT HISTORY:
Admin amend H2040 MTP, H17-20 TIP, 17-20 STIP to change the CSJ from 0002-12-029 to CSJ 0002-12-026.

Total Project Cost Information:

Preliminary Engineering:	$18,451
Right Of Way:	$0
Construction:	$576,605
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$595,056**

Cost of Approved Phases: **$595,056**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	5	CMAQ	$476,045	$119,011	$0	$0	$0	$595,056
		Fund by Share	**$476,045**	**$119,011**	**$0**	**$0**	**$0**	**$595,056**

02/2017	2020	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 NONEXEMPT
07/2017	2020	07/2017	Admin amend H2040 MTP, H17-20 TIP, 17-20 STIP to change the CSJ from 037402109 to CSJ 000212029 and change the From limit from “At Paisano Drive” to “At Montana Ave”.
11/2017	2020	11/2017	Admin amend H2040 MTP, H17-20 TIP, 17-20 STIP to change the CSJ from 0002-12-029 to CSJ 0002-12-026.
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

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DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**2552-03-049**	LP 375	C	El Paso	TXDOT	**$34,500,000**

TIP PROJECT NAME: **Loop 375 (Americas/Joe Battle) Widening**
REVISION DATE: 07/2018
LIMITS FROM: Bob Hope Dr.
MPO PROJECT ID: **F056X-CAP**
LIMITS TO: Zaragoza Rd.
MTP REFERENCE: F056X-CAP
TIP DESCRIPTION: Loop 375 (Americas/Joe Battle) Widening: Widen from 4 To 6 lanes divided from Bob Hope to Zaragoza Rd.
FUNDING CATEGORY: CAT 2M, CAT 4 (3c)
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

PROJECT HISTORY:
Amend to program into amended H2040 MTP, H17-20 TIP, 17-20 STIP in FY 2018.

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$34,500,000
Construction Engineering:	$1,814,892
Contingencies:	$728,152
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$1,368,487
Total Project Cost:	**$38,411,531**

Cost of Approved Phases: **$34,500,000**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 2M	TMA		$17,780,304	$4,445,076	$0	$0	$0	$22,225,380
Cat 4	4(3c)		$9,819,696	$2,454,924	$0	$0	$0	$12,274,620
	Fund by Share		**$27,600,000**	**$6,900,000**	**$0**	**$0**	**$0**	**$34,500,000**

	2020		
05/2017	2018	04/2017	Amend to program into amendedH2040 MTP, H17-20 TIP, 17-20 STIP in FY 2018. Former projects F403X-CAP and F040X-MOD.
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**1046-03-005**	SS 601	C	El Paso	TXDOT	**$23,931,284**

TIP PROJECT NAME: **Spur 601 at LP 375 Direct Connectors NB/WB and EB/SB**
REVISION DATE: 07/2018
LIMITS FROM: SPUR 601 LIBERTY EXPY AT LOOP 375 (Purple Heart)
MPO PROJECT ID: **P448X-CAP**
LIMITS TO:
MTP REFERENCE: P448X-CAP
TIP DESCRIPTION: Spur 601 at LP 375 Direct Connectors NB/WB and EB/SB: Construct Northbound to Westbound and Eastbound to Southbound Direct connectors
FUNDING CATEGORY: CAT 2, CAT 7, CAT 11
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

PROJECT HISTORY: Amend to revise the project name and project description to include EB/SB.
Reduce CAT 11 to from $5,820,000 to $3,400,000.

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$23,931,283
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$23,931,283**

Cost of Approved Phases: **$23,931,283**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 2M	TMA		$10,117,827	$2,529,457	$0	$0	$0	$12,647,284
Cat 7	STP-MM		$6,307,200	$1,576,800	$0	$0	$0	$7,884,000
Cat 11	District Discretionary		$2,720,000	$680,000	$0	$0	$0	$3,400,000
	Fund by Share		**$19,145,027**	**$4,786,257**	**$0**	**$0**	**$0**	**$23,931,284**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
05/2018	2020		Amend to program into amended H2040 MTP, H17-20 TIP, 17-20 STIP in FY 2018.
	2015	10/2013	New Project With New Mtp/tip (horizon 2040 Mtp/ Horizon 2013-2016 Tip)
	2019	03/2014	Amend To Deprog From Fy 2015 And Adjust Cost Est From $15m To $16.5m; 2014 Utp Funds Moved To Fy 2019
07/2016	2019	06/2016	Amend to program H2040 MTP, H17-20 TIP, 17-20 STIP, in FY 2019
02/2017	2020	12/2016	Amend to move from FY 2019 to FY 2020 and adjust cost to add $7,884,000 of CAT 7 STP-MM, reduce CAT 2 of $16,550,000 to $12,647,284 and add $5,820,000 of CAT 11 in the H2040 MTP, H17-20 TIP, 17-20 STIP, in FY 2020 NONEXEMPT
02/2018	2020	11/2017	Amend to revise the project name and project description to include EB/SB. Reduce CAT 11 to from $5,820,000 to $3,400,000.
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-544**	US 62/180	C,E	El Paso	COEP	**$3,241,465**

TIP PROJECT NAME: **MONTANA RTS PEDESTRIAN ENHANCEMENTS**

LIMITS FROM: 5 POINTS TRANSFER CENTER on Montana and Piedras

LIMITS TO: Far East Transfer Center at Edgemere and RC POE

TIP DESCRIPTION: MONTANA RTS PEDESTRIAN ENHANCEMENTS: Design and construction of pedestrian enhancements along the Montana RTS route to include installation of sidewalks and landscaping.

REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

REVISION DATE: 07/2018
MPO PROJECT ID: **T069X**
MTP REFERENCE: T069X
FUNDING CATEGORY: CAT 5 CMAQ
VOC (Kg/Day): 0.368 CO (Kg/Day): 11.177
NOX (Kg/Day): 0.946 PM 10 (Kg/Day): 0.307

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020
EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$427,693
Right Of Way:	$0
Construction:	$2,813,772
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$3,241,465**

Cost of Approved Phases: **$3,241,465**

Authorized Funding by Category/Share

	Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5 CMAQ	$2,593,172	$0	$0	$648,293	$0	$3,241,465
Fund by Share	**$2,593,172**	**$0**	**$0**	**$648,293**	**$0**	**$3,241,465**

	2015	07/2012	07/2012 New In Mission 2013-2016 Tip
	2015	10/2013	Stayed In Fy 2015 For H2013-2016; ……pending Coep Rts' Letting Schedule……
	2019	01/2014	Letter Received From Coep For Montana Rts Change In Letting 0374-02-089 (see Attachments)
	2019	03/2014	Amend To Deprog From Fy 2015 Due To Montana Rts Construction Letting Schedule. Competed For Fy 2018 Funds However Not Selected And Moved Out Of Tip Years (15-18).
02/2017	2020	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

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C=Construction, E=Engineering, R=Right-Of-Way (ROW), T=Transfer, YOE=Year Of Expenditure, CSJ:Control Section Job

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-577**	CS	C,E	El Paso	COEP	**$6,830,453**

TIP PROJECT NAME: **Bicycle Infrastructure Citywide**
LIMITS FROM: Citywide (Please see TIP History for complete street names)
LIMITS TO: Citywide (Please see TIP History for complete street names)
TIP DESCRIPTION: Bicycle Infrastructure Citywide: Construct bicycle facilities citywide to include: buffered bike lanes, conventional bike lanes, bicycle boulevards, shared lane markings, and protected bicycle lanes.
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

REVISION DATE: 07/2018
MPO PROJECT ID: **M090X**
MTP REFERENCE: M090X
FUNDING CATEGORY: CAT 5 CMAQ
VOC (Kg/Day): 6.516 CO (Kg/Day): 231.129
NOX (Kg/Day): 13.351 PM 10 (Kg/Day): 9.141

Total Project Cost Information:	
Preliminary Engineering:	$415,286
Right Of Way:	$0
Construction:	$6,415,167
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$6,830,453**

Cost of Approved Phases: **$6,830,453**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	5	CMAQ	$5,464,363	$0	$0	$1,366,090	$0	$6,830,453
	Fund by Share		**$5,464,363**	**$0**	**$0**	**$1,366,090**	**$0**	**$6,830,453**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021. From: High Ridge from Resler; Escondido from Resler; Ojo de Agua from Westwind; Via Descanso from Ojo de Agua; Via Serena from Via Descanso; Marcus Uribe from Martin Luther King Jr; Sean Haggerty from US 54; Will Ruth from Dyer; Diana from US 54; Stahala from Diana; Hondo Pass from US 54; Magentic from Hondo Pass; Stanton from Cliff; Robinson from Oregon; Cotton from San Antonio; Sixth from Cotton; Val Verde from Paisano; Fonseca from Loop 375; Clark from Delta; Montwood from Viscount; Montwood from Zanzibar; Lomaland from Montwood; Phoenix from Hawkins; Alameda from Loop 375; Pellicano from George Dieter; Peter Cooper from Pellicano; George Dieter from Vista Del Sol; Bob Mitchell from George Dieter; Saul Kleinfeld from Turner; Nolan Richardson from Turner; Pebble Hills from Yarbrough; Lee Trevino from Edgemere To:High Ridge to Franklin Hills; Escondido to Westwind; Ojo de Agua to Via Descanso; Via Descanso to Via Serena; Via Serena to High Ridge; Marcus Uribe to Benny Emler; Sean Haggerty to Rushing; Will Ruth to McCombs; Diana to Railroad; Stahala to Hondo Pass; Hondo Pass to Magnetic; Magnetic to Atlas; Stanton to Brentwood; Robinson to Piedmont; Cotton to Sixth; Sixth to Campbell; Fonseca to Delta; Clark to Trowbridge; Montwood to McRae; Montwood to Lee Trevino; Lomaland to Trawood; Phoenix to Giles; Pellicano to Loop 375; Peter Cooper to Ben Proctor; George Dieter to Edgemere; Bob Mitchell to Saul Kleinfeld; Saul Kleinfeld to Bob Mitchell; Nolan Richardson to Pebble Hills; Pebble Hills to Lisa Sherr; Lee Trevino to Trawood

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

TX DIST. 24	EP	**2121-01-094**	IH 10	C	El Paso	TXDOT	**$60,418,920**

TIP PROJECT NAME: **IH 10 WIDENING**
LIMITS FROM: 0.25 MI EAST OF FM 1905 (TX/NM STATELINE)
LIMITS TO: SH 20 (MESA ST)
TIP DESCRIPTION: IH 10 WIDENING: WIDEN FROM 4 TO 6 LANES DIVIDED
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

REVISION DATE: 07/2018
MPO PROJECT ID: **I405X-CAP**
MTP REFERENCE: I405X-CAP
FUNDING CATEGORY: CAT 2 TMA, CAT 7 STP, CAT 11

*Project Sponsor paying for PE and/or ROW Costs, if any.

Total Project Cost Information:	
Preliminary Engineering:	$3,591,774
Right Of Way:	$0
Construction:	$60,418,920
Construction Engineering:	$3,151,965
Contingencies:	$131,943
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$3,452,501
Total Project Cost:	**$70,747,103**

Cost of Approved Phases: **$60,418,920**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	2M	TMA	$29,584,000	$7,396,000	$0	$0	$0	$36,980,000
Cat	7	STP	$16,120,000	$4,030,000	$0	$0	$0	$20,150,000
Cat	11	District Discretionary	$2,631,136	$657,784	$0	$0	$0	$3,288,920
	Fund by Share		**$48,335,136**	**$12,083,784**	**$0**	**$0**	**$0**	**$60,418,920**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-570**	CS	C,E	El Paso	COEP	**$4,272,273**

TIP PROJECT NAME: **Downtown Bicycle Improvements Phase I**

LIMITS FROM: Various (Please see TIP history for complete street names)
LIMITS TO: Various (Please see TIP history for complete street names)
TIP DESCRIPTION: Downtown Bicycle Improvements Phase I: Construct bike facilities downtown to include: buffered/conventional/protected bike lanes, bike blvds, shared lane markings. Project will include associated signage, wayfinding, striping, intersection treatments.
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022

REVISION DATE: 07/2018
MPO PROJECT ID: **M089A**
MTP REFERENCE: M089A
FUNDING CATEGORY: CAT 5 CMAQ
VOC (Kg/Day): 0.115 CO (Kg/Day): 3.252
NOX (Kg/Day): 0.287 PM 10 (Kg/Day): 0.083

Total Project Cost Information:

Preliminary Engineering:	$199,563
Right Of Way:	$0
Construction:	$4,072,710
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$4,272,273**

Cost of Approved Phases: **$4,272,273**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5	CMAQ		$3,417,819	$0	$0	$854,454	$0	$4,272,273
	Fund by Share		**$3,417,819**	**$0**	**$0**	**$854,454**	**$0**	**$4,272,273**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
07/2018	2022	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022. From: El Paso from Franklin; El Paso from Sheldon; Main from Santa Fe; Main from Oregon; Mills from Sheldon; Missouri from Santa Fe; Myrtle from Stanton; San Antonio from Anthony; Sheldon from Santa Fe; Virginia to Mills; Magoffin from San Antonio To: Campbell to Paisano; El Paso to Main; El Paso to Paisano; Main to El Paso; Main to Campbell; Mills to Virginia; Missouri to Campbell; Myrtle to Campbell; San Antonio to Virginia; Sheldon to El Paso; Virginia to San Antonio; Magoffin to Virginia

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**2121-02-160**	IH 10	C	El Paso	TXDOT	**$60,540,000**

TIP PROJECT NAME: **IH 10 WIDENING**

LIMITS FROM: SH 20 (MESA ST)
LIMITS TO: IH 10/US 85/SUNLAND PARK INTERCHANGE
TIP DESCRIPTION: IH 10 WIDENING: WIDEN FROM 6 TO 8 LANES DIVIDED
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

REVISION DATE: 07/2018
MPO PROJECT ID: **I406X-CAP**
MTP REFERENCE: I406X-CAP
FUNDING CATEGORY: CAT 2 TMA, CAT 7 STP, CAT 11

*Project Sponsor paying for PE and/or ROW Costs, if any.

Total Project Cost Information:

Preliminary Engineering:	$3,148,554
Right Of Way:	$0
Construction:	$60,540,000
Construction Engineering:	$3,128,710
Contingencies:	$130,969
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$3,427,029
Total Project Cost:	**$70,375,262**

Cost of Approved Phases: **$60,540,000**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 2M	TMA		$29,248,000	$7,312,000	$0	$0	$0	$36,560,000
Cat 7	STP		$16,336,000	$4,084,000	$0	$0	$0	$20,420,000
Cat 11	District Discretionary		$2,848,000	$712,000	$0	$0	$0	$3,560,000
	Fund by Share		**$48,432,000**	**$12,108,000**	**$0**	**$0**	**$0**	**$60,540,000**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
07/2018	2022	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

C=Construction, E=Engineering, R=Right-Of-Way (ROW), T=Transfer, YOE=Year Of Expenditure, CSJ:Control Section Job

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-571**	CS	C,E	El Paso	COEP	**$597,282**

TIP PROJECT NAME: **Stanton Two-Way Cycle Track Roadway Improvements**
REVISION DATE: 07/2018
LIMITS FROM: San Antonio Avenue
MPO PROJECT ID: **E303X**
LIMITS TO: Rio Grande Avenue
MTP REFERENCE: E303X
TIP DESCRIPTION: Stanton Two-Way Cycle Track Roadway Improvements: Project includes installation of two-way cycle track facilities.
FUNDING CATEGORY: CAT 5 CMAQ
VOC (Kg/Day): 0.023 CO (Kg/Day): 0.804
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.
NOX (Kg/Day): 0.045 PM 10 (Kg/Day): 0.034

Total Project Cost Information:

Preliminary Engineering:	$27,900
Right Of Way:	$0
Construction:	$569,382
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$597,282**

Cost of Approved Phases: **$597,282**

Authorized Funding by Category/Share

		Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5 CMAQ		$477,826	$0	$0	$119,456	$0	$597,282
Fund by Share		**$477,826**	**$0**	**$0**	**$119,456**	**$0**	**$597,282**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
07/2018	2022	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-566**	N/A	E	El Paso	COEP	**$5,360,329**

TIP PROJECT NAME: **Traffic Management Center Upgrade Phase 1**
REVISION DATE: 07/2018
LIMITS FROM: City of El Paso city limits.
MPO PROJECT ID: **S301D**
LIMITS TO: City of El Paso city limits.
MTP REFERENCE: S301D
TIP DESCRIPTION: Traffic Management Center Upgrade Phase 1: Project includes the upgrade of the COEP TMC and Traffic Signal controller equipment city wide. 1st phase is the design phase. Phases 2-5 are the implement and construction of the design.
FUNDING CATEGORY: CAT 5 CMAQ
VOC (Kg/Day): 3.5 CO (Kg/Day): 68.03
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.
NOX (Kg/Day): 8.91 PM 10 (Kg/Day): 10.15

Total Project Cost Information:

Preliminary Engineering:	$5,360,329
Right Of Way:	$0
Construction:	$18,845,200
Construction Engineering:	$2,129,397
Contingencies:	$0
Indirects:	$319,404
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$26,654,330**

Cost of Approved Phases: **$5,360,329**

Authorized Funding by Category/Share

		Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5 CMAQ		$4,288,263	$0	$0	$1,072,066	$0	$5,360,329
Fund by Share		**$4,288,263**	**$0**	**$0**	**$1,072,066**	**$0**	**$5,360,329**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
07/2018	2022	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

C=Construction, E=Engineering, R=Right-Of-Way (ROW), T=Transfer, YOE=Year Of Expenditure, CSJ:Control Section Job

[2]FHWA to FTA Funds Transfer Projects

[2] Congestion Mitigation and Air Quality (CMAQ) Analyses can be found in Appendix A provided upon request and/or attached into the electronic version of this document.

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-550**	N/A	T	El Paso	Sun Metro	**$1,000,000**

TIP PROJECT NAME: **Alameda RTS Operating Assistance YR1 - 2019**
REVISION DATE: 07/2018
LIMITS FROM: Downtown Terminal - Santa Fe and Fourth
MPO PROJECT ID: **T064X**
LIMITS TO: Mission Valley Terminal - Alameda and Zaragoza
MTP REFERENCE: T064X
TIP DESCRIPTION: Alameda RTS Operating Assistance YR1 - 2019: 1st Year of Alameda BRT-RTS operations.
FUNDING CATEGORY: CAT 5 CMAQ
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.
VOC (Kg/Day): 8.076 CO (Kg/Day): 130.357
NOX (Kg/Day): 10.944 PM 10 (Kg/Day): 2.722

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019 EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$1,000,000
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$1,000,000**

Cost of Approved Phases: **$1,000,000**

Authorized Funding by Category/Share

		Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5	CMAQ	$800,000	$0	$0	$200,000	$0	$1,000,000
	Fund by Share	**$800,000**	**$0**	**$0**	**$200,000**	**$0**	**$1,000,000**

02/2017	2019	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019 EXEMPT
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-537**	N/A	T	El Paso	Sun Metro	**$1,000,000**

TIP PROJECT NAME: **Dyer RTS Operating Assistance YR1 - 2019**
REVISION DATE: 07/2018
LIMITS FROM: Downtown Terminal - Santa Fe and Fourth
MPO PROJECT ID: **T065X**
LIMITS TO: Northgate Terminal - Dyer at Wren
MTP REFERENCE: T065X
TIP DESCRIPTION: Dyer RTS Operating Assistance YR1 - 2019: 1st Year of Dyer BRT-RTS operations.
FUNDING CATEGORY: CAT 5 CMAQ
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.
VOC (Kg/Day): 6.931 CO (Kg/Day): 109.653
NOX (Kg/Day): 9.118 PM 10 (Kg/Day): 2.166

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019
EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$1,000,000
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$1,000,000**

Cost of Approved Phases: **$1,000,000**

Authorized Funding by Category/Share

		Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5	CMAQ	$800,000	$0	$0	$200,000	$0	$1,000,000
	Fund by Share	**$800,000**	**$0**	**$0**	**$200,000**	**$0**	**$1,000,000**

02/2017	2019	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019 EXEMPT
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-552**	N/A	T	El Paso	Sun Metro	**$1,000,000**

TIP PROJECT NAME: **El Paso Streetcar System 1st Year Operating Assistance**

LIMITS FROM: Father Rahm
LIMITS TO: Glory Road
TIP DESCRIPTION: El Paso Streetcar System 1st Year Operating Assistance: Operating Assistance for first year of new transit service intended to reduce congestion and CO emissions.
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

REVISION DATE: 07/2018
MPO PROJECT ID: **T108X-1**
MTP REFERENCE: T108X-1
FUNDING CATEGORY: CAT 5 CMAQ
VOC (Kg/Day): 0.792 CO (Kg/Day): 12.339
NOX (Kg/Day): 0.977 PM 10 (Kg/Day): 0.141

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019. EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$1,000,000
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$1,000,000**

Cost of Approved Phases: **$1,000,000**

Authorized Funding by Category/Share

		Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5	CMAQ	$800,000	$0	$0	$200,000	$0	$1,000,000
Fund by Share		**$800,000**	**$0**	**$0**	**$200,000**	**$0**	**$1,000,000**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
11/2016	2019	11/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019. EXEMPT
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

TX DIST. 24	EP	**0924-06-538**	N/A	T	El Paso	Sun Metro	**$1,800,000**

TIP PROJECT NAME: **Procurement of 3 Buses**

LIMITS FROM: Santa Fe Downtown terminal (2 buses)
MCA-TTU-UMC areas (1 bus)
LIMITS TO: Sunland Par-Shadow Mountain (2 buses)
Flower Streets (1 bus)
TIP DESCRIPTION: Procurement of 3 Buses: Sun Metro seeks to procure three buses in anticipation of increased frequency and ridership demand for services around the Montecillo Development and the MCA-TTU-UMC areas.
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

REVISION DATE: 07/2018
MPO PROJECT ID: **BP006**
MTP REFERENCE: BP006
FUNDING CATEGORY: CAT 5 CMAQ
VOC (Kg/Day): 1.561 CO (Kg/Day): 38.354
NOX (Kg/Day): 0.137 PM 10 (Kg/Day): 0.348

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019.

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$1,800,000
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$1,800,000**

Cost of Approved Phases: **$1,800,000**

Authorized Funding by Category/Share

		Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5	CMAQ	$1,440,000	$0	$0	$360,000	$0	$1,800,000
Fund by Share		**$1,440,000**	**$0**	**$0**	**$360,000**	**$0**	**$1,800,000**

02/2017	2019	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019.
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-551**	N/A	T	El Paso	Sun Metro	**$1,000,000**

TIP PROJECT NAME: **Alameda RTS Operating Assistance YR2 - 2020**
REVISION DATE: 07/2018
LIMITS FROM: Downtown Terminal - Santa Fe and Fourth
MPO PROJECT ID: **T091X-2**
LIMITS TO: Mission Valley Terminal - Alameda and Zaragoza
MTP REFERENCE: T091X-2
TIP DESCRIPTION: Alameda RTS Operating Assistance YR2 - 2020: 2nd Year of Alameda BRT-RTS operations.
FUNDING CATEGORY: CAT 5 CMAQ
VOC (Kg/Day): 4.125 CO (Kg/Day): 86.446
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.
NOX (Kg/Day): 6.936 PM 10 (Kg/Day): 1.594

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$1,000,000
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$1,000,000**

Cost of Approved Phases: **$1,000,000**

Authorized Funding by Category/Share

		Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5	CMAQ	$800,000	$0	$0	$200,000	$0	$1,000,000
	Fund by Share	**$800,000**	**$0**	**$0**	**$200,000**	**$0**	**$1,000,000**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
02/2017	2020	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

TX DIST. 24	EP	**0924-06-540**	N/A	T	El Paso	Sun Metro	**$1,000,000**

TIP PROJECT NAME: **Dyer RTS Operating Assistance YR2 - 2020**
REVISION DATE: 07/2018
LIMITS FROM: Downtown Terminal - Santa Fe and Fourth
MPO PROJECT ID: **T065X-2**
LIMITS TO: Northgate Terminal - Dyer at Wren
MTP REFERENCE: T065X-2
TIP DESCRIPTION: Dyer RTS Operating Assistance YR2 - 2020: 2nd Year of Dyer BRT-RTS operations.
FUNDING CATEGORY: CAT 5 CMAQ
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.
VOC (Kg/Day): 3.626 CO (Kg/Day): 72.787
NOX (Kg/Day): 5.788 PM 10 (Kg/Day): 1.555

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$1,000,000
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$1,000,000**

Cost of Approved Phases: **$1,000,000**

Authorized Funding by Category/Share

		Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5	CMAQ	$800,000	$0	$0	$200,000	$0	$1,000,000
	Fund by Share	**$800,000**	**$0**	**$0**	**$200,000**	**$0**	**$1,000,000**

02/2017	2020	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-553**	N/A	T	El Paso	Sun Metro	**$1,000,000**

TIP PROJECT NAME: **El Paso Streetcar System 2nd Year Operating Assistance**
REVISION DATE: 07/2018
LIMITS FROM: Father Rahm
MPO PROJECT ID: **T108X-2**
LIMITS TO: Glory Road
MTP REFERENCE: T108X-2
TIP DESCRIPTION: El Paso Streetcar System 2nd Year Operating Assistance: Operating Assistance for 2nd year of new transit service intended to reduce congestion and CO emissions.
FUNDING CATEGORY: CAT 5 CMAQ
VOC (Kg/Day): 0.531 CO (Kg/Day): 8.362
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.
NOX (Kg/Day): 0.638 PM 10 (Kg/Day): 0.101

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$1,000,000
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$1,000,000**

Cost of Approved Phases: **$1,000,000**

Authorized Funding by Category/Share

		Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5	CMAQ	$800,000	$0	$0	$200,000	$0	$1,000,000
	Fund by Share	**$800,000**	**$0**	**$0**	**$200,000**	**$0**	**$1,000,000**

02/2017	2020	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-541**	N/A	T	El Paso	Sun Metro	**$1,300,000**

TIP PROJECT NAME: **Montana RTS 1st year service operating assistance**
REVISION DATE: 07/2018
LIMITS FROM: Five Points Terminal - 2830 Montana
MPO PROJECT ID: **T093X**
LIMITS TO: Far East Terminal - R.C. Poe - Edgemere
MTP REFERENCE: T093X
TIP DESCRIPTION: Montana RTS 1st year service operating assistance: 1st year of Montana BRT-RTS operations.
FUNDING CATEGORY: CAT 5 CMAQ
VOC (Kg/Day): 5.553 CO (Kg/Day): 100.325
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.
NOX (Kg/Day): 2.929 PM 10 (Kg/Day): 1.629

PROJECT HISTORY:
Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$1,300,000
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$1,300,000**

Cost of Approved Phases: **$1,300,000**

Authorized Funding by Category/Share

		Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5	CMAQ	$1,040,000	$0	$0	$260,000	$0	$1,300,000
	Fund by Share	**$1,040,000**	**$0**	**$0**	**$260,000**	**$0**	**$1,300,000**

02/2017	2020	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-572**	N/A	T	El Paso	Sun Metro	**$2,288,542**

TIP PROJECT NAME: **Alameda RTS 3rd year Operating Assistance**
REVISION DATE: 07/2018
LIMITS FROM: Downtown terminal - Santa Fe
MPO PROJECT ID: **T096X**
LIMITS TO: Mission Valley Terminal - Alameda @ Zaragoza
MTP REFERENCE: T096X
TIP DESCRIPTION: Alameda RTS 3rd year Operating Assistance: 3rd year of Alameda RTS operations
FUNDING CATEGORY: CAT 5 CMAQ, CAT 3 LC
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.
VOC (Kg/Day): 3.842
CO (Kg/Day): 81.523
NOX (Kg/Day): 6.188
PM 10 (Kg/Day): 1.948

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$2,288,542
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$2,288,542**

Cost of Approved Phases: **$2,288,542**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5	CMAQ		$911,887	$0	$0	$227,972	$0	$1,139,859
Cat 3LC	Local Contribution		$0	$0	$0	$0	$1,148,683	$1,148,683
	Fund by Share		**$911,887**	**$0**	**$0**	**$227,972**	**$1,148,683**	**$2,288,542**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-573**	N/A	T	El Paso	Sun Metro	**$1,538,029**

TIP PROJECT NAME: **Dyer RTS 3rd year Operating Assistance**
REVISION DATE: 07/2018
LIMITS FROM: Downtown terminal - Santa Fe
MPO PROJECT ID: **T095X**
LIMITS TO: Northeast Terminal - Dyer @ Diana
MTP REFERENCE: T095X
TIP DESCRIPTION: Dyer RTS 3rd year Operating Assistance: 3rd year of Dyer RTS operations
FUNDING CATEGORY: CAT 5 CMAQ, CAT 3 LC
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.
VOC (Kg/Day): 3.38
CO (Kg/Day): 68.691
NOX (Kg/Day): 5.17
PM 10 (Kg/Day): 1.55

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$1,538,029
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$1,538,029**

Cost of Approved Phases: **$1,538,029**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5	CMAQ		$911,887	$0	$0	$227,972	$0	$1,139,859
Cat 3LC	Local Contribution		$0	$0	$0	$0	$398,170	$398,170
	Fund by Share		**$911,887**	**$0**	**$0**	**$227,972**	**$398,170**	**$1,538,029**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-576**	N/A	T	El Paso	Sun Metro	**$2,117,901**

TIP PROJECT NAME: **El Paso Streetcar 3rd year Operating Assistance**
REVISION DATE: 07/2018
LIMITS FROM: Father Rahm - Downtown Terminal
MPO PROJECT ID: **T108X-3**
LIMITS TO: Glory Road
MTP REFERENCE: T108X-3
TIP DESCRIPTION: El Paso Streetcar 3rd year Operating Assistance: 3rd year of Streetcar operations
FUNDING CATEGORY: CAT 5 CMAQ, CAT 3 LC
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.
VOC (Kg/Day): 0.513
CO (Kg/Day): 8.19
NOX (Kg/Day): 0.595
PM 10 (Kg/Day): 0.104

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$2,117,901
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$2,117,901**

Cost of Approved Phases: **$2,117,901**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat 5	CMAQ		$911,887	$0	$0	$227,972	$0	$1,139,859
Cat 3LC	Local Contribution		$0	$0	$0	$0	$978,042	$978,042
	Fund by Share		**$911,887**	**$0**	**$0**	**$227,972**	**$978,042**	**$2,117,901**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-574**	N/A	T	El Paso	Sun Metro	**$2,288,542**

TIP PROJECT NAME: **Montana RTS 2nd year Operating Assistance**
LIMITS FROM: Downtown terminal - Santa Fe
LIMITS TO: Far East Terminal - RC Poe & Edgemere
TIP DESCRIPTION: Montana RTS 2nd year Operating Assistance: 2nd year of Montana RTS operations
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

REVISION DATE: 07/2018
MPO PROJECT ID: **T092X**
MTP REFERENCE: T092X
FUNDING CATEGORY: CAT 5 CMAQ, CAT 3 LC
VOC (Kg/Day): 5.371 CO (Kg/Day): 110.234
NOX (Kg/Day): 8.313 PM 10 (Kg/Day): 2.522

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$2,288,542
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$2,288,542**

Cost of Approved Phases: **$2,288,542**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	5	CMAQ	$911,887	$0	$0	$227,972	$0	$1,139,859
Cat	3LC	Local Contribution	$0	$0	$0	$0	$1,148,683	$1,148,683
		Fund by Share	**$911,887**	**$0**	**$0**	**$227,972**	**$1,148,683**	**$2,288,542**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

C=Construction, E=Engineering, R=Right-Of-Way (ROW), T=Transfer, YOE=Year Of Expenditure, CSJ:Control Section Job

DISTRICT	COUNTY	CSJ	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
TX DIST. 24	EP	**0924-06-575**	N/A	T	El Paso	Sun Metro	**$2,411,283**

TIP PROJECT NAME: **Montana RTS 3rd year Operating Assistance**
LIMITS FROM: Downtown terminal - Santa Fe
LIMITS TO: Far East Terminal - RC Poe & Edgemere
TIP DESCRIPTION: Montana RTS 3rd year Operating Assistance: 3rd year of Montana RTS operations
REMARKS: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

REVISION DATE: 07/2018
MPO PROJECT ID: **T097X**
MTP REFERENCE: T097X
FUNDING CATEGORY: CAT 5 CMAQ, CAT 3 LC
VOC (Kg/Day): 5.191 CO (Kg/Day): 108.402
NOX (Kg/Day): 7.719 PM 10 (Kg/Day): 2.588

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$2,411,283
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$2,411,283**

Cost of Approved Phases: **$2,411,283**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	5	CMAQ	$973,322	$0	$0	$243,331	$0	$1,216,653
Cat	3LC	Local Contribution	$0	$0	$0	$0	$1,194,630	$1,194,630
		Fund by Share	**$973,322**	**$0**	**$0**	**$243,331**	**$1,194,630**	**$2,411,283**

PROJECT AMENDMENT HISTORY

STIP Rev Date(s)	FY(s)	Note/Amend Date	Note/Amendment
07/2018	2022	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

'STIP Rev Date(s)' also refers to TIP Administrative Amendment (Local Revision) Date

C=Construction, E=Engineering, R=Right-Of-Way (ROW), T=Transfer, YOE=Year Of Expenditure, CSJ:Control Section Job

[3]New Mexico Highway / Transit Projects

[3] NM 2018-2021 STIP

DISTRICT	COUNTY	CSJ/CN	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
NM DIST. 1	DA	**E100221**	CS	C	Anthony	Anthony, NM	**$2,256,165**

TIP PROJECT NAME: 4th Street Roadway Improvements

REVISION DATE: 07/2018
MPO PROJECT ID: M638X-B
MTP REFERENCE: M638X-B
FUNDING CATEGORY: NM CMAQ, NM STPL
VOC (Kg/Day): 0.007 CO (Kg/Day): 0.158
NOX (Kg/Day): 0.023 PM 10 (Kg/Day): 0

LIMITS FROM: Approximately 140 Linear feet (0.03 mi) South of Livesay Street
LIMITS TO: NM 404 (O'Hara Road)
TIP DESCRIPTION: Sidewalk, paved asphalt bike lanes, and ADA wheelchair ramps and drivepads
REMARKS: Program D2045 MTP, D19-22 TIP, 18-21 STIP, in FY 2019.

PROJECT HISTORY:
Amend to program into H2040 MTP, H15-18 TIP, NM 16-19 STIP in FY 2019 EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$2,256,165
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$2,256,165**

Cost of Approved Phases: **$2,256,165**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	NM CMAQ	CAQ	$1,229,562	$0	$0	$214,603	$0	$1,444,165
Cat	NM STPL	Large Urban	$691,337	$0	$0	$120,663	$0	$812,000
		Fund by Share	**$1,920,899**	**$0**	**$0**	**$335,266**	**$0**	**$2,256,165**

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
11/2016	2019	10/2015	Amend H2040 MTP, H15-18 TIP, NM 16-19 STIP, to add into FY 2019 EXEMPT
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 18-21 STIP, in FY 2019.

DISTRICT	COUNTY	CSJ/CN	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
NM DIST. 1	DA	**E100290**	CS	C	Chaparral	Dona Ana County	**$65,172**

TIP PROJECT NAME: Lisa Drive Connectivity Project (LDCP)

REVISION DATE: 07/2018
MPO PROJECT ID: E602B
MTP REFERENCE: E602B
FUNDING CATEGORY: NM TAP, CAT 3 LC

LIMITS FROM: Lisa Drive at McCombs Road, project is located north and parallel to Lisa Drive.
LIMITS TO: Lisa Drive at Lisa Retention Pond, project is located north and parallel to Lisa Drive.
TIP DESCRIPTION: Combined multi-purpose path and stormwater management facility
REMARKS: Program D2045 MTP, D19-22 TIP, 18-21 STIP, in FY 2019.

PROJECT HISTORY:
Amend H2040 MTP, H2017-2020 TIP and NM 2016-2020 STIP to program in FY 2019 EXEMPT

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$46,153
Construction Engineering:	$7,865
Contingencies:	$11,154
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$65,172**

Cost of Approved Phases: **$46,153**

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	NM TAPL	TAP	$46,153	$0	$0	$7,865	$0	$54,018
Cat	3LC	Local Contribution	$0	$0	$0	$0	$11,154	$11,154
		Fund by Share	**$46,153**	**$0**	**$0**	**$7,865**	**$11,154**	**$65,172**

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
11/2016	2019	10/2016	Amend H2040 MTP, H2017-2020 TIP and NM 2016-2020 STIP to program in FY 2019 EXEMPT
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 18-21 STIP, in FY 2019.

DISTRICT	COUNTY	CSJ/CN	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
NM DIST. 1	DA	**E100200**	NM 404	E	Chaparral NM	NMDOT	**$980,000**

TIP PROJECT NAME: NM 404 Phase C/D and Phase II FY2019 Funding

REVISION DATE: 07/2018

LIMITS FROM: I-10/NM 404 Intersection

MPO PROJECT ID: M644X

LIMITS TO: NM 404/NM 213 Intersection

MTP REFERENCE: M644X

TIP DESCRIPTION: Phase C/D (environmental and preliminary design) and Phase II (final design) for the NM 404 projects to include: NM 404/I-10 Bridge Replacement, Super 2 project, and 4 lane project

FUNDING CATEGORY: SBSI Border

REMARKS: Program D2045 MTP, D19-22 TIP, 18-21 STIP, in FY 2019.

PROJECT HISTORY:
Amend H2040 MTP, H2017-2020 TIP and NM 2016-2020 STIP to program in FY 2019.

Total Project Cost Information:

Preliminary Engineering:	$980,000
Right Of Way:	$0
Construction:	$0
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$980,000**

Cost of Approved Phases: **$980,000**

Authorized Funding by Category/Share

Cat			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
	NM State Funds	SBSI Border	$837,312	$142,688	$0	$0	$0	$980,000
	Fund by Share		**$837,312**	**$142,688**	**$0**	**$0**	**$0**	**$980,000**

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
02/2018	2019	12/2017	Amend H2040 MTP, H2017-2020 TIP and NM 2016-2020 STIP to program in FY 2019.
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 18-21 STIP, in FY 2019.

C=Construction, E=Engineering, R=Right-Of-Way (ROW), T=Transfer, YOE=Year Of Expenditure, CSJ:Control Section Job

DISTRICT	COUNTY	CSJ/CN	HWY	PHASE	CITY	PROJECT SPONSOR	YOE COST
NM DIST. 1	DA	**E100202**	IH 10	C	Anthony	NMDOT	**$9,500,000**

TIP PROJECT NAME: **NM 404/I-10 Bridge Replacement**
LIMITS FROM: At I-10 & NM 404 Interchange
LIMITS TO:
TIP DESCRIPTION: Bridge Replacement at NM 404/I-10 Interchange
REMARKS: Program D2045 MTP, D19-22 TIP, 18-21 STIP, in FY 2021.

REVISION DATE: 07/2018
MPO PROJECT ID: **B607X**
MTP REFERENCE: B607X
FUNDING CATEGORY: STP Flex, STP Large Urban, SBSI Border, NHPP

Total Project Cost Information:

Preliminary Engineering:	$0
Right Of Way:	$0
Construction:	$9,500,000
Construction Engineering:	$0
Contingencies:	$0
Indirects:	$0
Bond Financing:	$0
Potential Change Order:	$0
Total Project Cost:	**$9,500,000**

Cost of Approved Phases:
$9,500,000

Authorized Funding by Category/Share

			Federal Share	State Share	Regional Share	Local Share	Lcl Contribution	Total Share
Cat	NM STPF	Flex	$2,563,200	$436,800	$0	$0	$0	$3,000,000
Cat	NM STPL	Large Urban	$854,400	$145,600	$0	$0	$0	$1,000,000
Cat	NM State Funds	SBSI Border	$2,306,880	$393,120	$0	$0	$0	$2,700,000
Cat	NM NHPP		$2,392,320	$407,680	$0	$0	$0	$2,800,000
	Fund by Share		**$8,116,800**	**$1,383,200**	**$0**	**$0**	**$0**	**$9,500,000**

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 18-21 STIP, in FY 2021.

C=Construction, E=Engineering, R=Right-Of-Way (ROW), T=Transfer, YOE=Year Of Expenditure, CSJ:Control Section Job

Transit Projects FTA & Other Funds

Transit projects are included in this TIP. This public notice and time established for public review and comments satisfies FTA Program of Projects (POP) and public participation requirements.

FY 2019 TRANSIT PROJECT DESCRIPTIONS

EL PASO MPO TRANSPORTATION IMPROVEMENT PROGRAM (TIP) 2019-2022

District: TX DIST. 24

YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3H**
Project Name:	ADA ParaTransit
Apportionment Year:	2019
Project Phase:	N/A
Brief Project Description:	Provide ADA Para-Transit Service
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:	
Federal (FTA) Funds:	$1,326,130
State (TXDOT) Funds:	$0
Other Funds:	$331,533
Fiscal Year Cost:	**$1,657,663**
Construction: $1,657,663 PE: $0	ROW: $0
Total Project Cost:	**$1,657,663**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2019	06/2016	New Project in FY 2019 recurring funding for the development of 2017-2020 Horizon TIP
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3C**
Project Name:	Captial Maintenance
Apportionment Year:	2019
Project Phase:	N/A
Brief Project Description:	Capital Maintenance
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:	
Federal (FTA) Funds:	$11,062,703
State (TXDOT) Funds:	$0
Other Funds:	$2,765,676
Fiscal Year Cost:	**$13,828,379**
Construction: $13,828,379 PE: $0	ROW: $0
Total Project Cost:	**$13,828,379**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2019	06/2016	New Project in FY 2019 recurring funding for the development of 2017-2020 Horizon TIP
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3D**
Project Name:	Curb Cuts ADA Improvements (5339)
Apportionment Year:	2019
Project Phase:	N/A
Brief Project Description:	Curb Cuts ADA Improvements
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$200,000
State (TXDOT) Funds:	$0
Other Funds:	$50,000
Fiscal Year Cost:	**$250,000**
Construction: $250,000 PE: $0	ROW: $0
Total Project Cost:	**$250,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2019	06/2016	New Project in FY 2019 recurring funding for the development of 2017-2020 Horizon TIP
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

District: TX DIST. 24

YOE = Year of Expenditure

General Project Information

Project Sponsor:	EPMPO
MPO ID:	**T011**
Project Name:	FTA 5310 Enhanced Mobility for Seniors and Individuals with Disabilities
Apportionment Year:	2019
Project Phase:	N/A
Brief Project Description:	FTA 5310 Enhanced Mobility for Seniors and Individuals with Disabilities Program. Project for financial allocation demonstration. Fed. Distribution of $650,000 for Capital and Operating, for FFY 2018 funds for use in FY 2019.
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Amend H2040 MTP, H2017-2020 TIP and 2017-2020 STIP to add to FY2018 using FY2017 FTA 5310 Funds EXEMPT

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5310 - Seniors & People w/Disabilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$650,000
State (TXDOT) Funds:	$0
Other Funds:	$0
Fiscal Year Cost:	**$650,000**
Construction: $650,000	PE: $0 ROW: $0
Total Project Cost:	**$650,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

History STIP Rev Date	History FY	History Date
07/2018	2019	05/2018

General Project Information

Project Sponsor:	EPMPO
MPO ID:	**T011-14**
Project Name:	FTA 5310 EPMPO Program Administration FFY 2017 Funds
Apportionment Year:	2017
Project Phase:	C
Brief Project Description:	FTA 5310 EPMPO Program Administration FFY 2017 Funds: FTA 5310 Enhanced Mobility for Seniors and Individuals with Disabilites Program for EPMPO Program Administration FFY 2017 Funds for use in FY 2019.
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5310 - Seniors & People w/Disabilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$58,384
State (TXDOT) Funds:	$0
Other Funds:	$0
Fiscal Year Cost:	**$58,384**
Construction: $58,384	PE: $0 ROW: $0
Total Project Cost:	**$58,384**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
11/2017	2019	11/2017	FTA 5310 Enhanced Mobility for Seniors and Individuals with Disabilites Program for EPMPO Program Administration FFY 2017 Funds for use in FY 2019. Programming of funds was approved in the El Paso MPO's UPWP FFY 2018-2019 by the TPB on August 18, 2018.
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3I-6**
Project Name:	FY 2019 FTA 5339 Funding for Bus & Bus Facilities
Apportionment Year:	2019
Project Phase:	N/A
Brief Project Description:	FY 2019 FTA 5339 Funding: For the purchase of buses and facility enhancements incl. equipment such a ADP hardware/software and security related needs, ticket vending machines and sales related software. Capitalized maintenance incl rebuilds, bus shelters & amenities.
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$1,169,504
State (TXDOT) Funds:	$0
Other Funds:	$292,376
Fiscal Year Cost:	**$1,461,880**
Construction: $1,461,880	PE: $0 ROW: $0
Total Project Cost:	**$1,461,880**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2019	06/2016	New Project in FY 2019 recurring funding for the development of 2017-2020 Horizon TIP
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

District: TX DIST. 24 YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T2A**
Project Name:	JARC
Apportionment Year:	2019
Project Phase:	N/A
Brief Project Description:	Short-range Planning
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:	
Federal (FTA) Funds:	$160,000
State (TXDOT) Funds:	$0
Other Funds:	$40,000
Fiscal Year Cost:	**$200,000**
Construction: $200,000 PE: $0 ROW: $0	
Total Project Cost:	**$200,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3B**
Project Name:	Other Capital Program Items (5339)
Apportionment Year:	2019
Project Phase:	N/A
Brief Project Description:	Computer Hardware/software
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$198,378
State (TXDOT) Funds:	$0
Other Funds:	$49,594
Fiscal Year Cost:	**$247,972**
Construction: $247,972 PE: $0 ROW: $0	
Total Project Cost:	**$247,972**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2019	06/2016	New Project in FY 2019 recurring funding for the development of 2017-2020 Horizon TIP
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3A**
Project Name:	Planning
Apportionment Year:	2019
Project Phase:	N/A
Brief Project Description:	Short-range Planning
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:	
Federal (FTA) Funds:	$816,000
State (TXDOT) Funds:	$0
Other Funds:	$204,000
Fiscal Year Cost:	**$1,020,000**
Construction: $1,020,000 PE: $0 ROW: $0	
Total Project Cost:	**$1,020,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2019	06/2016	New Project in FY 2019 recurring funding for the development of 2017-2020 Horizon TIP
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

District: TX DIST. 24 YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3E**
Project Name:	Security Equipment
Apportionment Year:	2019
Project Phase:	N/A
Brief Project Description:	Security Program
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:	
Federal (FTA) Funds:	$137,017
State (TXDOT) Funds:	$0
Other Funds:	$34,254
Fiscal Year Cost:	**$171,271**
Construction: $171,271 PE: $0 ROW: $0	
Total Project Cost:	**$171,271**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2019	06/2016	New Project in FY 2019 recurring funding for the development of 2017-2020 Horizon TIP
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3F**
Project Name:	Support Vehicles/Bus Rehab (5339)
Apportionment Year:	2019
Project Phase:	N/A
Brief Project Description:	Support Vehicles/Bus Rehab
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$161,929
State (TXDOT) Funds:	$0
Other Funds:	$40,482
Fiscal Year Cost:	**$202,411**
Construction: $202,411 PE: $0 ROW: $0	
Total Project Cost:	**$202,411**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

FY 2020 TRANSIT PROJECT DESCRIPTIONS

EL PASO MPO TRANSPORTATION IMPROVEMENT PROGRAM (TIP) 2019-2022

District: TX DIST. 24

YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3H**
Project Name:	ADA ParaTransit
Apportionment Year:	2020
Project Phase:	N/A
Brief Project Description:	Provide ADA Para Transit Service
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:	
Federal (FTA) Funds:	$1,339,391
State (TXDOT) Funds:	$0
Other Funds:	$334,848
Fiscal Year Cost:	**$1,674,239**
Construction: $1,674,239 PE: $0	ROW: $0
Total Project Cost:	**$1,674,239**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2020	06/2016	New Project in FY 2020 recurring funding for the development of 2017-2020 Horizon TIP
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3C**
Project Name:	Capital Maintenance
Apportionment Year:	2020
Project Phase:	N/A
Brief Project Description:	Capital Maintenance
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:	
Federal (FTA) Funds:	$11,173,330
State (TXDOT) Funds:	$0
Other Funds:	$2,793,333
Fiscal Year Cost:	**$13,966,663**
Construction: $13,966,663 PE: $0	ROW: $0
Total Project Cost:	**$13,966,663**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2020	06/2016	New Project in FY 2020 recurring funding for development of 2017-2020 Horizon TIP
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3D**
Project Name:	Curb Cuts ADA Improvements (5339)
Apportionment Year:	2020
Project Phase:	
Brief Project Description:	Curb Cuts ADA Improvements
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$800,000
State (TXDOT) Funds:	$0
Other Funds:	$200,000
Fiscal Year Cost:	**$1,000,000**
Construction: $1,000,000 PE: $0	ROW: $0
Total Project Cost:	**$1,000,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2020	06/2016	New Project in FY 2020 recurring funding for development of 2017-2020 Horizon TIP
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

District: TX DIST. 24

YOE = Year of Expenditure

General Project Information

Project Sponsor:	EPMPO
MPO ID:	**T011**
Project Name:	FTA 5310 Enhanced Mobility for Seniors and Individuals with Disabilities
Apportionment Year:	2020
Project Phase:	N/A
Brief Project Description:	FTA 5310 Enhanced Mobility for Seniors and Individuals with Disabilities Program. Project for financial allocation demonstration. Fed. Distribution of $650,000 for Capital and Operating, for FFY 2019 funds for use in FY 2020.
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Amend H2040 MTP, H2017-2020 TIP and 2017-2020 STIP to add to FY2020 using FY2019 FTA 5310 Funds EXEMPT

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5310 - Seniors & People w/Disabilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$650,000
State (TXDOT) Funds:	$0
Other Funds:	$0
Fiscal Year Cost:	**$650,000**
Construction: $650,000	PE: $0 ROW: $0
Total Project Cost:	**$650,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

History STIP Rev Date	History FY	History Date
07/2018	2020	05/2018

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3I-7**
Project Name:	FY 2020 FTA 5339 Funding for Bus & Bus Facilities
Apportionment Year:	2020
Project Phase:	N/A
Brief Project Description:	FY 2020 FTA 5339 Funding: For the purchase of buses and facility enhancements incl. equipment such a ADP hardware/software and security related needs, ticket vending machines and sales related software. Capitalized maintenance incl rebuilds, bus shelters & amenities.
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$1,181,199
State (TXDOT) Funds:	$0
Other Funds:	$295,300
Fiscal Year Cost:	**$1,476,499**
Construction: $1,476,499	PE: $0 ROW: $0
Total Project Cost:	**$1,476,499**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2020	06/2016	New Project in FY 2020 recurring funding for development of 2017-2020 Horizon TIP
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3B**
Project Name:	Other Capital Program Items (5339)
Apportionment Year:	2020
Project Phase:	N/A
Brief Project Description:	Computer hardware/software
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$200,362
State (TXDOT) Funds:	$0
Other Funds:	$50,090
Fiscal Year Cost:	**$250,452**
Construction: $250,452	PE: $0 ROW: $0
Total Project Cost:	**$250,452**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2020	06/2016	New Project in FY 2020 recurring funding for development of 2017-2020 Horizon TIP
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

District: TX DIST. 24 YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3A**
Project Name:	Planning
Apportionment Year:	2020
Project Phase:	N/A
Brief Project Description:	Short-range Planning
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:	
Federal (FTA) Funds:	$824,160
State (TXDOT) Funds:	$0
Other Funds:	$206,040
Fiscal Year Cost:	**$1,030,200**
Construction: $1,030,200 PE: $0 ROW: $0	
Total Project Cost:	**$1,030,200**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2020	06/2016	New Project in FY 2020 recurring funding for development of 2017-2020 Horizon TIP
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3E**
Project Name:	Security Equipment
Apportionment Year:	2020
Project Phase:	N/A
Brief Project Description:	Security Program
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:	
Federal (FTA) Funds:	$138,386
State (TXDOT) Funds:	$0
Other Funds:	$34,597
Fiscal Year Cost:	**$172,983**
Construction: $172,983 PE: $0 ROW: $0	
Total Project Cost:	**$172,983**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2020	06/2016	New Project in FY 2020 recurring funding for development of 2017-2020 Horizon TIP
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3F**
Project Name:	Support Vehicles/Bus Rehab (5339)
Apportionment Year:	2020
Project Phase:	N/A
Brief Project Description:	Support Vehicles/Bus Rehab
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$415,532
State (TXDOT) Funds:	$0
Other Funds:	$103,883
Fiscal Year Cost:	**$519,415**
Construction: $519,415 PE: $0 ROW: $0	
Total Project Cost:	**$519,415**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

FY 2020 TRANSIT PROJECT DESCRIPTIONS

EL PASO MPO TRANSPORTATION IMPROVEMENT PROGRAM (TIP) 2019-2022

District: TX DIST. 24

YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3G**
Project Name:	Transit Enhancements (5339)
Apportionment Year:	2020
Project Phase:	N/A
Brief Project Description:	Transit Enhancements
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$800,000
State (TXDOT) Funds:	$0
Other Funds:	$200,000
Fiscal Year Cost:	**$1,000,000**
Construction: $1,000,000 PE: $0	ROW: $0
Total Project Cost:	**$1,000,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2016	2020	06/2016	New Project in FY 2020 recurring funding for development of 2017-2020 Horizon TIP
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

FY 2021 TRANSIT PROJECT DESCRIPTIONS

EL PASO MPO TRANSPORTATION IMPROVEMENT PROGRAM (TIP) 2019-2022

District: TX DIST. 24

YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3H**
Project Name:	ADA ParaTransit
Apportionment Year:	2021
Project Phase:	N/A
Brief Project Description:	Provide ADA Para Transit Service
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:	
Federal (FTA) Funds:	$1,352,786
State (TXDOT) Funds:	$0
Other Funds:	$338,196
Fiscal Year Cost:	**$1,690,982**
Construction: $1,690,982 PE: $0	ROW: $0
Total Project Cost:	**$1,690,982**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3C**
Project Name:	Capital Maintenance
Apportionment Year:	2021
Project Phase:	N/A
Brief Project Description:	Capital Maintenance
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:	
Federal (FTA) Funds:	$11,125,064
State (TXDOT) Funds:	$0
Other Funds:	$2,781,266
Fiscal Year Cost:	**$13,906,330**
Construction: $13,906,330 PE: $0	ROW: $0
Total Project Cost:	**$13,906,330**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

General Project Information

Project Sponsor:	EPMPO
MPO ID:	**T011**
Project Name:	FTA 5310 Enhanced Mobility for Seniors and Individuals with Disabilities
Apportionment Year:	2021
Project Phase:	N/A
Brief Project Description:	FTA 5310 Enhanced Mobility for Seniors and Individuals with Disabilities Program. Project for financial allocation demonstration. Fed. Distribution of $650,000 for Capital and Operating, for FFY 2020 funds for use in FY 2021.
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Amend H2040 MTP, H2017-2020 TIP and 2017-2020 STIP to add to FY2021 using FY2020 FTA 5310 Funds EXEMPT

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5310 - Seniors & People w/Disabilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$650,000
State (TXDOT) Funds:	$0
Other Funds:	$0
Fiscal Year Cost:	**$650,000**
Construction: $650,000 PE: $0	ROW: $0
Total Project Cost:	**$650,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

History STIP Rev Date	History FY	History Date
07/2018	2021	05/2018

District: TX DIST. 24

YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3I-8**
Project Name:	FY 2021 FTA 5339 Funding for Bus & Bus Facilities
Apportionment Year:	2021
Project Phase:	N/A
Brief Project Description:	FY 2021 FTA 5339 Funding: For the purchase of buses and facility enhancements incl. equipment such a ADP hardware/software and security related needs, ticket vending machines and sales related software. Capitalized maintenance incl rebuilds, bus shelters & amenities.
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$1,120,000
State (TXDOT) Funds:	$0
Other Funds:	$280,000
Fiscal Year Cost:	**$1,400,000**
Construction: $1,400,000 PE: $0 ROW: $0	
Total Project Cost:	**$1,400,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T2A**
Project Name:	JARC
Apportionment Year:	2021
Project Phase:	N/A
Brief Project Description:	Short-range Planning
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:	
Federal (FTA) Funds:	$160,000
State (TXDOT) Funds:	$0
Other Funds:	$40,000
Fiscal Year Cost:	**$200,000**
Construction: $200,000 PE: $0 ROW: $0	
Total Project Cost:	**$200,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3B**
Project Name:	Other Capital Program Items (5339)
Apportionment Year:	2021
Project Phase:	N/A
Brief Project Description:	Computer hardware/software
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$80,000
State (TXDOT) Funds:	$0
Other Funds:	$20,000
Fiscal Year Cost:	**$100,000**
Construction: $100,000 PE: $0 ROW: $0	
Total Project Cost:	**$100,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

District: TX DIST. 24 YOE = Year of Expenditure

General Project Information

Project Sponsor: Sun Metro-Transit
MPO ID: **T3A**
Project Name: Planning
Apportionment Year: 2021
Project Phase: N/A
Brief Project Description: Short-range Planning
Sec5309 ID:
Amend Date: 07/2018
Remarks/Amend Action: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

Funding Information (YOE)

Fed. Funding Category: **Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:
Federal (FTA) Funds: $832,402
State (TXDOT) Funds: $0
Other Funds: $208,100
Fiscal Year Cost: **$1,040,502**
Construction: $1,040,502 PE: $0 ROW: $0
Total Project Cost: **$1,040,502**
TDC Amount Requested: $0
TDC Awarded Date & Amount: $0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

General Project Information

Project Sponsor: Sun Metro-Transit
MPO ID: **T3E**
Project Name: Security Equipment
Apportionment Year: 2021
Project Phase: N/A
Brief Project Description: Security Program
Sec5309 ID:
Amend Date: 07/2018
Remarks/Amend Action: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

Funding Information (YOE)

Fed. Funding Category: **Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:
Federal (FTA) Funds: $139,760
State (TXDOT) Funds: $0
Other Funds: $34,940
Fiscal Year Cost: **$174,700**
Construction: $174,700 PE: $0 ROW: $0
Total Project Cost: **$174,700**
TDC Amount Requested: $0
TDC Awarded Date & Amount: $0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

General Project Information

Project Sponsor: Sun Metro-Transit
MPO ID: **T3F**
Project Name: Support Vehicles/Bus Rehab (5339)
Apportionment Year: 2021
Project Phase: N/A
Brief Project Description: Support Vehicles/Bus Rehab
Sec5309 ID:
Amend Date: 07/2018
Remarks/Amend Action: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

Funding Information (YOE)

Fed. Funding Category: **Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:
Federal (FTA) Funds: $429,287
State (TXDOT) Funds: $0
Other Funds: $107,322
Fiscal Year Cost: **$536,609**
Construction: $536,609 PE: $0 ROW: $0
Total Project Cost: **$536,609**
TDC Amount Requested: $0
TDC Awarded Date & Amount: $0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

General Project Information

Project Sponsor: Sun Metro-Transit
MPO ID: **T3G**
Project Name: Transit Enhancements (5339)
Apportionment Year: 2021
Project Phase: N/A
Brief Project Description: Transit Enhancements
Sec5309 ID:
Amend Date: 07/2018
Remarks/Amend Action: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category: **Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:
Federal (FTA) Funds: $800,000
State (TXDOT) Funds: $0
Other Funds: $200,000
Fiscal Year Cost: **$1,000,000**
Construction: $1,000,000 PE: $0 ROW: $0
Total Project Cost: **$1,000,000**
TDC Amount Requested: $0
TDC Awarded Date & Amount: $0

District: TX DIST. 24 YOE = Year of Expenditure

General Project Information

Project Sponsor: Sun Metro-Transit
MPO ID: **T3H**
Project Name: ADA ParaTransit
Apportionment Year: 2022
Project Phase: N/A
Brief Project Description: Provide ADA Para Transit Service
Sec5309 ID:
Amend Date: 07/2018
Remarks/Amend Action: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

Funding Information (YOE)

Fed. Funding Category: **Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:
Federal (FTA) Funds: $1,366,313
State (TXDOT) Funds: $0
Other Funds: $341,578
Fiscal Year Cost: **$1,707,891**
Construction: $1,707,891 PE: $0 ROW: $0
Total Project Cost: **$1,707,891**
TDC Amount Requested: $0
TDC Awarded Date & Amount: $0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2022	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

General Project Information

Project Sponsor: Sun Metro-Transit
MPO ID: **T3C**
Project Name: Capital Maintenance
Apportionment Year: 2022
Project Phase: N/A
Brief Project Description: Capital Maintenance
Sec5309 ID:
Amend Date: 07/2018
Remarks/Amend Action: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

Funding Information (YOE)

Fed. Funding Category: **Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:
Federal (FTA) Funds: $11,236,314
State (TXDOT) Funds: $0
Other Funds: $2,809,079
Fiscal Year Cost: **$14,045,393**
Construction: $14,045,393 PE: $0 ROW: $0
Total Project Cost: **$14,045,393**
TDC Amount Requested: $0
TDC Awarded Date & Amount: $0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2022	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

General Project Information

Project Sponsor: Sun Metro-Transit
MPO ID: **T3D**
Project Name: Curb Cuts ADA Improvements (5339)
Apportionment Year: 2022
Project Phase: N/A
Brief Project Description: Curb Cuts ADA Improvements
Sec5309 ID:
Amend Date: 07/2018
Remarks/Amend Action: Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category: **Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:
Federal (FTA) Funds: $800,000
State (TXDOT) Funds: $0
Other Funds: $200,000
Fiscal Year Cost: **$1,000,000**
Construction: $1,000,000 PE: $0 ROW: $0
Total Project Cost: **$1,000,000**
TDC Amount Requested: $0
TDC Awarded Date & Amount: $0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2022	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

General Project Information

Project Sponsor: EPMPO
MPO ID: **T011**
Project Name: FTA 5310 Enhanced Mobility for Seniors and Individuals with Disabilities
Apportionment Year: 2022
Project Phase: N/A
Brief Project Description: FTA 5310 Enhanced Mobility for Seniors and Individuals with Disabilities Program. Project for financial allocation demonstration. Fed. Distribution of $650,000 for Capital and Operating, for FFY 2021 funds for use in FY 2022.
Sec5309 ID:
Amend Date: 07/2018
Remarks/Amend Action: Amend H2040 MTP, H2017-2020 TIP and 2017-2020 STIP to add to FY2022 using FY2020 FTA 5310 Funds EXEMPT

Funding Information (YOE)

Fed. Funding Category: **Sec. 5310 - Seniors & People w/Disabilities >200K**
Other FTA Section:
Federal (FTA) Funds: $650,000
State (TXDOT) Funds: $0
Other Funds: $0
Fiscal Year Cost: **$650,000**
Construction: $650,000 PE: $0 ROW: $0
Total Project Cost: **$650,000**
TDC Amount Requested: $0
TDC Awarded Date & Amount: $0

History STIP Rev Date	History FY	History Date
07/2018	2022	05/2018

District: TX DIST. 24

YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3I-9**
Project Name:	FY 2022 FTA 5339 Funding for Bus & Bus Facilities
Apportionment Year:	2022
Project Phase:	N/A
Brief Project Description:	FY 2022 FTA 5339 Funding: For the purchase of buses and facility enhancements incl. equipment such a ADP hardware/software and security related needs, ticket vending machines and sales related software. Capitalized maintenance incl rebuilds, bus shelters & amenities.
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$1,148,000
State (TXDOT) Funds:	$0
Other Funds:	$287,000
Fiscal Year Cost:	**$1,435,000**
Construction: $1,435,000 PE: $0	ROW: $0
Total Project Cost:	**$1,435,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2022	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3B**
Project Name:	Other Capital Program Items (5339)
Apportionment Year:	2022
Project Phase:	N/A
Brief Project Description:	Computer hardware/software
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$84,000
State (TXDOT) Funds:	$0
Other Funds:	$21,000
Fiscal Year Cost:	**$105,000**
Construction: $105,000 PE: $0	ROW: $0
Total Project Cost:	**$105,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2022	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3A**
Project Name:	Planning
Apportionment Year:	2022
Project Phase:	N/A
Brief Project Description:	Short-range Planning
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:	
Federal (FTA) Funds:	$840,726
State (TXDOT) Funds:	$0
Other Funds:	$210,181
Fiscal Year Cost:	**$1,050,907**
Construction: $1,050,907 PE: $0	ROW: $0
Total Project Cost:	**$1,050,907**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2022	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

FY 2022 TRANSIT PROJECT DESCRIPTIONS

EL PASO MPO TRANSPORTATION IMPROVEMENT PROGRAM (TIP) 2019-2022

District: TX DIST. 24

YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3E**
Project Name:	Security Equipment
Apportionment Year:	2022
Project Phase:	N/A
Brief Project Description:	Security Program
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5307 - Urbanized Formula >200K**
Other FTA Section:	
Federal (FTA) Funds:	$143,254
State (TXDOT) Funds:	$0
Other Funds:	$35,814
Fiscal Year Cost:	**$179,068**
Construction: $179,068	PE: $0 ROW: $0
Total Project Cost:	**$179,068**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2022	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

General Project Information

Project Sponsor:	Sun Metro-Transit
MPO ID:	**T3F**
Project Name:	Support Vehicles/Bus Rehab (5339)
Apportionment Year:	2022
Project Phase:	N/A
Brief Project Description:	Support Vehicles/Bus Rehab
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5339 - Bus & Bus Facilities >200K**
Other FTA Section:	
Federal (FTA) Funds:	$443,120
State (TXDOT) Funds:	$0
Other Funds:	$110,780
Fiscal Year Cost:	**$553,900**
Construction: $553,900	PE: $0 ROW: $0
Total Project Cost:	**$553,900**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2022	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

FTA from FHWA Transfer Transit Projects

FY 2019 TRANSIT PROJECT DESCRIPTIONS

EL PASO MPO TRANSPORTATION IMPROVEMENT PROGRAM (TIP) 2019-2022

District: TX DIST. 24

YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro
MPO ID:	**T064X**
Project Name:	Alameda RTS Operating Assistance YR1 - 2019
Apportionment Year:	2019
Project Phase:	T
Brief Project Description:	Alameda RTS Operating Assistance YR1 - 2019: 1st Year of Alameda BRT-RTS operations.
Sec5309 ID:	1539
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Funding Information (YOE)

Fed. Funding Category:	**Regionally Significant or Other (incl FHWA transfers)**
Other FTA Section:	**FHWA CAT 5 - CMAQ Transfer to FTA**
Federal (FTA) Funds:	$800,000
State (TXDOT) Funds:	$0
Other Funds:	$200,000
Fiscal Year Cost:	**$1,000,000**
Construction: $1,000,000	PE: $0 ROW: $0
Total Project Cost:	**$1,000,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

11/2016	2019	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019 EXEMPT
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

General Project Information

Project Sponsor:	Sun Metro
MPO ID:	**T065X**
Project Name:	Dyer RTS Operating Assistance YR1 - 2019
Apportionment Year:	2019
Project Phase:	T
Brief Project Description:	Dyer RTS Operating Assistance YR1 - 2019: 1st Year of Dyer BRT-RTS operations.
Sec5309 ID:	1539
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Funding Information (YOE)

Fed. Funding Category:	**Regionally Significant or Other (incl FHWA transfers)**
Other FTA Section:	**FHWA CAT 5 - CMAQ Transfer to FTA**
Federal (FTA) Funds:	$800,000
State (TXDOT) Funds:	$0
Other Funds:	$200,000
Fiscal Year Cost:	**$1,000,000**
Construction: $1,000,000	PE: $0 ROW: $0
Total Project Cost:	**$1,000,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

11/2016	2019	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019 EXEMPT
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

General Project Information

Project Sponsor:	Sun Metro
MPO ID:	**T108X-1**
Project Name:	El Paso Streetcar System 1st Year Operating Assistance
Apportionment Year:	2019
Project Phase:	T
Brief Project Description:	El Paso Streetcar System 1st Year Operating Assistance: Operating Assistance for first year of new transit service intended to reduce congestion and CO emissions.
Sec5309 ID:	1539
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Funding Information (YOE)

Fed. Funding Category:	**Regionally Significant or Other (incl FHWA transfers)**
Other FTA Section:	**FHWA CAT 5 - CMAQ Transfer to FTA**
Federal (FTA) Funds:	$800,000
State (TXDOT) Funds:	$0
Other Funds:	$200,000
Fiscal Year Cost:	**$1,000,000**
Construction: $1,000,000	PE: $0 ROW: $0
Total Project Cost:	**$1,000,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

11/2016	2019	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019 EXEMPT
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

District: TX DIST. 24

YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro
MPO ID:	**BP006**
Project Name:	Procurement of 3 Buses
Apportionment Year:	2020
Project Phase:	T
Brief Project Description:	Procurement of 3 Buses: Sun Metro seeks to procure three buses in anticipation of increased frequency and ridership demand for services around the Montecillo Development and the MCA-TTU-UMC areas.
Sec5309 ID:	1539
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

Funding Information (YOE)

Fed. Funding Category:	**Sec. 5309 - Fixed Guideway Investment**
Other FTA Section:	**FHWA CAT 5 - CMAQ Transfer to FTA**
Federal (FTA) Funds:	$1,440,000
State (TXDOT) Funds:	$0
Other Funds:	$360,000
Fiscal Year Cost:	**$1,800,000**
Construction: $1,800,000	PE: $0 ROW: $0
Total Project Cost:	**$1,800,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

11/2016	2019	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2019 NONEXEMPT
07/2018	2019	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2019.

FY 2020 TRANSIT PROJECT DESCRIPTIONS

EL PASO MPO TRANSPORTATION IMPROVEMENT PROGRAM (TIP) 2019-2022

District: TX DIST. 24

YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro
MPO ID:	**T091X-2**
Project Name:	Alameda RTS Operating Assistance YR2 - 2020
Apportionment Year:	2020
Project Phase:	T
Brief Project Description:	Alameda RTS Operating Assistance YR2 - 2020: 2nd Year of Alameda BRT-RTS operations.
Sec5309 ID:	1539
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category:	**Regionally Significant or Other (incl FHWA transfers)**
Other FTA Section:	**FHWA CAT 5 - CMAQ Transfer to FTA**
Federal (FTA) Funds:	$800,000
State (TXDOT) Funds:	$0
Other Funds:	$200,000
Fiscal Year Cost:	**$1,000,000**
Construction: $1,000,000	PE: $0 ROW: $0
Total Project Cost:	**$1,000,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

11/2016	2020	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

General Project Information

Project Sponsor:	Sun Metro
MPO ID:	**T065X-2**
Project Name:	Dyer RTS Operating Assistance YR2 - 2020
Apportionment Year:	2020
Project Phase:	T
Brief Project Description:	Dyer RTS Operating Assistance YR2 - 2020: 2nd Year of Dyer BRT-RTS operations.
Sec5309 ID:	1539
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category:	**Regionally Significant or Other (incl FHWA transfers)**
Other FTA Section:	**FHWA CAT 5 - CMAQ Transfer to FTA**
Federal (FTA) Funds:	$800,000
State (TXDOT) Funds:	$0
Other Funds:	$200,000
Fiscal Year Cost:	**$1,000,000**
Construction: $1,000,000	PE: $0 ROW: $0
Total Project Cost:	**$1,000,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

11/2016	2020	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

General Project Information

Project Sponsor:	Sun Metro
MPO ID:	**T108X-2**
Project Name:	El Paso Streetcar System 2nd Year Operating Assistance
Apportionment Year:	2020
Project Phase:	T
Brief Project Description:	El Paso Streetcar System 2nd Year Operating Assistance: Operating Assistance for 2nd year of new transit service intended to reduce congestion and CO emissions.
Sec5309 ID:	1539
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category:	**Regionally Significant or Other (incl FHWA transfers)**
Other FTA Section:	**FHWA CAT 5 - CMAQ Transfer to FTA**
Federal (FTA) Funds:	$800,000
State (TXDOT) Funds:	$0
Other Funds:	$200,000
Fiscal Year Cost:	**$1,000,000**
Construction: $1,000,000	PE: $0 ROW: $0
Total Project Cost:	**$1,000,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

11/2016	2020	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

General Project Information

Project Sponsor:	Sun Metro
MPO ID:	**T093X**
Project Name:	Montana RTS 1st year service operating assistance
Apportionment Year:	2020
Project Phase:	T
Brief Project Description:	Montana RTS 1st year service operating assistance: 1st year of Montana BRT-RTS operations.
Sec5309 ID:	1539
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

Funding Information (YOE)

Fed. Funding Category:	**Regionally Significant or Other (incl FHWA transfers)**
Other FTA Section:	**FHWA CAT 5 - CMAQ Transfer to FTA**
Federal (FTA) Funds:	$1,040,000
State (TXDOT) Funds:	$0
Other Funds:	$260,000
Fiscal Year Cost:	**$1,300,000**
Construction: $1,300,000	PE: $0 ROW: $0
Total Project Cost:	**$1,300,000**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

11/2016	2020	10/2016	Amend H2040 MTP, H17-20 TIP, 17-20 STIP to program in FY 2020 EXEMPT
07/2018	2020	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2020.

District: TX DIST. 24

YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro
MPO ID:	**T096X**
Project Name:	Alameda RTS 3rd year Operating Assistance
Apportionment Year:	2021
Project Phase:	T
Brief Project Description:	Alameda RTS 3rd year Operating Assistance: 3rd year of Alameda RTS operations
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

Funding Information (YOE)

Fed. Funding Category:	**Regionally Significant or Other (incl FHWA transfers)**
Other FTA Section:	**FHWA CAT 5 - CMAQ Transfer to FTA**
Federal (FTA) Funds:	$911,887
State (TXDOT) Funds:	$0
Other Funds:	$1,376,655
Fiscal Year Cost:	**$2,288,542**
Construction: $2,288,542	PE: $0 ROW: $0
Total Project Cost:	**$2,288,542**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

General Project Information

Project Sponsor:	Sun Metro
MPO ID:	**T095X**
Project Name:	Dyer RTS 3rd year Operating Assistance
Apportionment Year:	2021
Project Phase:	T
Brief Project Description:	Dyer RTS 3rd year Operating Assistance: 3rd year of Dyer RTS operations.
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

Funding Information (YOE)

Fed. Funding Category:	**Regionally Significant or Other (incl FHWA transfers)**
Other FTA Section:	**FHWA CAT 5 - CMAQ Transfer to FTA**
Federal (FTA) Funds:	$911,887
State (TXDOT) Funds:	$0
Other Funds:	$626,142
Fiscal Year Cost:	**$1,538,029**
Construction: $1,538,029	PE: $0 ROW: $0
Total Project Cost:	**$1,538,029**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

General Project Information

Project Sponsor:	Sun Metro
MPO ID:	**T108X-3**
Project Name:	El Paso Streetcar 3rd year Operating Assistance
Apportionment Year:	2021
Project Phase:	T
Brief Project Description:	El Paso Streetcar 3rd year Operating Assistance: 3rd year of Streetcar operations.
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

Funding Information (YOE)

Fed. Funding Category:	**Regionally Significant or Other (incl FHWA transfers)**
Other FTA Section:	**FHWA CAT 5 - CMAQ Transfer to FTA**
Federal (FTA) Funds:	$911,887
State (TXDOT) Funds:	$0
Other Funds:	$1,206,014
Fiscal Year Cost:	**$2,117,901**
Construction: $2,117,901	PE: $0 ROW: $0
Total Project Cost:	**$2,117,901**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

General Project Information

Project Sponsor:	Sun Metro
MPO ID:	**T092X**
Project Name:	Montana RTS 2nd year Operating Assistance
Apportionment Year:	2021
Project Phase:	T
Brief Project Description:	Montana RTS 2nd year Operating Assistance: 2nd year of Montana RTS operations.
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

Funding Information (YOE)

Fed. Funding Category:	**Regionally Significant or Other (incl FHWA transfers)**
Other FTA Section:	**FHWA CAT 5 - CMAQ Transfer to FTA**
Federal (FTA) Funds:	$911,887
State (TXDOT) Funds:	$0
Other Funds:	$1,376,655
Fiscal Year Cost:	**$2,288,542**
Construction: $2,288,542	PE: $0 ROW: $0
Total Project Cost:	**$2,288,542**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2021	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2021.

FY 2022 TRANSIT PROJECT DESCRIPTIONS

EL PASO MPO TRANSPORTATION IMPROVEMENT PROGRAM (TIP) 2019-2022

District: TX DIST. 24

YOE = Year of Expenditure

General Project Information

Project Sponsor:	Sun Metro
MPO ID:	**T097X**
Project Name:	Montana RTS 3rd year Operating Assistance
Apportionment Year:	2022
Project Phase:	T
Brief Project Description:	Montana RTS 3rd year Operating Assistance: 3rd year of Montana RTS operations.
Sec5309 ID:	
Amend Date:	07/2018
Remarks/Amend Action:	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

Funding Information (YOE)

Fed. Funding Category:	**Regionally Significant or Other (incl FHWA transfers)**
Other FTA Section:	**FHWA CAT 5 - CMAQ Transfer to FTA**
Federal (FTA) Funds:	$973,322
State (TXDOT) Funds:	$0
Other Funds:	$1,437,961
Fiscal Year Cost:	**$2,411,283**
Construction: $2,411,283	PE: $0 ROW: $0
Total Project Cost:	**$2,411,283**
TDC Amount Requested:	$0
TDC Awarded Date & Amount:	$0

AMENDMENT HISTORY

History STIP Rev Date	History FY	History Date	History Note/Amendment
07/2018	2022	05/2018	Program D2045 MTP, D19-22 TIP, 19-22 STIP, in FY 2022.

Financial Section

Transit projects are included in this TIP. This public notice and time established for public review and comments satisfies FTA Program of Projects (POP) and public participation requirements.

EL PASO MPO - District 24

FY 2019 - 2022 Transportation Improvement Program

Funding by Category

Thursday, April 26, 2018

		FY 2019		FY 2020		FY 2021		FY 2022		Total FY 2019 - 2022	
Category	Description	Programmed	Authorized	Programmed	Authorized	Programmed	Authorized	Programmed	Authorized	Programmed	Authorized
1	Preventive Maintenance & Rehabilitation	$20,540,000	$20,540,000	$21,270,000	$21,270,000	$22,000,000	$22,000,000	$22,780,000	$22,780,000	$86,590,000	$86,590,000
2M or 2U	Urban Area (Non- TMA) Corridor Projects	$43,110,000	$43,110,000	$34,872,664	$35,100,000	$36,980,000	$36,980,000	$36,560,000	$36,560,000	$151,522,664	$151,750,000
3	Non-Traditionally Funded Transportation Project (Includes Prop 12v1, Prop 12v2, Prop 14, Lcl funds)	$1,706,932	$1,706,932	$149,307	$149,307	$3,673,578	$3,673,578	$1,194,630	$1,194,630	$6,724,447	$6,724,447
4	Statewide Connectivity Corridor Projects	$126,116,604	$126,120,000	$12,274,620	$12,274,620	$0	$0	$0	$0	$138,391,224	$138,394,620
5	CMAQ	$10,072,819	$10,980,000	$10,666,933	$11,240,000	$11,389,889	$11,390,000	$11,446,537	$11,540,000	$43,576,178	$45,150,000
5 Flex	Map21 Flex	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
6	Structures	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
7	Metro Mobility & Rehab	$19,080,000	$19,080,000	$19,900,000	$19,900,000	$20,150,000	$20,150,000	$20,420,000	$20,430,000	$79,550,000	$79,560,000
8	Safety	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
9	Transportation Enhancements	$2,465,500	$2,465,500	$0	$0	$0	$0	$0	$0	$2,465,500	$2,465,500
9 Flex	TAP	$1,510,485	$2,063,306	$823,523	$1,400,000	$0	$1,400,000	$0	$1,400,000	$2,334,008	$6,263,306
10	Supplemental Transportation Projects (Includes:Earmark, GR, CBI, KTXB)	$12,655,874	$12,665,874	$0	$0	$0	$0	$0	$0	$12,655,874	$12,665,874
11	District Discretionary	$10,000,000	$13,560,000	$3,400,000	$3,560,000	$3,288,920	$3,560,000	$3,560,000	$3,560,000	$20,248,920	$24,240,000
12	Strategic Priority	$63,930,000	$63,930,000	$0	$0	$0	$0	$0	$0	$63,930,000	$63,930,000
12C	Strategic Priority RECON (CMAQ)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
12S	Strategic Priority RECON (STP)	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
SBPE	Strategy Budget PE	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
SB 102	Strategy 102 Budget	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
	Total	$311,188,214	$316,221,612	$103,357,047	$104,893,927	$97,482,387	$99,153,578	$95,961,167	$97,464,630	$607,988,815	$617,733,747

Funding Participation Source

Source	FY 2019	FY 2020	FY 2021	FY 2022	Total
Federal	$247,586,052	$82,566,192	$87,130,831	$87,921,230	$505,204,305
State	$55,870,200	$16,205,268	$4,400,000	$4,556,000	$81,031,468
Local Match	$6,025,030	$4,436,280	$2,277,978	$2,289,307	$15,028,595
CAT 3 - Local/State Contributions	$1,706,932	$149,307	$3,673,578	$1,194,630	$6,724,447
Total	$311,188,214	$103,357,047	$97,482,387	$95,961,167	$607,988,815

El Paso Metropolitan Planning Organization

EL PASO MPO - New Mexico District 1 & 2

2018- 2021 NM State Transportation Improvement Program

Destino 2019-2022 TIP

Funding by Category

Monday, March 5, 2018

	FY 2019		FY 2020		FY 2021		Total FY 2018 - 2021	
Description	**Programmed**	**Authorized**	**Programmed**	**Authorized**	**Programmed**	**Authorized**	**Programmed**	**Authorized**
CAQ (CMAQ Mandatory)	$1,444,165	$1,444,165	$0	$0	$0	$0	$1,444,165	$1,444,165
Dona Ana County	$11,154	$11,154	$0	$0	$0	$0	$11,154	$11,154
HPP (High Priority Projects)	$0	$0	$0	$0	$0	$0	$0	$0
NHPP (National Highway Performance Program)	$0	$0	$0	$0	$2,800,000	$2,800,000	$2,800,000	$2,800,000
NHPP (National Highway Performance Program)-Freight	$0	$0	$0	$0	$0	$0	$0	$0
NM State Funds	$980,000	$980,000	$0	$0	$2,700,000	$2,700,000	$3,680,000	$3,680,000
STPF (Surface Transp Prog Flexible)	$0	$0	$0	$0	$3,000,000	$3,000,000	$3,000,000	$3,000,000
STPL (Surface Transp Prog Large Urban >200K)	$812,000	$812,000	$0	$0	$1,000,000	$1,000,000	$1,812,000	$1,812,000
TAPL (Transp. Alternative Prog Large Urban >200K)	$54,018	$54,018	$0	$0	$0	$0	$54,018	$54,018
Total	**$3,301,337**	**$3,301,337**	**$0**	**$0**	**$9,500,000**	**$9,500,000**	**$12,801,337**	**$12,801,337**

Funding Participation Source

Source	FY 2019	FY 2020	FY 2021	Total
Federal Participation	$2,804,364	$0	$8,116,800	$10,921,164
State Participation	$142,688	$0	$1,383,200	$1,525,888
Local Participation	$343,131	$0	$0	$343,131
Local/State Contributions	$11,154	$0	$0	$11,154
Total	**$3,301,337**	**$0**	**$9,500,000**	**$12,801,337**

Transit Financial Summary

El Paso MPO - TXDOT District 24

FY 2019 - 2022 Transportation Improvement Program

All Figures in Year of Expenditure (YOE) Dollars

Thursday, April 26, 2018

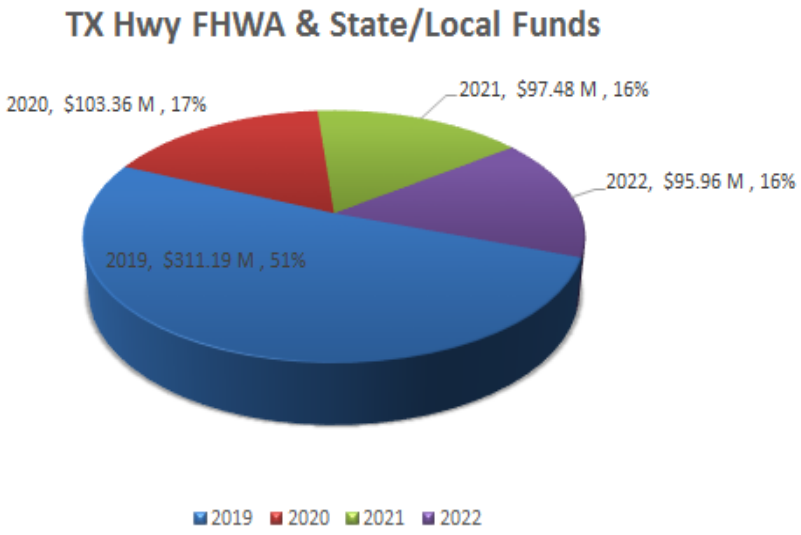
	Transit Program	FY 2019			FY 2020			FY 2021		
		Federal	Match	Total	Federal	Match	Total	Federal	Match	Total
1	Sec. 5307 - Urbanized Formula >200K	$13,501,850	$3,375,463	$16,877,313	$13,475,267	$3,368,818	$16,844,085	$13,610,012	$3,402,502	$17,012,514
2	Sec. 5307 - Urbanized Formula <200K	$0	$0	$0	$0	$0	$0	$0	$0	$0
3	Sec. 5309 - Fixed Guideway Investment	$1,440,000	$360,000	$1,800,000	$0	$0	$0	$0	$0	$0
4	Sec. 5337 - State of Good Repair	$0	$0	$0	$0	$0	$0	$0	$0	$0
5	Sec. 5339 - Bus & Bus Facilities >200K	$1,729,811	$432,452	$2,162,263	$3,397,093	$849,273	$4,246,366	$2,429,287	$607,322	$3,036,609
6	Sec. 5310 - Seniors & People w/Disabilities >200K	$708,384	$0	$708,384	$650,000	$0	$650,000	$650,000	$0	$650,000
7	Sec. 5316 - JARC >200K	$0	$0	$0	$0	$0	$0	$0	$0	$0
8	Sec. 5317 - New Freedom >200K	$0	$0	$0	$0	$0	$0	$0	$0	$0
9	Other FTA	$0	$0	$0	$0	$0	$0	$0	$0	$0
10	Regionally Significant or Other (incl FHWA transfers)	$2,400,000	$600,000	$3,000,000	$3,440,000	$860,000	$4,300,000	$3,647,548	$4,585,466	$8,233,014
	Total Funds	**$19,780,045**	**$4,767,915**	**$24,547,960**	**$20,962,360**	**$5,078,091**	**$26,040,451**	**$20,336,847**	**$8,595,290**	**$28,932,137**
	Transportation Development Credits									
	Requested			$0			$0			$0
	Awarded			$0			$0			$0

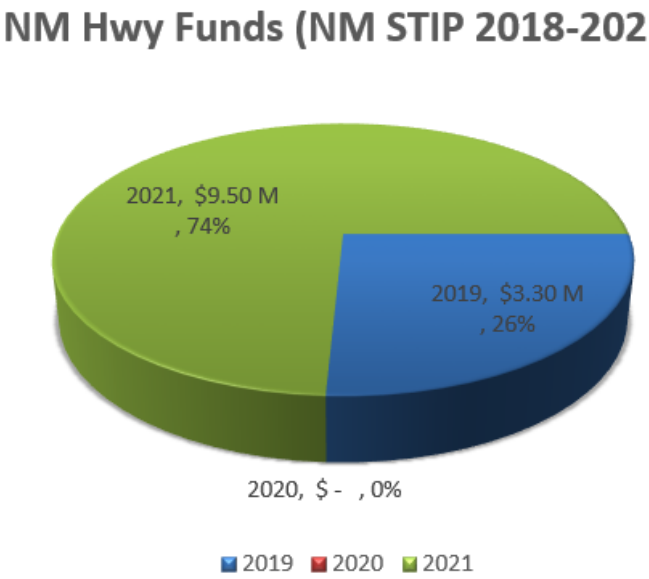
All Figures in Year of Expenditure (YOE) Dollars

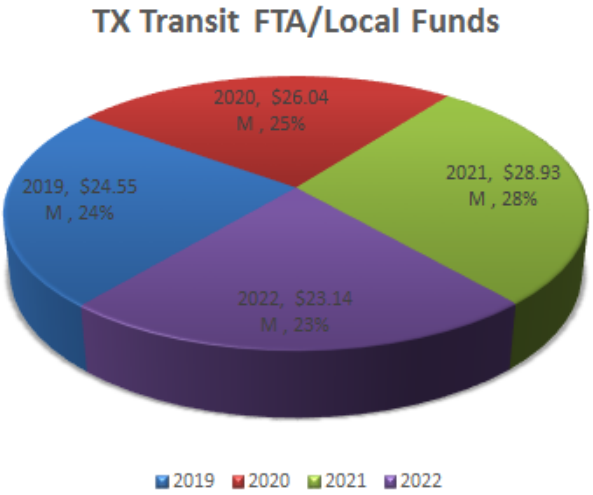
	Transit Program	FY 2022			TOTAL		
		Federal	State/Other	Total	Federal	State/Other	Total
1	Sec. 5307 - Urbanized Formula >200K	$13,586,607	$3,396,652	$16,983,259	$54,173,736	$13,543,435	$67,717,171
2	Sec. 5307 - Urbanized Formula <200K	$0	$0	$0	$0	$0	$0
3	Sec. 5309 - Fixed Guideway Investment	$0	$0	$0	$1,440,000	$360,000	$1,800,000
4	Sec. 5337 - State of Good Repair	$0	$0	$0	$0	$0	$0
5	Sec. 5339 - Bus & Bus Facilities >200K	$2,475,120	$618,780	$3,093,900	$10,031,311	$2,507,828	$12,539,138
6	Sec. 5310 - Seniors & People w/Disabilities >200K	$650,000	$0	$650,000	$2,658,384	$0	$2,658,384
7	Sec. 5316 - JARC >200K	$0	$0	$0	$0	$0	$0
8	Sec. 5317 - New Freedom >200K	$0	$0	$0	$0	$0	$0
9	Other FTA	$0	$0	$0	$0	$0	$0
10	Regionally Significant or Other (incl FHWA transfers)	$973,322	$1,437,961	$2,411,283	$10,460,870	$7,483,427	$17,944,297
	Total Funds	**$17,685,049**	**$5,453,393**	**$23,138,442**	**$78,764,301**	**$23,894,690**	**$102,658,990**
	Transportation Development Credits						
	Requested			$0			$0
	Awarded			$0			$0

Analyses Section

The illustrations below show a summary of the Total Costs per Fiscal Year for Texas Highway FHWA/Local Funds, New Mexico Highway/Transit Funds, and Texas Transit FTA/Local Funds.





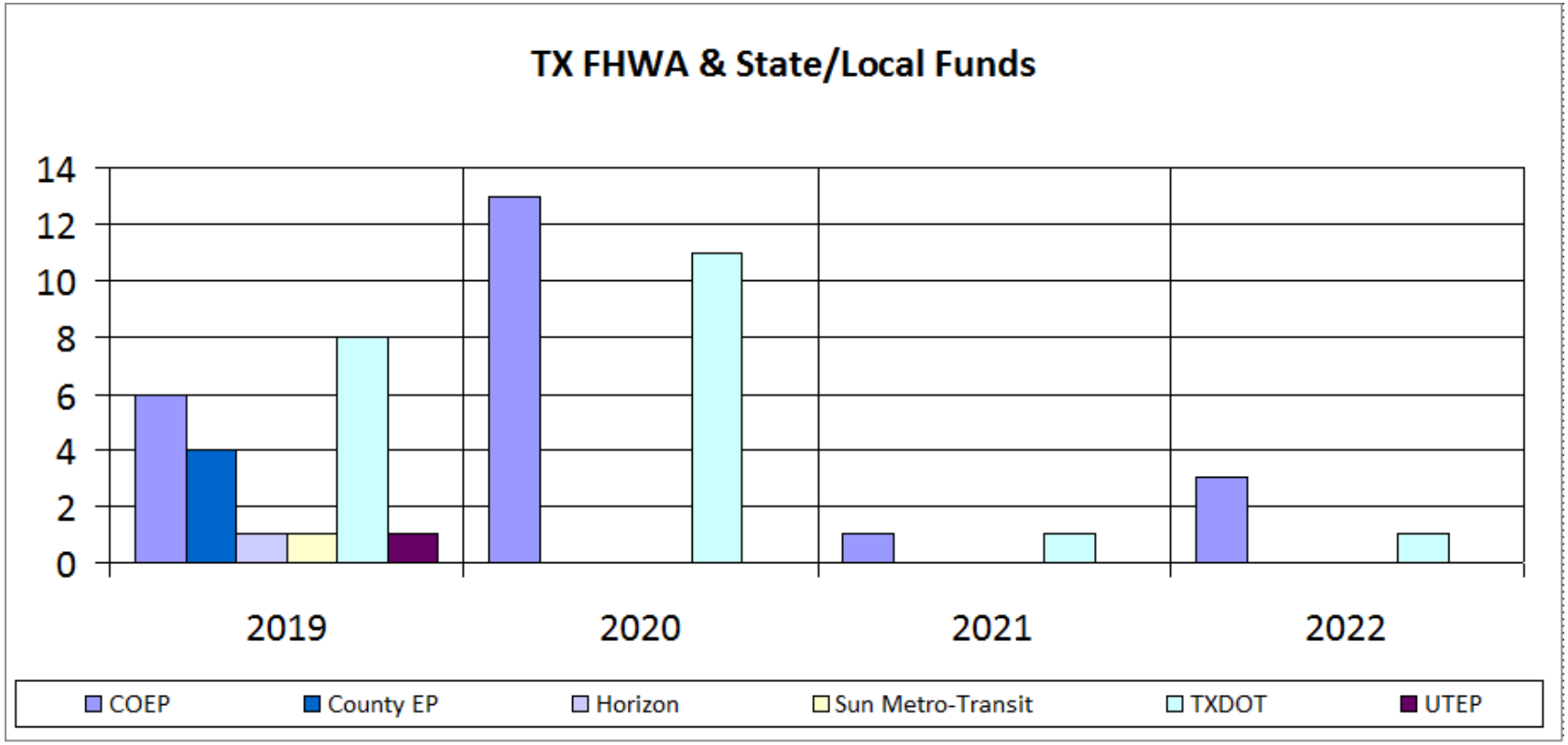


Destino 2019-2022 TIP

TX FHWA & State/Local Funds

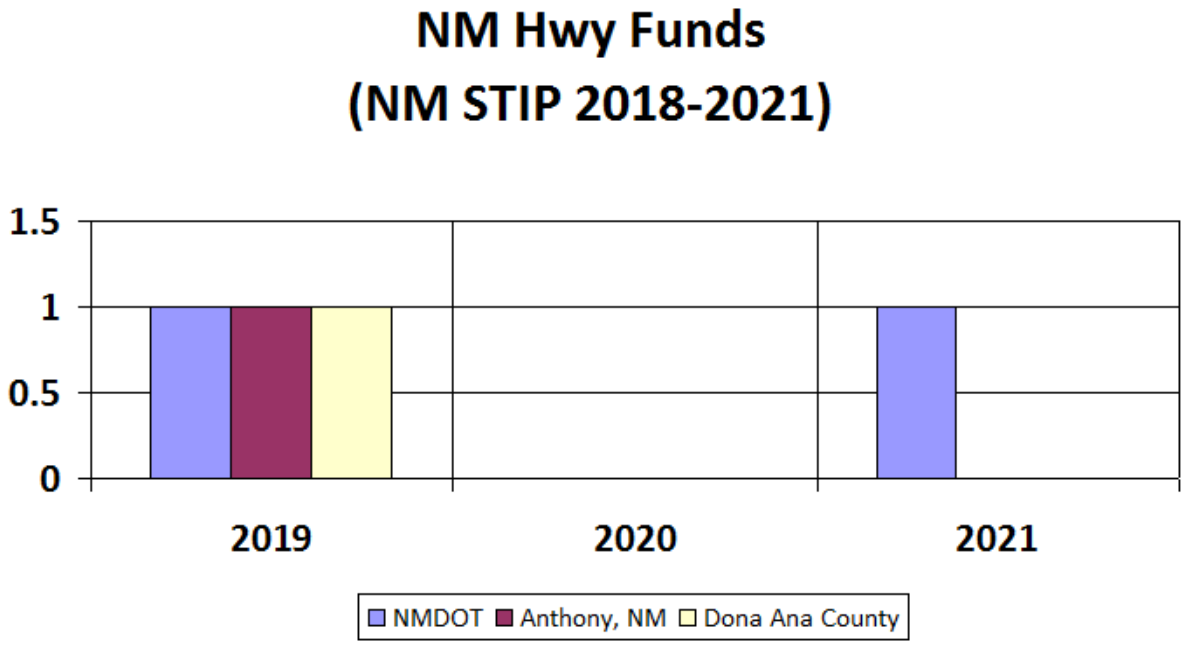
Monday, March 5, 2018

Fiscal Year	Total YOE	Total Projects	COEP	County EP	Sun Metro-Transit	TXDOT	UTEP
2019	$340,309,777	29	6	3	1	8	1
2020	$105,497,047	28	13	-	-	11	-
2021	$97,482,387	7	1	-	-	2	-
2022	$96,591,167	6	3	-	-	2	-
	$639,880,378	70	23	3	1	23	1



NM Hwy Funds

Fiscal Year	Total YOE	Total Projects	NMDOT	Anthony, NM	Dona Ana County
2019	$3,301,337	3	1	1	1
2020	$0				
2021	$9,500,000	1	1		
	$12,801,337	4	2	1	1

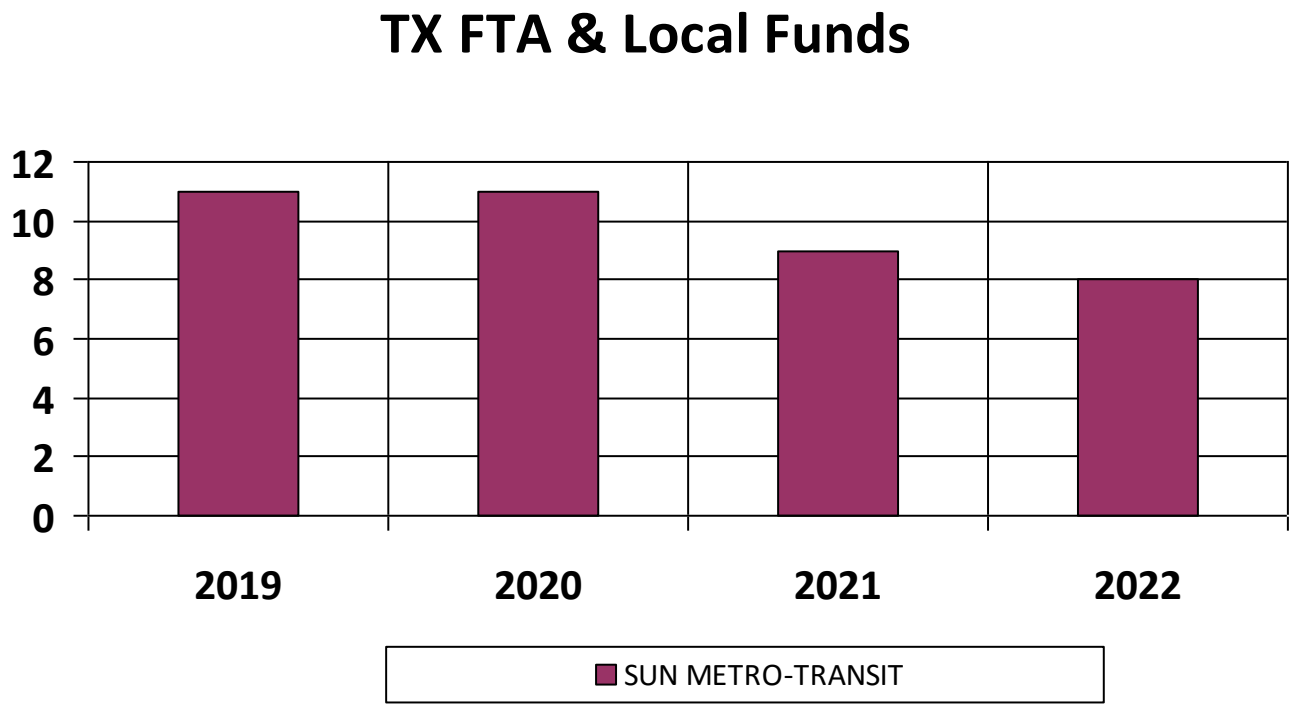


Destino 2019-2022 TIP

TX FTA & Local Funds

Monday, March 5, 2018

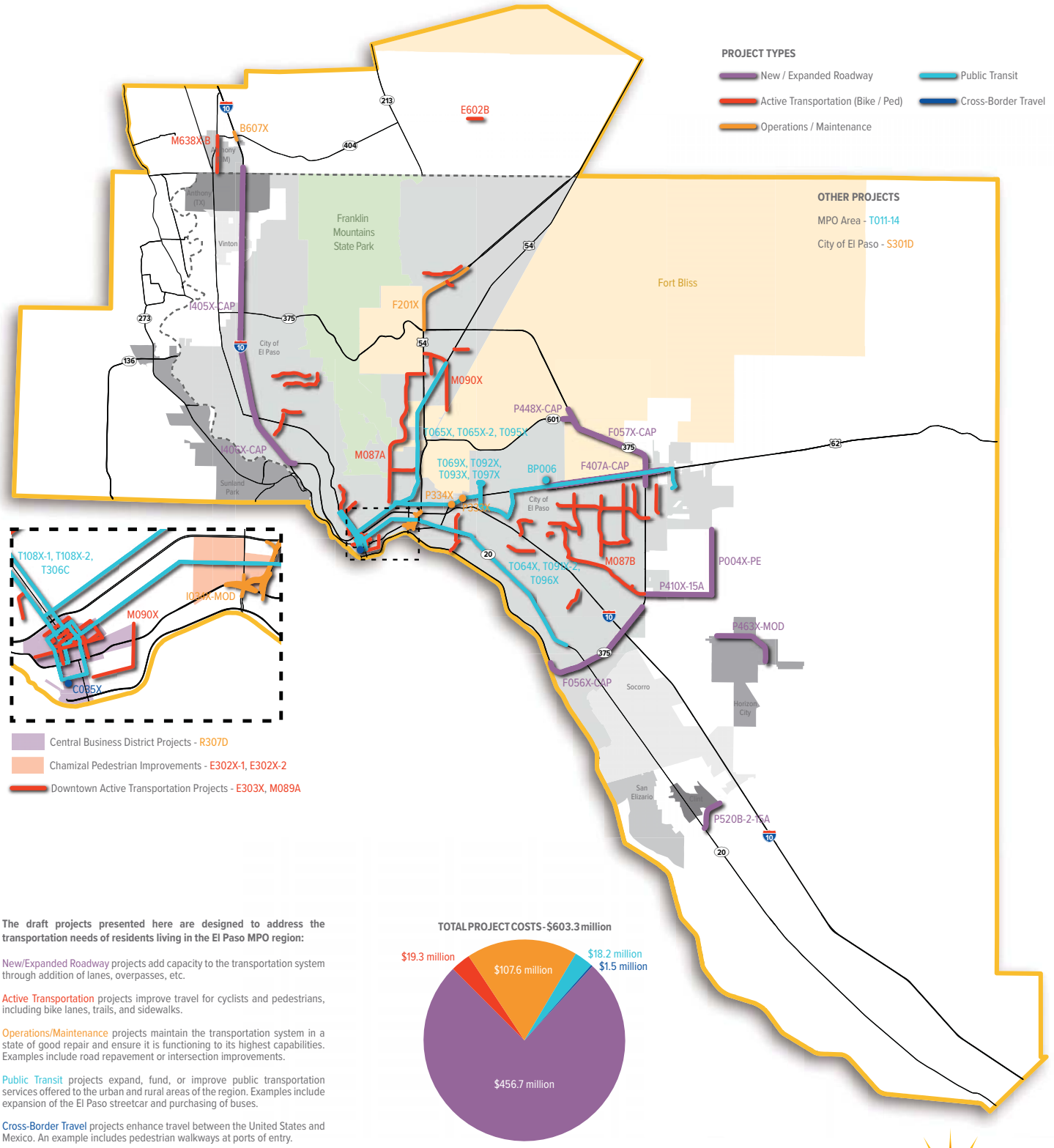
Fiscal Year	Total YOE	Total Projects	Sun Metro-Transit
2019	$24,547,960	17	11
2020	$26,040,451	16	11
2021	$28,932,137	14	9
2022	$23,138,442	10	8
	$102,658,990	57	39



[4]Map Section

[4] *Map may not contain all projects in this document, only map-able projects will be illustrated.

DRAFT PROGRAM OF TIP PROJECTS



The draft projects presented here are designed to address the transportation needs of residents living in the El Paso MPO region:

New/Expanded Roadway projects add capacity to the transportation system through addition of lanes, overpasses, etc.

Active Transportation projects improve travel for cyclists and pedestrians, including bike lanes, trails, and sidewalks.

Operations/Maintenance projects maintain the transportation system in a state of good repair and ensure it is functioning to its highest capabilities. Examples include road repavement or intersection improvements.

Public Transit projects expand, fund, or improve public transportation services offered to the urban and rural areas of the region. Examples include expansion of the El Paso streetcar and purchasing of buses.

Cross-Border Travel projects enhance travel between the United States and Mexico. An example includes pedestrian walkways at ports of entry.

MPO Self-Certification

MPO Self-Certification

In accordance with 23 Code of Federal Regulations (CFR) part 450.334 and 450.220 of the Fixing America's Surface Transportation Act (FAST Act), the Texas Department of Transportation, and the El Paso Metropolitan Planning Organization for the El Paso urbanized area(s) hereby certify that the metropolitan transportation planning process is being conducted in accordance with all applicable requirements including:

1) 23 United States Code (U.S.C) 134, 49 U.S.C 503, and 23 CFR 450 subpart C – Metropolitan Transportation Planning and Programming;
2) In nonattainment and maintenance areas, sections 174 and 176 (c) and (d) of the Clean Air Act, as amended (42 U.S.C. 7504, 7506 (c) and (d)) and 40 CFR part 93;
3) Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d-1) and 49 CFR part 21;
4) 49 U.S.C. 5332, prohibiting discrimination on the basis of race, color, creed, national origin, sex, or age in employment or business opportunity;
5) Section 1101(b) of the FAST Act (Public Law 109-59)) and 49 CFR part 26 regarding the involvement of disadvantaged business enterprises in USDOT funded projects;
6) 23 CFR part 230, regarding the implementation of an equal employment opportunity program on Federal and Federal-aid highway construction contracts;
7) The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) and 49 CFR parts 27, 37, and 38;
8) The Older Americans Act, as amended (42 U.S.C. 6101), prohibiting discrimination on the basis of age in programs or activities receiving Federal financial assistance;
9) Section 324 of title 23 U.S.C. regarding the prohibition of discrimination based on gender; and
10) Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) and 49 CFR part 27 regarding discrimination against individuals with disabilities.

Robert Bielek, P.E.

Robert Bielek, P.E. – District Engineer
Texas Department of Transportation-El Paso

May 18, 2018
Date

Joe Moody, Chairperson
Transportation Policy Board

May 18, 2018
Date

Trent Doolittle

Trent Doolittle, P.E. – District Engineer
New Mexico Department of Transportation

May 18, 2018
Date

MPO SELF-CERTIFICATION FOR NON-ATTAINMENT AREAS CERTIFICATION STATEMENT

The following information provides a summary of policies, procedures, and planning activities of the El Paso Metropolitan Planning Organization (MPO) and its Transportation Policy Board set forth to meet the requirements of federal transportation and air quality planning regulations in carrying out the FY2014 and FY 2015 Unified Planning Work Program for Regional Transportation Planning and biennial development of the Transportation Improvement Program.

Metropolitan Planning: 23 U.S.C. 134, 49 U.S.C 5303, and implementing regulations;

The El Paso MPO's planning process is based on using state-of-the-art procedures, encompassing accurate data and methodologies, applied in a professional and unbiased manner. This planning process is carried out through an open approach that includes all local, state and federal transportation and air quality related agencies and organization, local elected officials and the public in the decision-making process. The continued focus of the MPO planning process is on the use of innovative techniques, as well as facilitating communication and partnerships as key mechanisms for improving mobility and air quality.

This process is carried out through the implementation of the Unified Planning Work Program through Performance Based Planning and the development of a financial and fiscally constrained long-range multi-modal transportation plan for the region; the biennial development of the Transportation Improvement Program; the development and adoption of the Metropolitan Transportation Plan every four years; the ongoing implementation of the region's Congestion Management Process focusing on the Travel Demand Management (TDM), Transportation Systems Management (TSM), and Intelligent Transportation System (ITS) technology; working closely with transportation providers throughout the region to conduct major investment and corridor feasibility studies which serve to evaluate, refine, and select transportation options for implementation; and ensuring that policies, programs, and projects when implemented will result in improved air quality for the region through the air quality conformity process.

Statewide Planning: U.S.C. Title 23, Sec. 135, U.S.C. Title 49, Ch. 53, Secs 5307-5311 and 5323(l); and 23 CFR Part 450.220

El Paso MPO works closely with TXDOT-El Paso District Office, the TXDOT Transportation Planning and Programming Division, and the Texas Transportation Commission to support the planning, funding, and implementation of transportation improvements. Whenever called upon, planning assistance is provided to assist TXDOT in meeting Statewide Planning requirements. The MPO and the State share financial information to carry out the financial constraint requirements of the planning process.

Clean Air Act: Air Pollution Prevention and Control: In non-attainment and maintenance area, section 174 and 176 © and (d) of the Clean Air Act, as amended (42, U.S.C. 7504, 7506 (c) and (d)) and 40 CFR part 93;

It is the policy of the El Paso MPO and its Transportation Policy Board that the continuing, cooperative, and comprehensive transportation planning process carried out by the MPO shall be done in coordination with the transportation-air quality planning process carried out by the State of Texas. Furthermore, it is the policy of the El Paso MPO and its Transportation Policy Board to not adopt a Metropolitan Transportation Plan or a Transportation Improvement Program until each plan or program has been demonstrated to be in conformity with the State Implementation Plan for Air Quality, including the air quality conformity requirements as set forth in the Clean Air Act Amendments of 1990. Resources are allocated biennially as part of the Unified Planning Work Program to ensure the coordination of the El Paso MPO transportation and air quality planning activities, and support determination of the air quality conformity process of the Metropolitan Transportation Plan and the Transportation Improvement Program. The El Paso MPO is an active partner with state and federal agencies as a member of the Air Quality Conformity Consultation Process.

Title VI of the Civil Rights Act of 1964, as amended (42 U.S.C. 2000d-1) and 49 CRF part 21; The Older Americans Act, as amended (42 U.S.C. 6101), prohibiting discrimination on the bases of age in programs or activities receiving Federal financial assistance; and Section 324 of title 23 U.S.C. regarding the prohibition of discrimination based on gender;

The El Paso MPO is committed throughout the development of its plans and programs to ensure that no person on the grounds of age, gender, race color or national origin is excluded from participation in, denied the benefits of, or subjected to discrimination under any program receiving federal financial assistance. No plans, programs or policies developed or implemented by the El Paso MPO will have a disproportionately high adverse human health or environmental effect on minority and low-income populations. The El Paso MPO plans continue to work on improving the accessibility of employment to the identified protected populations. Further, many of the current MPO public meetings are held in minority and low-income communities in the region and are located near accessible public transit facilities. Funding is allocated as part of the Unified Planning Work Program for a Title VI Plan to maintain an analytical approach that produces procedures that meet Title VI requirements by ensuring that federally-funded transportation projects adequately consider effects on low-income and minority segments of the population.

Disadvantaged Business Enterprises (DBE) in planning projects: 49 U.S.C. 5332, prohibiting discrimination on the basis of race, color, creed, national origin, sex or age in employment business opportunity; and Section 1101 (b) of the SAFETEA-LU (Pub. L. 109-59) and 49 CFR part 26 regarding the involvement of disadvantaged business enterprises in USDOT funded projects; 23 CFR part 230, regarding the implementation of an equal employment opportunity program on Federal and Federal-aid highway construction contracts;

The El Paso MPO follows the City of El Paso's Disadvantaged Business Enterprise which in turn follows the TXDOT DBE Plan. Funding is allocated as part of the Unified Planning Work Program to maintain an analytical approach that produces procedures that meet Environmental Justice requirements by ensuring that federally-funded transportation projects adequately consider effects on low-income and minority segments of the population.

Americans with Disabilities Act of 1990: The provision of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) and 49 CFR parts 27, 37, and 38; and Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) and 49 CFR part 27 regarding discrimination against individuals with disabilities.

It is the policy of the El Paso MPO to ensure that all agency programs and services are accessible to people with disabilities and are in compliance with the applicable regulations as a condition of receiving Federal financial assistance from the Department of Transportation. The El Paso MPO will make reasonable accommodations to a qualified individual with a disability who attends on-site meetings and meeting facilities meet this requirement. Every effort is made to ensure that meeting facilities off-site are ADA accessible. A notice is published in advance of all MPO public meetings that reasonable accommodations will be provided for meeting locations on and off-site with a phone number and contact persons listed to provide assistance if needed. In addition, the El Paso MPO staff is actively involved in various ADA-related initiatives which are being carried out as part of the Unified Planning Work Program including Elderly and Disabled Planning, the Job Access/Reverse Commute Program, and the review of ADA compliance documents developed by the region's transit and paratransit agencies, all of which focus on ensuring that transportation program and services across the region are accessible to those citizens with disabilities.

Restrictions on influencing certain federal activities: CFR 29, Part 20;

It is the policy of the El Paso MPO that no state or federal funds received by the agencies shall be paid to any person for the purpose of influencing the award of a federal contract, grant, or loan or the entering into of a cooperative agreement. NO state or federal funds received by the agencies shall be used directly or indirectly to influence any member of Congress, any membe3r of the State Legislature, or any local elected official to favor or oppose the adoption of any prosed legislation pending before any federal, state, or local legislative body.

Glossary

ADA	Americans With Disabilities Act
ADT	Average Daily Traffic
ATS	Austin Transportation Study
BEEP	Buspool Express El Paso
BOTA	Bridge of the Americas
CAAA	Clean Air Act Amendments
CBD	Central Business District
CBI	Coordinated Border Infrastructure
CMAQ	Congestion, Mitigation, & Air Quality
CMP	Congestion Management Program
CO	Carbon Monoxide
DHDCC	Department Heads Development Coordinating Committee
TP&P	Transportation Planning and Programming Division, TXDOT Austin
EMPACT	Environmental Monitoring for Public Access and Community Tracking
EPA	U.S. Environmental Protection Agency
EPUTS	El Paso Urban Transportation Study
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
FAST Act	Fixing America's Surface Transportation Act
GIS	Geographic Information System
HOV	High Occupancy Vehicle
HSMS	Highway Safety Management System
ISTEA	Intermodal Surface Transportation Efficiency Act
ITS	Intelligent Transportation System
IVHS	Intelligent Vehicle Highway System
MAP-21	Moving Ahead for Progress in the 21st Century
MBE	Minority Business Enterprise Program
MPO	Metropolitan Planning Organization: City of El Paso
MTD	Mass Transit Department (Sun Metro)
MTP	Metropolitan Transportation Plan
NAFTA	North American Free Trade Agreement
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHS	National Highway System
NMDOT	New Mexico Department of Transportation
NMED	New Mexico Environment Department
NOx	Nitrogen Oxide
O-D	Origin-Destination
PAC	Policy Advisory Committee
PC	Personal Computer
PDP	Project Development Plan
PIP	Public Involvement Program
POE	Port-of-Entry

PM10	Particulate Matter 10 Microns or Less
PMIS	Pavement Management Information System
RFP	Request For Proposal
ROW	Right of Way
RPC	Regional Planning Commission
RPO	Regional Planning Organization
RTC	Regional Transportation Commission
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act – A Legacy for Users
SAM	Statewide Analysis Model
SCC	Subdivision Coordinating Committee
SIP	State Implementation Plan
SOV	Single Occupancy Vehicle
S.T.E.P.	Statewide Transportation Enhancement Program
STIP	Statewide Transportation Improvement Program
STP-MM	Surface Transportation Program – Metro-Mobility
TAP	Transportation Alternatives Program
TAZ	Transportation Analysis Zone
TCSP	Transportation, Community and System Preservation
TIF	Tax Increment Financing
T&T	Traffic and Transportation Department
TCM	Transportation Control Measure
TEA-21	Transportation Equity Act for the 21st Century
TIP	Transportation Improvement Program
TMA	Transportation Management Area
TCEQ	Texas Commission on Environmental Quality
TPB	Transportation Policy Board
TPC	Transportation Planning Coordinator
TRZ	Transportation Reinvestment Zone
TSC	Transportation Steering Committee
TSM	Transportation System Management
TTC	Texas Transportation Commission
TTI	Texas Transportation Institute
TXDOT	Texas Department of Transportation
TWG	Technical Work Group
UPWP	Unified Planning Work Program
USP	Urban Street Program
UTA	University of Texas at Arlington
UTEP	University of Texas at El Paso
UTP	Unified Transportation Program
VOC	Volatile Organic Compound
VMT	Vehicles Miles Traveled
VRF	Vehicle Registration Fee
WtW	Welfare to Work
YOE	Year of Expenditure
2008 CMP	2008 Comprehensive Mobility Plan
2013 EPC CMP	2013 El Paso County Comprehensive Mobility Plan

Appendix A
CMAQ Analyses

CMAQ ANALYSES
DESTINO 2019-2022 TIP

January 2018 Table of Contents

Emission Reduction Analysis for City of El Paso Proposed CMAQ Project

Paso Del Norte POE Roundabout

April 2016

Prepared for

By

Texas A&M Transportation Institute

Task Summary

The Texas A&M Transportation Institute (TTI) was tasked by the City of El Paso to perform a mobile source emissions analysis for a proposed project in the El Paso metropolitan region. The city is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement the project.

The project will construct a one lane traffic roundabout at the intersection of S. El Paso St. and E. 6th Ave. just north of the Paso Del Norte port of entry.

Individual Project Analysis

The emissions analysis for the project is presented below. The project name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy.

Given the short time available to conduct this analysis, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ applications, but more time and effort would increase the accuracy of the emissions benefits. As a result, this analysis should not be used for conformity purposes.

Paso Del Norte POE Roundabout

The City of El Paso proposes to construct the Paso Del Norte (PDN) POE Roundabout at S. El Paso St. and E. 6th Ave. just north of the port of entry. The roundabout replaces an unsignalized intersection with one stop sign on westbound E. 6th Ave. The city will design and construct a roundabout to accommodate 1 lane and parameters as described in the FHWA NCHRP Report 672, to include but not limited to concrete and asphalt roadway intersection, signage, markings and striping. The project length is 0.14 miles

Data Sources

The City of El Paso provided several items containing project information and data for the analysis: project description and scope plus the design plans for the roundabout. These resources provided the research team with a better understanding of the proposed project and potential emissions benefits.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014a Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." This inventory file is currently being updated by TTI with 2014 data and the research team was granted access to these newer inputs for this analysis. The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

To better understand the traffic improvements from roundabouts, the research team reviewed the Mississippi Department of Transportation State Study 213: *Performance Evaluation of Roundabouts for Traffic Delay and Crash Reductions in Oxford, MS* published in June 2011.

Analysis Methods

TTI staff used a modified version of the analysis method provided in the August 2008 version of the MOSERs Guide, Equation 7.2 - *Traffic Operations*. The equation attempts to estimate the improvements in idling emission and speed changes as a result of operational improvements. For this particular project, the primary benefit is the changes in idling emissions. The modified equation is provided below in Strategy Equation.

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10.
- The analysis year used is 2019.
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs), gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31). These vehicle types appear to be the vast majority in the area at this port of entry.

- Running exhaust and evaporative emissions, break wear and tire wear emissions rates were calculated.
- Considering the project area and the type of emissions reduced through the strategy, emissions on Road Type 5, urban unrestricted access were analyzed.
- Idling speed in MOVES2014a is speed bin 1.
- The analysis period is from 6:00 a.m. to 6:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10. Use of the roundabout can occur throughout the day, but the greatest impact on emissions will occur with any peak hour or daytime mode shift.
- The idling emissions reduced as a result of project were distributed across the 12 hours and by vehicle types and fuel types in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects. TTI staff attempted to determine a valid delay reduction from the intersection improvement. The characteristics of this new facility may provide impetus for significant mode shift, but planners should use available data.

The following assumptions were made for the project:

- In reviewing the data and information provided, the primary emissions benefit from this project is the reduction in delay from removal the existing stop sign on westbound 6th Ave. traffic from the gated parking lot on the west side of the intersection appears negligible. Northbound traffic on S. El Paso St. will actually see a speed reduction from a current 30 mph to 15 mph through the roundabout. This will increase safety, but the model may also show a slight increase in emissions, which are greater at slower speeds.
- Light-duty passenger vehicle and light-duty passenger truck projected AADT of 2,750 is estimated for E. 6th St. This figure is estimated based on 2012 TxDOT traffic counts east of the intersection and 2014 City of El Paso traffic counts at 4th Ave. and S. El Paso St. Future AADT is estimated based on the data plus a professional estimate of traffic growth and an averaging of the counts. It assumes 80% of the daily traffic along the roadways occurs in the 12-hour daytime period under analysis. It also assumes two-thirds of traffic at the intersection is incoming westbound.
- Average delay reduction is assumed to be 20 seconds in peak hours and 5 seconds in off-peak hours.
- Facility length of 0.14 miles is computed.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Equation 7.2, Traffic Operations (modified)

Daily Emission Reduction = $(I_P + I_{OP}) * EF_I$

Change in idling exhaust emissions from improved traffic flow during the peak and off-peak periods

Where

$I_P = (N_{PH} * V_{H,P} * DR_P)/3600$ seconds per hour
$I_{OP} = (N_{OPH} * V_{H,OP} * DR_{OP})/3600$ seconds per hour

Reduction of idling in the peak and off-peak period

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute (modified from CARB and FHWA Southern Resource Center)

Variables:

DR_P:	Estimated delay reduction during peak period (seconds)
DR_{OP}:	Estimated delay reduction during off-peak period (seconds)
EF_I:	Idling emission factor (grams/hour)
I_P:	Peak hour reduction in idling emissions (vehicle-hours)
I_{OP}:	Off-peak hour reduction in idling emissions (hours)
N_{PH}:	Number of peak hours
N_{OPH}:	Number of off-peak hours
$V_{H,P}$:	Number of vehicles that pass through the intersection per hour during the peak period
$V_{H,OP}$:	Number of vehicles that pass through the intersection per hour during the off-peak period

Analysis

Results

Daily Emission Reduction = $(I_P + I_{OP}) * EF_I$

Note: For presentation purposes, the individual emissions rates are not given in the results below.

Where

$I_P = (6 * 150 * 20)/3600$ seconds per hour

I_{OP} = (6 * 100 * 5)/3600 seconds per hour

(5 + 0.83) = 5.83

For CO:

5.83 * EF_I = 556.861 grams/day

Daily emission reduction is equal to 0.557 kg/day

For NOx:

5.83 * EF_I = 37.124 grams/day

Daily emission reduction is equal to 0.037 kg/day

For VOC:

5.83 * EF_I = 44.295 grams/day

Daily emission reduction is equal to 0.044 kg/day

For PM-10:

5.83 * EF_I = 23.861 grams/day

Daily emission reduction is equal to 0.024 kg/day

Summary of Results

The overall emissions analysis results for the project are shown in Table 1. The estimated emissions benefits from the roundabout are modest, but an emissions benefit in the El Paso region can be expected from this project.

Table 1. Estimated Emissions Benefits from Paso Del Norte POE Roundabout

Pollutant	Emissions Reduction (kg/day)
CO	0.557
NOx	0.037
VOC	0.044
PM_{10}	0.024

Emission Reduction Analysis for City of El Paso Proposed CMAQ Project

Bicycle Connectivity Infrastructure Improvements Phase 1

April 2016

Prepared for

By

Texas A&M Transportation Institute

Task Summary

The Texas A&M Transportation Institute (TTI) Arlington office was tasked by the City of El Paso to perform a mobile source emissions analysis for a proposed project in the El Paso metropolitan region. The city is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement the project.

The project will construct 10.7 miles of bike lane infrastructure improvements in the region.

Individual Project Analysis

The emissions analysis for the project is presented below. The project name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy.

Given the short time available to conduct this analysis, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ applications, but more time and effort would increase the accuracy of the emissions benefits. As a result, this analysis should not be used for conformity purposes.

Bicycle Connectivity Infrastructure Improvements - Phase 1

The Bicycle Connectivity Infrastructure Improvements – Phase 1 project will install 10.7 miles of bicycle in the El Paso region. These facilities will encourage an alternative form of transportation in the region. The infrastructure will be installed within City right-of-way and no property acquisition is anticipated.

The project will construct bicycle facilities citywide to include: buffered bike lanes, conventional bike lanes, bicycle boulevards, shared lane markings, and protected bicycle lanes. The project will include associated signage, wayfinding, striping, and intersection treatments.

The limits of the improvements are seven roadways: Alabama from Atlas to Arizona; Viscount from Montwood to Interstate Highway 10; Resler from Belvidere to Enid; High Ridge from Resler to Franklin Hills; Robinson from Oregon to Virginia; Fort from Alabama to Dyer; Los Angeles from Yandell to Oregon.

Data Sources

The City of El Paso provided several items containing project information and data for the analysis: project description and scope plus current average speed data for the affected roadways. These resources provided the research team with a better understanding of the proposed project and potential emissions benefits.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014 Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." This inventory file is currently being updated by TTI with 2014 data and the research team was granted access to these newer inputs for this analysis. The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

TTI staff used 2009 American Community Survey data to compute a bicycle mode share for El Paso, along with a future growth rate for the mode in the region.

Analysis Methods

TTI staff used the analysis method provided in the August 2008 version of the MOSERs Guide, Equation 11.1 – *Bicycle and Pedestrian Lanes or Paths*.

Stated in words, the average annual daily traffic (AADT) of the corridor is multiplied by the percentage of drivers shifting to bicycle mode, multiplied by the bike facility length, multiplied by the speed-based running exhaust emission factor for participants' trip before utilizing the bike lane.

The detailed equation is provided below in Strategy Equation.

The analysis year used is 2019. *For planning purposes, the emissions benefit of a static program will decline over time.* Without the increased use of the bike lanes over the project lifetime, any benefits accrued by the mode shift to bicycles may be negated by the increased emissions from potential higher traffic volumes in the corridor over time.

Assumptions in the MOVES2014 output for the project included:

- Output created for VOC, CO, NOx, and PM-10.
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs), gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- Running exhaust and evaporative emissions and start emissions rates were calculated.
- Considering the project area and the type of trips reduced through the strategy, emissions on Road Type 5, urban unrestricted access were analyzed.
- Overall average speed in the seven roadways is assumed to be 30 mph (Speed bin 7).
- The analysis period is from 7:00 a.m. to 7:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10. Use of the bicycle lanes can occur throughout the day, but the greatest impact on emissions will occur with any peak hour or daytime mode shift.
- The vehicle-miles traveled (VMT) reduced as a result of the mode shift to bicycle were distributed proportionally across the 12 hours and by vehicle types and fuel types in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects. TTI staff determined a valid percentage mode shift from automobile to bicycle by participants in El Paso region. The characteristics of this new facility may provide impetus for significant mode shift, but planners should use available data.

The following assumptions were made for the project:

- Light-duty passenger vehicle and light-duty passenger truck AADT of 49,605 is estimated. This figure is based on 2012 and 2013AADT and ADT traffic counts from TxDOT and the City of El Paso. AADT is estimated based on the data plus a professional estimate of traffic growth and an averaging of the counts. It assumes 80% of the daily traffic along the roadways occurs in the 12-hour daytime period under analysis. It assumes 86% of the traffic is passenger vehicles.
- The current percent bicycle mode share for the El Paso region is estimated to be 2.0% and can serve as an optimistic mode share increase for the new bike facilities.
- The 0.02 increase in mode share represents new cyclists (vehicle trips replaced).
- Bike lane facility length of 10.7 miles is computed.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Equation 11.1, Bicycle and Pedestrian Lanes or Paths

Daily Emission Reduction = AADT * PMS * L * EF_B

The average annual daily traffic of the corridor multiplied by the percentage of drivers shifting to bike/pedestrian multiplied by the average bicycle trip length multiplied by the speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program.

Final unit of measure: grams/day
Source: Capitol Area MPO (CAMPO)

Variables: **AADT:** Average annual daily traffic in corridor (vehicles/day)

EF_B: Speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program (NO_x, VOC, or CO) (grams/mile)

L: Length of facility (miles)

PMS: Percentage mode shift from driving to bike/pedestrian (decimal)

Analysis

Results

Daily Emission Reduction = AADT * PMS * L * EF_B

Note: For presentation purposes, the individual emissions rates are not given in the results below.

For CO:

49,605 * 0.02 * 10.7 * EF_B = 23,206.786 grams/day

Daily emission reduction is equal to 23.207 kg/day

For NOx:

49,650 * 0.02 * 10.7 * EF_B = 2,048.159 grams/day

Daily emission reduction is equal to 2.048 kg/day

For VOC:

49,605 * 0.02 * 10.7 * EF_B = 820.184 grams/day

Daily emission reduction is equal to 0.820 kg/day

For PM-10:

49,650 * 0.02 * 10.7 * EF_B = 595.501 grams/day

Daily emission reduction is equal to 0.596 kg/day

Summary of Results

The overall emissions analysis results for the project are shown in Table 1. The estimated emissions benefits from the new bike lanes are modest and are dependent on increased use of bicycles as a travel mode in the city and region, but an emissions benefit in the El Paso region can be expected from this project.

Table 1. Estimated Emissions Benefits from Bicycle Infrastructure Improvements – Phase 1

Pollutant	Emissions Reduction (kg/day)
CO	23.207
NOx	2.048
VOC	0.820
PM_{10}	0.596

Emission Reduction Analysis for TxDOT Proposed CMAQ Project

Operational Improvements at Montana Avenue/Airport Road/Mescalero Drive Intersection

May 2016

Prepared for

Texas Department of Transportation

By

Texas A&M Transportation Institute

Task Summary

The Texas A&M Transportation Institute (TTI) was tasked by the Texas Department of Transportation (TxDOT) to perform a mobile source emissions analysis for a proposed project in the El Paso metropolitan region. The state agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement the project.

The project will construct operational improvements to the intersection of Montana Avenue /Airport Road /Mescalero Drive.

Individual Project Analysis

The emissions analysis for the project is presented below. The project name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy.

Given the short time available to conduct this analysis, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ applications, but more time and effort would increase the accuracy of the emissions benefits. As a result, *this analysis should not be used for conformity purposes.*

Operational Improvements at Montana Ave./Airport Rd./Mescalero Dr. Intersection

The proposed improvements at this location consist of modifying the Airport Road approach to Montana Avenue by relocating it to the east and creating a modified T-intersection between westbound Montana Avenue and Airport Road. The improvements turn both approaches of Mescalero Drive into right-in/right-out intersections. The purpose of these improvements is to increase capacity at this intersection, reducing delays and providing continuous flow for eastbound Montana Avenue.

Data Sources

TxDOT provided several items containing project information and data for the analysis: a project description and scope plus the design plans for the intersection. These resources provided the research team with a better understanding of the proposed project and potential emissions benefits.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014a Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." This inventory file is currently being updated by TTI with 2014 data and the research team was granted access to these newer inputs for this analysis. The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

Analysis Methods

TTI staff used a modified version of the analysis method provided in the August 2008 version of the MOSERs Guide, Equation 7.2 - *Traffic Operations*. The equation attempts to estimate the improvements in idling emission and speed changes as a result of operational improvements. For this particular project, focus was placed on the changes in idling emissions and delay reduction. The modified equation is provided below in Strategy Equation.

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10.
- The analysis year used is 2021. The project is requested for fiscal year 2019 with construction by 2020.
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs), motorcycles, light commercial trucks, single unit short and long-haul trucks, and combination short and long-haul trucks, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 11, 21, 31, 32, 52, 53, 61, 62).
- Running exhaust and evaporative emissions, brake wear, and tire wear emissions rates were calculated.

- Considering the project area and the type of emissions reduced through the strategy, emissions on Road Type 5, urban unrestricted access were analyzed.
- Idling speed in MOVES2014a is speed bin 1.
- The analysis period is from 6:00 a.m. to 6:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10. Use of the intersection occurs throughout the day, but the greatest impact on emissions will occur with any peak hour or daytime mode shift.
- The idling emissions reduced as a result of project were distributed across the 12 hours and by vehicle types and fuel types in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects. TTI staff attempted to determine a valid delay reduction from the intersection improvement.

The following assumptions were made for the project:

- In reviewing the data and information provided, the primary emissions benefit from this project is the reduction in delay from operational improvements.
- Projected ADT of 38,750 is estimated for Montana Ave.; 7,440 for Airport Road; 2,070 for Mescalero Drive. This figure is derived from 2012 TxDOT traffic counts 2013 City of El Paso traffic counts. Future ADT is estimated based on the data plus an annual growth rate of 1.105%. It assumes 80% of the daily traffic along the roadways occurs in the 12-hour daytime period under analysis: 31,000 for Montana Ave.; 5,952 for Airport Road; 1,656 for Mescalero Drive.
- 6 peak hours and 6 off-peak hours are assumed in the analysis period. Traffic volumes in the peak hours are assumed to be twice off-peak hours. Two-thirds of the estimated AADT is distributed in the 6 peak hours; one-third in the off peak hours.
- Average delay reduction is assumed to be 15 seconds in peak hours and 5 seconds in off-peak hours. Benefits will accrue for all approaches to the intersection.
- Total facility length of 0.7 miles is computed.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Equation 7.2, Traffic Operations (modified)

Daily Emission Reduction = $(I_P + I_{OP}) * EF_I$

Change in idling exhaust emissions from improved traffic flow during the peak and off-peak periods
Where

$I_P = (N_{PH} * V_{H,P} * DR_P)/3600$ seconds per hour
$I_{OP} = (N_{OPH} * V_{H,OP} * DR_{OP})/3600$ seconds per hour

Reduction of idling in the peak and off-peak period

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute (modified from CARB and FHWA Southern Resource Center)

Variables:

DR_P:	Estimated delay reduction during peak period (seconds)
DR_{OP}:	Estimated delay reduction during off-peak period (seconds)
EF_I:	Idling emission factor (grams/hour)
I_P:	Peak hour reduction in idling emissions (vehicle-hours)
I_{OP}:	Off-peak hour reduction in idling emissions (hours)
N_{PH}:	Number of peak hours
N_{OPH}:	Number of off-peak hours
$V_{H,P}$:	Number of vehicles that pass through the intersection per hour during the peak period
$V_{H,OP}$:	Number of vehicles that pass through the intersection per hour during the off-peak period

Analysis

Daily Emission Reduction = $(I_P + I_{OP}) * EF_I$

Note: For presentation purposes, the individual emissions rates are not given in the results below.

As stated in the *Variables* section above, the numbers presented below represent the delay reduction in seconds during peak and off-peak hours. These numbers were calculated by distributing the projected AADT for each roadway, assuming 80% of the total occurs in the 12 hour analysis period and distributing it though the 12 hours (6 peak, 6 off-peak). For example, as shown on page 3, future 2021 AADT for Montana Ave is 38,750. Thus, 38,750*0.80=31,000 vehicles

Since no traffic simulation model exists for this intersection, researchers made the assumption using professional experience that approximately 2/3 of the 31,000 vehicles will be circulating during the peak periods. For example, on Montana Avenue, 31,000 *(2/3) = 20,666 distributed through the 6 hours to get the numbers of vehicles per hour.

$\mathbf{V}_{H,P}$ = 20,666/6 = 3,444 vehicles-hour
$\mathbf{V}_{H,OP}$ = 10,333 /6 = 1,722 vehicles-hour

The two variables are then summed for all three roadways: 4,289 during peak hours, 2,144 for off-peak.

Where

I_P = (6 * 4,289 * 15)/3600 seconds per hour
I_{OP} = (6 * 2,144 * 5)/3600 seconds per hour

(107.23 + 17.87) = 125.10

For CO:

125.10 * EF_I = 10,772.455 grams/day

Daily emission reduction is equal to 10.772 kg/day

For NOx:

125.10 * EF_I = 2,766.261 grams/day

Daily emission reduction is equal to 2.766 kg/day

For VOC:

125.10 * EF_I = 1003.273 grams/day

Daily emission reduction is equal to 1.003 kg/day

For PM-10:

125.10 * EF_I = 737.748 grams/day

Daily emission reduction is equal to 0.738 kg/day

Summary of Results

The overall emissions analysis results for the project are shown in Table 1. An emissions benefit in the El Paso region can be expected from this project.

Table 1. Estimated Emissions Benefits from Operational Improvements at Montana Ave/Airport Rd./Mescalero Dr. Intersection

Pollutant	Emissions Reduction (kg/day)
CO	10.772
NOx	2.766
VOC	1.003
PM_{10}	0.738

Emission Reduction Analysis for County of El Paso Proposed CMAQ Project

Pellicano Drive Widening
Final Report

June 2016

Prepared for

By

Texas A&M Transportation Institute

Task Summary

The Texas A&M Transportation Institute (TTI) El Paso office was tasked by the County of El Paso to perform a mobile source emissions analysis for a proposed project in the El Paso metropolitan region. The County is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement the project.

The project will construct 3.0 miles of traffic operational improvements including lane reconfigurations, traffic signalization, right turn lanes, bike lanes and sidewalk infrastructure on Pellicano Drive in the East El Paso area.

Individual Project Analysis

The emissions analysis for the project is presented below. The project name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy.

It is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ applications, but more time and effort would increase the accuracy of the emissions benefits. As a result, this analysis should not be used for conformity purposes.

Pellicano Drive Operational Improvements

The County of El Paso is proposing to construct traffic operational improvements in both directions of a 3-mile segment of Pellicano Drive between Loop 375 and Berryville St. on the Far Eastside of El Paso region. The facilities will enhance transportation options in an area of new and future residential developments. They will also connect with future bicycle facilities in the area.

The project will construct modifications to the current lane configuration, signalization improvements, right turn lanes, and 5-foot bicycle lanes and sidewalk facilities to include conventional bike lanes and shared lane markings. The project will include associated signage, wayfinding, striping, and intersection treatments. Estimated completion date is 2020.

Data Sources

The County of El Paso provided several items containing project information and data for the analysis: project description and scope plus the estimated current average speed data for the affected roadway. The agency also provided the November 2011 *West Texas Estates Traffic Impact Analysis* conducted by Conde, Inc. for a residential development in the project area. These resources provided the research team with a better understanding of the proposed project and potential emissions benefits.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014 Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." This inventory file is currently being updated by TTI with 2014 data and the research team was granted access to these newer inputs for this analysis. The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

TTI staff used 2009 American Community Survey data to compute a bicycle mode share for El Paso, along with a future growth rate for the mode in the region.

Analysis Methods

In reviewing the proposed improvements to Pellicano Drive, it appears the more significant emissions reductions will come from the new bike lanes and pedestrian facilities. The reductions in VMT from use of the bike lanes and/or walking are a direct benefit in the analysis period.

TTI staff used the analysis method provided in the August 2008 version of the MOSERs Guide, Equation 11.1 – *Bicycle and Pedestrian Lanes or Paths*.

Stated in words, the average annual daily traffic (AADT) of the corridor is multiplied by the percentage of drivers shifting to bicycle mode, multiplied by the bike facility length, multiplied by the speed-based running exhaust emission factor for participants' trip before utilizing the bike lane.

Secondary emissions benefit can accrue from the traffic operational improvements proposed within the roadway. Current average speed along the roadway is good (40 mph) and, even with the projected development in the area, the proposed right turn lanes, signalization, and design improvements should maintain the flow of traffic. To capture these benefits, TTI staff used a modified version of the analysis method outlined in the August 2008 version of the MOSERs Guide. TTI staff based the analysis on the MOSERs Guide equation 7.2 - *Traffic Operations*. The equation is below:

$$(EF_{B,P} - EF_{A,P}) * VMT_{PH}$$

Stated in words, the equation measures the change in running exhaust emissions from improved traffic flow during the peak period multiplied by the vehicle miles traveled affected by the strategy in the peak period.

The detailed equations are provided below in Strategy Equation.

The analysis year used is 2020. *For planning purposes, the emissions benefit of a static program will decline over time.* Without the increased use of the bike lanes over the project lifetime, any benefits accrued by the mode shift to bicycles may be negated by the increased emissions from potential higher traffic volumes in the corridor over time.

Assumptions in the MOVES2014a output for the project included:

- Output created for CO, VOC, NOx, and PM-10.
- For the bike lanes, light-duty passenger vehicles and light-duty passenger trucks (SUVs), gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- For the traffic operations improvements, light-duty passenger vehicles and light-duty passenger trucks (SUVs), motorcycles, light commercial trucks, single unit short and long-haul trucks, and combination short and long-haul trucks, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 11, 21, 31, 32, 52, 53, 61, 62).
- Running exhaust and evaporative emissions, brake wear and tire wear emissions rates were calculated.
- Considering the project area and the type of trips reduced through the strategy, emissions on Road Type 5, urban unrestricted access were analyzed.
- An average speed improvement from 40 mph to 42 mph is assumed (Speed bin 9 to bin 10) as a result of implementation.
- For the bike lanes, the analysis period is from 7:00 a.m. to 7:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10. Use of the bicycle lanes can occur throughout the day, but the greatest impact on emissions will occur with any peak hour or daytime hours mode shift.
- For traffic operations improvements, the analysis period is AM peak hours of 6:00-9:00 a.m. and PM peak hours of 4:00-7:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10.

- The vehicle-miles traveled (VMT) reduced as a result of the mode shift to bicycle was distributed proportionally across the 12 hours and by passenger vehicle types and fuel types in line with the vehicle fleet mix in the El Paso region.
- The emissions reduced as a result of operations improvements were distributed across the 6 hours and by vehicle types and fuel types in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equations. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects. TTI staff determined a valid percentage mode shift from automobile to bicycle by participants in El Paso region. The characteristics of this new facility may provide impetus for significant mode shift, but planners should use available data.

The following assumptions were made for the project:

- For the bike lanes, light-duty passenger vehicle and light-duty passenger truck 2020 AADT of 7,654 is estimated for the 12-hour analysis period. This figure is based on the Conde, Inc. traffic impact analysis and the 2012 and 2013 AADT and ADT traffic counts from TxDOT and the City of El Paso along and around the Pellicano Drive project area. AADT is estimated based on the data plus a professional estimate of traffic growth and an averaging of the counts. Researchers then assume 80% of the projected average daily traffic along the roadway occurs in the 12-hour daytime period under analysis. It also assumes 86% of the traffic is passenger vehicles.
- The current percent bicycle mode share for the El Paso region is estimated to be 2.0% and can serve as an optimistic mode share increase for the new bike facilities.
- The 0.02 increase in mode share represents new cyclists (vehicle trips replaced).
- Total project length of 3.0 miles is computed.
- For the operations improvements, an estimated 2020 ADT in the peak period of 5,910 for the roadway segment. This figure is estimated based on Conde, Inc. traffic impact analysis.
- VMT of 2.0 miles per vehicle as most vehicles will not travel the entire 3.0-mile roadway section.
- The total VMT of 11,820 was distributed across the peak hours being analyzed.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equations

Equation 11.1, Bicycle and Pedestrian Lanes or Paths

Daily Emission Reduction = AADT * PMS * L * EF_B

The average annual daily traffic of the corridor multiplied by the percentage of drivers shifting to bike/pedestrian multiplied by the average bicycle trip length multiplied by the speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program.

Final unit of measure: grams/day
Source: Capitol Area MPO (CAMPO)

Variables: **AADT:** Average annual daily traffic in corridor (vehicles/day)

EF_B: Speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program (NO_x, VOC, or CO) (grams/mile)

L: Length of facility (miles)

PMS: Percentage mode shift from driving to bike/pedestrian (decimal)

Analysis

Results

Daily Emission Reduction = AADT * PMS * L * EF_B

Note: For presentation purposes, the individual emissions rates generated for the speed, hour, and each pollutant (**EF_B**) are not shown in the equations below.

For CO:

7,654 * 0.02 * 3.0 * EF_B = 9,223.215 grams/day

Daily emission reduction is equal to 9.223 kg/day

For NOx:

7,654 * 0.02 * 3.0 * EF_B = 910.228 grams/day

Daily emission reduction is equal to 0.910 kg/day

For VOC:

7,654 * 0.02 * 3.0 * EF_B = 292.953 grams/day

Daily emission reduction is equal to 0.293 kg/day

For PM-10:

7,654 * 0.02 * 3.0 * EF_B = 197.625 grams/day

Daily emission reduction is equal to 0.198 kg/day

Equation 7.2, Traffic Operations (Modified)

Daily Emission Reduction = $(EF_{B,P} - EF_{A,P}) * VMT_{PH}$

Change in running exhaust emissions from improved traffic flow during the peak period

Where

$VMT_{PH} = N_{PH} * V_{H,P} * L$

Vehicle miles traveled affected by the strategy in the peak period

Final unit of measure: grams/day
Source: Texas Transportation Institute (modified from CARB and FHWA Southern Resource Center)

***Variables*:**

$EF_{A,P}$:	Speed-based running exhaust emission factor during the peak period after implementation (grams/mile)
$EF_{B,P}$:	Speed-based running exhaust emission factor during the peak period before implementation (grams/mile)
L:	Length of affected roadway (miles)
N_{PH}:	Number of peak hours
$V_{H,P}$:	Number of vehicles that pass through the roadway section per hour during the peak period
VMT_{PH}:	Vehicle miles-traveled during peak period

Results

Due to the extensiveness of the data and to help presentation of results, the individual emission rates per distance ($\mathbf{EF}_{B,P}$, $\mathbf{EF}_{A,P}$) per vehicle type per pollutant computed are not presented.

VMT_{PH} = 6 * 985 * 2 = 11,820

$(EF_{B,P} - EF_{A,P})$ * 11,820

Change in running exhaust emissions from improved traffic flow during the peak period

For CO:

Daily emission reduction is equal to 2909.266 grams/day

Daily emission reduction is equal to = 2.909 kg/day

For NOx:

Daily emission reduction is equal to 170.110 grams/day

Daily emission reduction is equal to = 0.170 kg/day

For VOC:

Daily emission reduction is equal to 53.047 grams/day

Daily emission reduction is equal to = 0.053 kg/day

For PM-10:

Daily emission reduction is equal to 548.498 grams/day

Daily emission reduction is equal to = 0.548 kg/day

Summary of Results

The individual and overall emissions analysis results for the project are shown in Tables 1-3. The estimated emissions benefits from the new bike lanes and operational improvements are modest and are dependent on increased use of bicycles as a travel mode in the city and region, but an emissions benefit in the El Paso region can be expected from this project.

Table 1. Estimated Emissions Benefits from Pellicano Drive Bicycle and Pedestrian Improvements

Pollutant	Emissions Reduction (kg/day)
CO	9.223
NOx	0.910
VOC	0.293
PM_{10}	0.198

Table 2. Estimated Emissions Benefits from Pellicano Drive Traffic Operations Improvements

Pollutant	Emissions Reduction (kg/day)
CO	2.909
NOx	0.170
VOC	0.053
PM_{10}	0.548

Table 3. Total Estimated Emissions Benefits from Pellicano Drive Widening

Pollutant	Emissions Reduction (kg/day)
CO	12.132
NOx	1.080
VOC	0.346
PM_{10}	0.746

Strategy Equation

3.2 System/Service Operational Improvements

Daily Emission Reduction (for each pollutant) = A + B – C – D

$A = VT_R * TEF_{AUTO}$

Reduction in auto start emissions from trips reduced

$B = VMT_R * EF_B$

Reduction in auto running exhaust emissions from VMT reductions

$C = VT_{BUS} * TEF_{BUS}$

Increase in emissions from additional bus starts

$D = VMT_{BUS} * EF_{BUS}$

Increase in emissions from additional bus running exhaust emissions

Where

$VT_R = N_{TR} * F_{T, SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute

Variables:

EF_B: Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO) (grams/mile)

EF_{BUS}: Speed-based running exhaust emission factor for transit vehicle (NO_x, VOC, or CO) (grams/mile)

$F_{T, SOV}$: Percentage of people using a transit vehicle that previously were vehicle drivers (decimal)

N_{TR}: New transit ridership

TEF_{AUTO}: Auto trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TEF_{BUS}: Bus (or other transit vehicle) trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TL_W: Average auto trip length (miles)

VMT_{BUS}: VMT by transit vehicle

VMT_R: Reduction in daily automobile VMT

VT_{BUS}: Daily vehicle trips by transit vehicle

VT_R: Reduction in number of daily automobile vehicle trips

Analysis

VT_R = (3400 * 2) * 0.50 = 3,400 trips/day

Number of transit riders multiplied by 2 multiplied by the percentage of riders shifting from single-occupant auto use

VMT_R = 3,400 * 12.0 = 40,824 vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

Summary of Results

The emissions analysis result for the project is shown in Table 1. There are significant emissions benefits for all four pollutants. The results indicate an estimated air quality benefit from the Dyer RTS operational assistance project.

Table 1. Dyer RTS Operational Assistance – Phase 2 Emission Reductions

Pollutant	Emissions Reduction (kg/day)
CO	109.653
NOx	9.118
VOC	6.931
PM_{10}	2.166

Emission Reduction Analysis for Sun Metro Proposed CMAQ Project

Dyer RTS Operations Assistance Phase 1

April 2016 (Updated April 2018)

Prepared for

By

Task Summary

The Texas A&M Transportation Institute (TTI) El Paso office was tasked by Sun Metro to perform a mobile source emissions analysis for a proposed project in the El Paso nonattainment area. The transit agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement it.

The project is operational assistance for the first phase of the Rapid Transit Service, BRIO, in the Dyer corridor in northeast El Paso region.

Individual Project Analysis

The emissions analysis for the project is presented below. The strategy name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy equation.

Given the short time available to conduct these analyses, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for submission but more time available and effort would increase the accuracy of the emissions benefits. As a result, *this analysis should not be used for conformity purposes*.

Dyer RTS Operations Assistance - Phase 1

Sun Metro transit agency is proposing operational assistance for the future 12-mile BRIO line in the Dyer corridor in northeast El Paso. The RTS line begins at the Downtown Transfer Center and ends at the future Northeast Transfer Center. Eight buses will operate along the route with 22 stations.

Data Sources

Sun Metro provided several data sources to the TTI team: a map of the proposed route, previous emissions analysis for the route, the mileage, hours of operation, and operating costs for the route.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014 Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

Transit passenger characteristics were derived from the American Public Transportation Association report *A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys* published in May 2007.

Analysis Methods

TTI staff used an analysis method provided in the August 2008 version of the MOSERs Guide, equation 3.2 - *System/Service Operational Improvements*. The detailed equation is provided below in Strategy Equation.

Stated in words, the equation measures the reduction in start emissions and running exhaust emissions from a change in mode during the operating period and subtracting any additional emissions from the transit vehicles. The benefit is derived through attracting single occupant passenger vehicle drivers to utilize transit as their mode of travel.

The analysis year used is 2019. *For planning purposes, the emissions benefit of a static program will decline over time.*

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs) vehicle types, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- The project is implemented after the RTS is initiated; therefore no transit vehicle emissions are included in the analysis.
- Running exhaust, running evaporative, and start emissions (Process ID 1, 2, 11, 12, 13, 15)
- Considering the project area and the type of trips reduced through the strategy, primarily, freeway commuting, emissions on Road Type 4, urban restricted access.
- Average speed on IH-10 during operating hours (peak and off-peak) is assumed 30 mph.
- The analysis period is AM peak hours of 6:00-9:00 a.m., off-peak daytime hours from 9:00 a.m.-3:00 p.m. and PM peak hours of 3:00-8:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10.
- The vehicle trips reduced (VT_R) and vehicle-miles travelled reduced (VMT_R) were distributed proportionally across the 14 hours of model analysis and by vehicle type and fuel type in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

- Based on ridership data provided by Sun Metro, an average daily ridership of 3,400 was assumed.
- APTA ridership survey reports show 55% of transit passengers to be commuting. The RTS project focuses on capturing new commute traffic, so 75% of riders are assumed to be traveling to work and back totaling 2,550 per day.
- The analysis assumes 50% of these commute passengers are former single occupant vehicle (SOV) drivers. This translates to 25% of all passengers. This should be considered optimistic. The APTA survey report showed 14.3% of transit roadway passengers would drive alone as an alternative if no transit service was available. However this new service actively seeks SOV commuters.
- An average trip length of 12.0 miles was computed based on data provided by Sun Metro. The trip lengths were distributed evenly in the reduced VMT.

The final estimated emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

3.2 System/Service Operational Improvements

Daily Emission Reduction (for each pollutant) = A + B – C – D

$A = VT_R * TEF_{AUTO}$

Reduction in auto start emissions from trips reduced

$B = VMT_R * EF_B$

Reduction in auto running exhaust emissions from VMT reductions

$C = VT_{BUS} * TEF_{BUS}$

Increase in emissions from additional bus starts

$D = VMT_{BUS} * EF_{BUS}$

Increase in emissions from additional bus running exhaust emissions

Where

$VT_R = N_{TR} * F_{T, SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute

Variables:

EF_B: Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO) (grams/mile)

EF_{BUS}: Speed-based running exhaust emission factor for transit vehicle (NO_x, VOC, or CO) (grams/mile)

$F_{T, SOV}$: Percentage of people using a transit vehicle that previously were vehicle drivers (decimal)

N_{TR}: New transit ridership

TEF_{AUTO}: Auto trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TEF_{BUS}: Bus (or other transit vehicle) trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TL_W: Average auto trip length (miles)

VMT_{BUS}: VMT by transit vehicle

VMT_R: Reduction in daily automobile VMT

VT_{BUS}: Daily vehicle trips by transit vehicle

VT_R: Reduction in number of daily automobile vehicle trips

Analysis

VT_R = (3400 * 2) * 0.50 = 3,400 trips/day

Number of transit riders multiplied by 2 multiplied by the percentage of riders shifting from single-occupant auto use

VMT_R = 3,400 * 12.0 = 40,824 vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

Summary of Results

The emissions analysis result for the project is shown in Table 1. There are significant emissions benefits for all four pollutants. The results indicate an estimated air quality benefit from the Dyer RTS operational assistance project.

Table 1. Dyer RTS Operational Assistance – Phase 1 Emission Reductions

Pollutant	Emissions Reduction (kg/day)
CO	109.653
NOx	9.118
VOC	6.931
PM_{10}	2.166

Emission Reduction Analysis for Sun Metro Proposed CMAQ Project

Three New Buses for West and Central El Paso

May 2016

Prepared for

By

Task Summary

The Texas A&M Transportation Institute (TTI) El Paso office was tasked by Sun Metro to perform a mobile source emissions analysis for a proposed project in the El Paso nonattainment area. The transit agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement it.

The project is the purchase of three new buses: two serving the new Montecillo development in west El Paso, one to provide circulator service around the Texas Tech Medical Center and the County hospital in central El Paso.

Individual Project Analysis

The emissions analysis for the project is presented below. The strategy name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy equation.

Given the short time available to conduct these analyses, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for submission but more time available and effort would increase the accuracy of the emissions benefits. As a result, *this analysis should not be used for conformity purposes*.

Three New Buses for West and Central El Paso

Sun Metro transit agency is proposing the purchase of three (3) new buses to increase frequency to areas with anticipated increased economic development and opportunity.

Two new units will serve the Montecillo area. It is a retail-commercial and residential community on either side of Mesa Street with anticipated transit service needs for the northwest communities in the vicinity of the development.

The third new unit will also increase frequency to Texas Tech Medical Center and the County Hospital through the use of a circulator service in the area. Texas Tech University has plans to expand classrooms, medical and science labs, and may include a dormitory area for staff. The plan will greatly impact economic activity in a traditional low-income area.

Data Sources

Sun Metro provided an analysis of the proposed new routes to the TTI team: anticipated bus operating hours, VMT, and estimated average daily ridership.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014 Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

Transit passenger characteristics were derived from the American Public Transportation Association report *A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys* published in May 2007.

Analysis Methods

TTI staff used an analysis method provided in the August 2008 version of the MOSERs Guide, equation 3.1 - *System/Service Expansion*. The detailed equation is provided below in Strategy Equation.

Stated in words, the equation measures the reduction in start emissions and running exhaust emissions from a change in mode during the operating period and subtracting any additional emissions from the transit vehicles. The benefit is derived through attracting single occupant passenger vehicle drivers to utilize transit as their mode of travel.

The analysis year used is 2019. *For planning purposes, the emissions benefit of a static program will decline over time.*

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10.

- Light-duty passenger vehicles and light-duty passenger trucks (SUVs) vehicle types, gasoline and diesel-fueled, and transit buses are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- Transit vehicle (source type 42) emission rates were included as these will be new buses on new routes.
- Running exhaust, running evaporative, and start emissions (Process ID 1, 2, 11, 12, 13, 15)
- Considering the project area and the type of trips reduced through the strategy, emissions on Road Type 5, urban unrestricted access, was used for the passenger and transit vehicles.
- Average transit vehicle speed is assumed 11 mph (speed bin 3) based on data received from Sun Metro with passenger vehicles assumed to be 30 mph (speed bin 7).
- The analysis period is AM peak hours of 6:00-9:00 a.m., off-peak daytime hours from 9:00 a.m.-3:00 p.m. and PM peak hours of 3:00-9:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10.
- The vehicle trips reduced (VT_R) and vehicle-miles travelled reduced (VMT_R) were distributed proportionally across 15 hours of model analysis and by vehicle type and fuel type in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

- Based on ridership data provided by Sun Metro, an average daily ridership of 2,395 was assumed for all three buses; 1,520 for the Montecillo buses, 875 for the Medical Center circulator.
- The analysis assumes 50% of these commute passengers are former single occupant vehicle (SOV) drivers. This should be considered very optimistic. The APTA survey report showed 14.3% of transit roadway passengers would drive alone as an alternative if no transit service was available. However, this new service seeks SOV commuters.
- An average passenger trip length of 3 miles for the Montecillo buses and 2 miles for the Medical Center Circulator was computed based on data provided by Sun Metro. The trip lengths were distributed evenly in the reduced VMT.

The final estimated emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

3.1 System/Service Expansion

Daily Emission Reduction (for each pollutant) = A + B – C – D

$$A = VT_R * TEF_{AUTO}$$

Reduction in auto start emissions from trips reduced

$$B = VMT_R * EF_B$$

Reduction in auto running exhaust emissions from VMT reductions

$$\mathbf{C = VT_{BUS} * TEF_{BUS}}$$

Increase in emissions from additional bus starts

$$\mathbf{D = VMT_{BUS} * EF_{BUS}}$$

Increase in emissions from additional bus running exhaust emissions

Where

$VT_R = N_{TR} * F_{T, SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute

Variables:

EF_B: Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO) (grams/mile)

EF_{BUS}: Speed-based running exhaust emission factor for transit vehicle (NO_x, VOC, or CO) (grams/mile)

$F_{T, SOV}$: Percentage of people using a transit vehicle that previously were vehicle drivers (decimal)

N_{TR}: New transit ridership

TEF_{AUTO}: Auto trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TEF_{BUS}: Bus (or other transit vehicle) trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TL_W: Average auto trip length (miles)

VMT_{BUS}: VMT by transit vehicle

VMT_R:	Reduction in daily automobile VMT
VT_{BUS}:	Daily vehicle trips by transit vehicle
VT_R:	Reduction in number of daily automobile vehicle trips

Analysis

For presentation purposes, the MOVES calculation results and extensive results from the equation calculations are not presented in the results below.

For Montecillo buses:

$VT_R = (1{,}520 * 2) * 0.50 = 1{,}520$ trips/day

Number of transit riders multiplied by 2 multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = 1{,}520 * 3 = 4{,}560$ vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

For Texas Tech Medical Center circulator bus:

$VT_R = (875 * 2) * 0.50 = 875$ trips/day

Number of transit riders multiplied by 2 multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = 875 * 2 = 1{,}750$ vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

Summary of Results

The emissions analysis results for the project are shown in the tables below. Table 1 shows the total emissions reduction for the CMAQ application. Tables 2 and 3 show the estimated benefits for the new buses on each route There are modest emissions benefits for all four pollutants. The results indicate an estimated air quality benefit from the 3 New Buses in west and central El Paso project.

Table 1. Three New Buses Emission Reductions - Total

Pollutant	Emissions Reduction (kg/day)
CO	38.354
NOx	0.137
VOC	1.561
PM_{10}	0.348

Table 2. Three New Buses Emission Reductions – Montecillo Buses

Pollutant	Emissions Reduction (kg/day)
CO	24.341
NOx	0.087
VOC	0.991
PM_{10}	0.221

Table 3. Three New Buses Emission Reductions – Texas Tech Medical Center Circulator

Pollutant	Emissions Reduction (kg/day)
CO	14.013
NOx	0.050
VOC	0.570
PM_{10}	0.127

Emission Reduction Analysis for Proposed CMAQ Project

City of Anthony, New Mexico – North 4th Street Bike Lanes and Road Improvements

September 2015

Prepared for

WILSON & COMPANY

By

Texas A&M Transportation Institute

Task Summary

The Texas A&M Transportation Institute (TTI) Arlington office was tasked by Wilson & Company, Inc. Architects and Engineers New Mexico office to perform a mobile source emissions analysis for a proposed project in the City of Anthony, New Mexico in the El Paso metropolitan region. The city is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement the project.

The project is 1.69 miles in length and consists of reconstructing the existing 2-lane roadway to full depth, curb & gutter, and sidewalk. The project will also install bike lanes in short segments where the right-of-way is wide enough to accommodate them (less than 2,000 linear feet).

Individual Project Analysis

The emissions analysis for the project is presented below. The project name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy.

Given the short time available to conduct this analysis, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ applications, but more time and effort would increase the accuracy of the emissions benefits. As a result, this analysis should not be used for conformity purposes.

North 4th Street Bike Lanes in City of Anthony

The North 4th Street improvement project will reconstruct the existing 2-lane roadway to full depth, curb & gutter, and sidewalk. The project will also install bike lanes in short segments where the right-of-way is wide enough to accommodate them (less than 2,000 linear feet), along with pedestrian accommodations. The project lies within the City of Anthony, New Mexico, approximately 21 miles from downtown El Paso. The project limits are from State Line Drive north to State Highway 404 (O'Hara Road). The project is approximately 1.69 miles long and will provide improvements to 85% of the distance, 15% having already been completed.

Bicycle facilities will also be integrated into the roadway. Bicycle facilities are provided along the outsides of the roadway in short segments where the right-of-way is wide enough to accommodate them, approximately 22% (less than 2,000 linear-feet) of the project length.

Data Sources

Wilson & Company provided several items containing project information and data for the analysis: a map of the city with the project location, current traffic volume and classification data along the roadway, and current speed data for N. 4th St. These resources provided the research team with a better understanding of the proposed project and potential emissions benefits.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014 model. TTI staff created MOVES2014 output files using their "MOVES2014 Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." This inventory file is currently being updated by TTI with 2014 data and the research team was granted access to these newer inputs for this analysis. The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

TTI staff used 2009 American Community Survey data to compute a bicycle mode share for El Paso, along with a future growth rate for the mode in the region. The traffic data provided by Wilson & Company also contained bicycle counts along the project roadway.

Analysis Methods

TTI staff used the analysis method provided in the August 2008 version of the MOSERs Guide, Equation 11.1 – *Bicycle and Pedestrian Lanes or Paths*.

The detailed equation is provided below in Strategy Equation. Stated in words, the average annual daily traffic (AADT) of the corridor is multiplied by the percentage of drivers shifting to bicycle mode, multiplied by the bike facility length, multiplied by the speed-based running exhaust emission factor for participants' trip before utilizing the bike lane.

The analysis year used is 2015. *For planning purposes, the emissions benefit of a static program will decline over time.* Without the increased use of the bike lanes over the project lifetime, any benefits accrued by the mode shift to bicycles may be negated by the increased emissions from potential higher traffic volumes in the corridor due to the roadway improvements.

Assumptions in the MOVES2014 output for the project included:

- Output created for VOC, CO, NOx.
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- Running exhaust emissions (Process ID 1) rates were calculated.
- Considering the project area and the type of trips reduced through the strategy, emissions on Road Type 5, urban unrestricted access were analyzed.
- Average speed on N. 4th St. is assumed to be 22 mph (Speed bin 6).
- The analysis period is AM peak hours of 6:00-10:00 a.m. and PM peak hours of 3:00-7:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx and VOC. Use of the bicycle lanes can occur throughout the day, but the greatest impact on emissions will occur with any peak hour mode shift.
- The vehicle-miles traveled (VMT) reduced as a result of the mode shift to bicycle were distributed proportionally across the eight peak hours and by vehicle types and fuel types in line with the vehicle fleet mix in the El Paso region and the Wilson & Company classification data.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects. TTI staff determined a valid percentage mode shift from automobile to bicycle by participants in El Paso region. The characteristics of this new facility may provide impetus for significant mode shift, but planners should use available data.

The following assumptions were made for the project:

- Light-duty passenger vehicle and light-duty passenger truck AADT of 1,960 is estimated. This figure is based on the northbound and southbound passenger vehicle components of the vehicle classification data provided by Wilson & Company to TTI.
- Current bicycle mode share on N. 4th St. is 0.1%. The current percent bicycle mode share for the El Paso region is calculated to be 2.8% and can serve as an optimistic mode share increase for the new bike facilities.
- The 0.027 increase in mode share represents new cyclists (vehicle trips replaced).
- Bike lane facility length of 0.38 miles is computed.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Equation 11.1, Bicycle and Pedestrian Lanes or Paths

Daily Emission Reduction = AADT * PMS * L * EF_B

The average annual daily traffic of the corridor multiplied by the percentage of drivers shifting to bike/pedestrian multiplied by the average bicycle trip length multiplied by the speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program.

Final unit of measure: grams/day
Source: Capitol Area MPO (CAMPO)

Variables: **AADT:** Average annual daily traffic in corridor (vehicles/day)

EF_B: Speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program (NO_x, VOC, or CO) (grams/mile)

L: Length of facility (miles)

PMS: Percentage mode shift from driving to bike/pedestrian (decimal)

Analysis

Results

Daily Emission Reduction = AADT * PMS * L * EF_B

Note: For presentation purposes, the individual emissions rates are not given in the results below. Two vehicle types, two fuel types, and eight hours analyzed produced 96 emission rates used in the analysis equation. The rates are provided in the attached appendix.

For VOC:

1,960 * 0.027 * 0.38 * EF_B = 6.204 grams/day

Daily emission reduction is equal to 0.007 kg/day

For CO:

1,960 * 0.027 * 0.38 * EF_B = 143.926 grams/day

Daily emission reduction is equal to 0.158 kg/day

For NOx:

1,960 * 0.027 * 0.38 * EF_B = 20.822 grams/day

Daily emission reduction is equal to 0.028 kg/day

Summary of Results

The overall emissions analysis results for the project are shown in Table 1. The estimated emissions benefits from the new bike lanes are very modest and are dependent on increased use of bicycles as a travel mode in the city and region, but an emissions benefit in the El Paso region can be expected from this project.

Table 1. Estimated Emissions Benefits from Bike Lanes on N. 4th St.

Pollutant	Emissions Reduction (kg/day)
VOC	0.007
CO	0.158
NOx	0.023

APPENDIX - MOVES2014 Analysis Emission Rates

Year	Month	Day	Hour	Pollutant	Process	Source Type	Fuel Type	Road Type	Speed Bin	Temp	Humidity	Rate Per Distance
2015	1	5	7	2	1	21	1	5	6	41.2	48.0	3.8428
2015	1	5	8	2	1	21	1	5	6	41.6	47.4	3.8428
2015	1	5	9	2	1	21	1	5	6	43.9	43.6	3.8428
2015	1	5	10	2	1	21	1	5	6	46.7	39.9	3.8428
2015	1	5	16	2	1	21	1	5	6	59.9	23.1	3.8428
2015	1	5	17	2	1	21	1	5	6	59.8	23.2	3.8428
2015	1	5	18	2	1	21	1	5	6	58.3	24.6	3.8428
2015	1	5	19	2	1	21	1	5	6	56.5	26.6	3.8428
2015	1	5	7	2	1	21	2	5	6	41.2	48.0	4.4780
2015	1	5	8	2	1	21	2	5	6	41.6	47.4	4.4780
2015	1	5	9	2	1	21	2	5	6	43.9	43.6	4.4780
2015	1	5	10	2	1	21	2	5	6	46.7	39.9	4.4780
2015	1	5	16	2	1	21	2	5	6	59.9	23.1	4.4780
2015	1	5	17	2	1	21	2	5	6	59.8	23.2	4.4780
2015	1	5	18	2	1	21	2	5	6	58.3	24.6	4.4780
2015	1	5	19	2	1	21	2	5	6	56.5	26.6	4.4780
2015	1	5	7	2	1	31	1	5	6	41.2	48.0	11.6136
2015	1	5	8	2	1	31	1	5	6	41.6	47.4	11.6136
2015	1	5	9	2	1	31	1	5	6	43.9	43.6	11.6136
2015	1	5	10	2	1	31	1	5	6	46.7	39.9	11.6136
2015	1	5	16	2	1	31	1	5	6	59.9	23.1	11.6136
2015	1	5	17	2	1	31	1	5	6	59.8	23.2	11.6136
2015	1	5	18	2	1	31	1	5	6	58.3	24.6	11.6136
2015	1	5	19	2	1	31	1	5	6	56.5	26.6	11.6136

2015	1	5	7	2	1	31	2	5	6	41.2	48.0	6.8159
2015	1	5	8	2	1	31	2	5	6	41.6	47.4	6.8159
2015	1	5	9	2	1	31	2	5	6	43.9	43.6	6.8159
2015	1	5	10	2	1	31	2	5	6	46.7	39.9	6.8159
2015	1	5	16	2	1	31	2	5	6	59.9	23.1	6.8159
2015	1	5	17	2	1	31	2	5	6	59.8	23.2	6.8159
2015	1	5	18	2	1	31	2	5	6	58.3	24.6	6.8159
2015	1	5	19	2	1	31	2	5	6	56.5	26.6	6.8159
2015	7	5	7	3	1	21	1	5	6	76.8	43.2	0.5014
2015	7	5	8	3	1	21	1	5	6	78.9	40.6	0.5128
2015	7	5	9	3	1	21	1	5	6	81.6	37.1	0.5206
2015	7	5	10	3	1	21	1	5	6	84.2	33.9	0.5295
2015	7	5	16	3	1	21	1	5	6	94.4	19.8	0.5915
2015	7	5	17	3	1	21	1	5	6	94.3	20.3	0.5887
2015	7	5	18	3	1	21	1	5	6	93.6	21.1	0.5846
2015	7	5	19	3	1	21	1	5	6	92.3	22.3	0.5779
2015	7	5	7	3	1	21	2	5	6	76.8	43.2	0.3970
2015	7	5	8	3	1	21	2	5	6	78.9	40.6	0.4058
2015	7	5	9	3	1	21	2	5	6	81.6	37.1	0.4116
2015	7	5	10	3	1	21	2	5	6	84.2	33.9	0.4182
2015	7	5	16	3	1	21	2	5	6	94.4	19.8	0.4592
2015	7	5	17	3	1	21	2	5	6	94.3	20.3	0.4577
2015	7	5	18	3	1	21	2	5	6	93.6	21.1	0.4549
2015	7	5	19	3	1	21	2	5	6	92.3	22.3	0.4503
2015	7	5	7	3	1	31	1	5	6	76.8	43.2	1.5446
2015	7	5	8	3	1	31	1	5	6	78.9	40.6	1.5747

2015	7	5	9	3	1	31	1	5	6	81.6	37.1	1.5956
2015	7	5	10	3	1	31	1	5	6	84.2	33.9	1.6197
2015	7	5	16	3	1	31	1	5	6	94.4	19.8	1.7954
2015	7	5	17	3	1	31	1	5	6	94.3	20.3	1.7873
2015	7	5	18	3	1	31	1	5	6	93.6	21.1	1.7757
2015	7	5	19	3	1	31	1	5	6	92.3	22.3	1.7568
2015	7	5	7	3	1	31	2	5	6	76.8	43.2	2.9268
2015	7	5	8	3	1	31	2	5	6	78.9	40.6	3.0085
2015	7	5	9	3	1	31	2	5	6	81.6	37.1	3.0617
2015	7	5	10	3	1	31	2	5	6	84.2	33.9	3.1223
2015	7	5	16	3	1	31	2	5	6	94.4	19.8	3.4752
2015	7	5	17	3	1	31	2	5	6	94.3	20.3	3.4629
2015	7	5	18	3	1	31	2	5	6	93.6	21.1	3.4389
2015	7	5	19	3	1	31	2	5	6	92.3	22.3	3.3981
2015	7	5	7	87	1	21	1	5	6	76.8	43.2	0.1175
2015	7	5	8	87	1	21	1	5	6	78.9	40.6	0.1188
2015	7	5	9	87	1	21	1	5	6	81.6	37.1	0.1196
2015	7	5	10	87	1	21	1	5	6	84.2	33.9	0.1205
2015	7	5	16	87	1	21	1	5	6	94.4	19.8	0.1243
2015	7	5	17	87	1	21	1	5	6	94.3	20.3	0.1242
2015	7	5	18	87	1	21	1	5	6	93.6	21.1	0.1240
2015	7	5	19	87	1	21	1	5	6	92.3	22.3	0.1235
2015	7	5	7	87	1	21	2	5	6	76.8	43.2	0.2152
2015	7	5	8	87	1	21	2	5	6	78.9	40.6	0.2175
2015	7	5	9	87	1	21	2	5	6	81.6	37.1	0.2188
2015	7	5	10	87	1	21	2	5	6	84.2	33.9	0.2203

2015	7	5	16	87	1	21	2	5	6	94.4	19.8	0.2265
2015	7	5	17	87	1	21	2	5	6	94.3	20.3	0.2265
2015	7	5	18	87	1	21	2	5	6	93.6	21.1	0.2260
2015	7	5	19	87	1	21	2	5	6	92.3	22.3	0.2252
2015	7	5	7	87	1	31	1	5	6	76.8	43.2	0.5436
2015	7	5	8	87	1	31	1	5	6	78.9	40.6	0.5484
2015	7	5	9	87	1	31	1	5	6	81.6	37.1	0.5513
2015	7	5	10	87	1	31	1	5	6	84.2	33.9	0.5546
2015	7	5	16	87	1	31	1	5	6	94.4	19.8	0.5682
2015	7	5	17	87	1	31	1	5	6	94.3	20.3	0.5680
2015	7	5	18	87	1	31	1	5	6	93.6	21.1	0.5671
2015	7	5	19	87	1	31	1	5	6	92.3	22.3	0.5653
2015	7	5	7	87	1	31	2	5	6	76.8	43.2	0.7223
2015	7	5	8	87	1	31	2	5	6	78.9	40.6	0.7295
2015	7	5	9	87	1	31	2	5	6	81.6	37.1	0.7339
2015	7	5	10	87	1	31	2	5	6	84.2	33.9	0.7388
2015	7	5	16	87	1	31	2	5	6	94.4	19.8	0.7590
2015	7	5	17	87	1	31	2	5	6	94.3	20.3	0.7588
2015	7	5	18	87	1	31	2	5	6	93.6	21.1	0.7573
2015	7	5	19	87	1	31	2	5	6	92.3	22.3	0.7547

Emission Reduction Analysis for Sun Metro Proposed CMAQ Project

Alameda RTS Operations Assistance Phase 1

April 2016 (Updated April 2018)

Prepared for

By

Task Summary

The Texas A&M Transportation Institute (TTI) El Paso office was tasked by Sun Metro to perform a mobile source emissions analysis for a proposed project in the El Paso nonattainment area. The transit agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement it.

The project is operational assistance for the first phase of the Rapid Transit Service, BRIO, in the Alameda corridor in east El Paso region.

Individual Project Analysis

The emissions analysis for the project is presented below. The strategy name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy equation.

Given the short time available to conduct these analyses, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for submission but more time available and effort would increase the accuracy of the emissions benefits. As a result, *this analysis should not be used for conformity purposes*.

Alameda RTS Operations Assistance - Phase 1

Sun Metro transit agency is proposing operational assistance for the future 14.9-mile BRIO line in the Alameda corridor in northeast El Paso. The RTS line begins at the Downtown Transfer Center and ends at the Mission Valley Transfer Center. Fourteen buses will operate along the route with 29 stations.

Data Sources

Sun Metro provided several data sources to the TTI team: a map of the proposed route, previous emissions analysis for the route, the mileage, hours of operation, and operating costs for the route.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014 Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

Transit passenger characteristics were derived from the American Public Transportation Association report *A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys* published in May 2007.

Analysis Methods

TTI staff used an analysis method provided in the August 2008 version of the MOSERs Guide, equation 3.2 - *System/Service Operational Improvements*. The detailed equation is provided below in Strategy Equation.

Stated in words, the equation measures the reduction in start emissions and running exhaust emissions from a change in mode during the operating period and subtracting any additional emissions from the transit vehicles. The benefit is derived through attracting single occupant passenger vehicle drivers to utilize transit as their mode of travel.

The analysis year used is 2019. *For planning purposes, the emissions benefit of a static program will decline over time.*

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs) vehicle types, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- The project is implemented after the RTS is initiated; therefore no transit vehicle emissions are included in the analysis.
- Running exhaust, running evaporative, and start emissions (Process ID 1, 2, 11, 12, 13, 15)
- Considering the project area and the type of trips reduced through the strategy, primarily, freeway commuting, emissions on Road Type 4, urban restricted access.
- Average speed on IH-10 during operating hours (peak and off-peak) is assumed 30 mph.
- The analysis period is AM peak hours of 6:00-9:00 a.m., off-peak daytime hours from 9:00 a.m.-3:00 p.m. and PM peak hours of 3:00-8:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10.
- The vehicle trips reduced (VT_R) and vehicle-miles travelled reduced (VMT_R) were distributed proportionally across the 14 hours of model analysis and by vehicle type and fuel type in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

- Based on ridership data provided by Sun Metro, an average daily ridership of 3,450 was assumed.
- APTA ridership survey reports show 55% of transit passengers to be commuting. The RTS project focuses on capturing new commute traffic, so 75% of riders are assumed to be traveling to work and back totaling 2,588 per day.
- The analysis assumes 50% of these commute passengers are former single occupant vehicle (SOV) drivers. This translates to 37.5% of all passengers. This should be considered optimistic. The APTA survey report showed 14.3% of transit roadway passengers would drive alone as an alternative if no transit service was available. However this new service actively seeks SOV commuters.
- An average trip length of 14.9 miles was computed based on data provided by Sun Metro. The trip lengths were distributed evenly in the reduced VMT.

The final estimated emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

3.2 System/Service Operational Improvements

Daily Emission Reduction (for each pollutant) = A + B – C – D

$A = VT_R * TEF_{AUTO}$

Reduction in auto start emissions from trips reduced

$B = VMT_R * EF_B$

Reduction in auto running exhaust emissions from VMT reductions

$C = VT_{BUS} * TEF_{BUS}$

Increase in emissions from additional bus starts

$D = VMT_{BUS} * EF_{BUS}$

Increase in emissions from additional bus running exhaust emissions

Where

$VT_R = N_{TR} * F_{T, SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute

Variables:

EF_B: Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO) (grams/mile)

EF_{BUS}: Speed-based running exhaust emission factor for transit vehicle (NO_x, VOC, or CO) (grams/mile)

$F_{T, SOV}$: Percentage of people using a transit vehicle that previously were vehicle drivers (decimal)

N_{TR}: New transit ridership

TEF_{AUTO}: Auto trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TEF_{BUS}: Bus (or other transit vehicle) trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TL_W: Average auto trip length (miles)

VMT_{BUS}: VMT by transit vehicle

VMT_R: Reduction in daily automobile VMT

VT_{BUS}: Daily vehicle trips by transit vehicle

VT_R: Reduction in number of daily automobile vehicle trips

Analysis

VT_R = (3,450 * 2) * 0.50 = 3,450 trips/day

Number of transit riders multiplied by 2 multiplied by the percentage of riders shifting from single-occupant auto use

VMT_R = 3,450 * 14.9 = 51,405 vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

Summary of Results

The emissions analysis result for the project is shown in Table 1. There are significant emissions benefits for all four pollutants. The results indicate an estimated air quality benefit from the Alameda RTS Phase 1 operational assistance project.

Table 1. Alameda RTS Operational Assistance – Phase 1 Emission Reductions

Pollutant	Emissions Reduction (kg/day)
CO	130.357
NOx	10.944
VOC	8.076
PM_{10}	2.722

Emission Reduction Analysis for Sun Metro Proposed CMAQ Project

El Paso Streetcar Operations Assistance Phase 1

April 2016

Prepared for

By

Task Summary

The Texas A&M Transportation Institute (TTI) El Paso office was tasked by Sun Metro to perform a mobile source emissions analysis for a proposed project in the El Paso nonattainment area. The transit agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement it.

The project is the El Paso Streetcar - Phase 1in the central region of the metropolitan area.

Individual Project Analysis

The emissions analysis for the project is presented below. The strategy name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy equation.

Given the short time available to conduct these analyses, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for submission but more time available and effort would increase the accuracy of the emissions benefits. As a result, *this analysis should not be used for conformity purposes*.

El Paso Streetcar – Phase 1

The proposed El Paso Streetcar Project consists of a two-mile, double-tracked corridor, beginning in the area near the Downtown Shopping District and International Bridges, traveling north through downtown to the University of Texas at El Paso area, the Cincinnati Entertainment District and back.

The guideway would be positioned within existing traffic lanes; along the right lane, adjacent to the curb or parking lane. The streetcar stops would be located two to three blocks apart along the right edge of traffic. A maintenance facility would be constructed within the Downtown Transfer Center.

Data Sources

Sun Metro provided several data sources to the TTI team: a map of the proposed route, projected ridership, the mileage, hours of operation, and operating costs for the route.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014 Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

Transit passenger characteristics were derived from the American Public Transportation Association report *A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys* published in May 2007.

Analysis Methods

TTI staff used an analysis method provided in the August 2008 version of the MOSERs Guide, equation 3.1 - *System/Service Expansion*. The detailed equation is provided below in Strategy Equation.

Stated in words, the equation measures the reduction in start emissions and running exhaust emissions from a change in mode during the operating period and subtracting any additional emissions from the transit vehicles. The benefit is derived through attracting single occupant passenger vehicle drivers to utilize transit as their mode of travel.

The analysis year used is 2019. *For planning purposes, the emissions benefit of a static program will decline over time.*

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs) vehicle types, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- The streetcar appears to be an electrified rail line; therefore no transit vehicle emissions are included in the analysis.
- Running exhaust, running evaporative, and start emissions (Process ID 1, 2, 11, 12, 13, 15)
- Considering the project area and the type of trips reduced through the strategy, primarily short distance, emissions on Road Type 5, urban unrestricted access.
- Average speed on surrounding roadways during operating hours (peak and off-peak) is assumed 30 mph.
- The analysis period is AM peak hours of 7:00-9:00 a.m., off-peak daytime hours from 9:00 a.m.-3:00 p.m. and PM peak hours of 3:00-7:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10.
- The vehicle trips reduced (VT_R) and vehicle-miles travelled reduced (VMT_R) were distributed proportionally across the 14 hours of model analysis and by vehicle type and fuel type in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

- Based on ridership data provided by Sun Metro, an average daily ridership of 800 was assumed.
- The analysis assumes 50% of the passengers in the analysis year are using the streetcar for a local trip for which they would have used a vehicle. This should be considered optimistic. The APTA survey report showed 14.3% of transit passengers would drive alone as an alternative if no transit service was available. However, this new service actively seeks SOV drivers.
- An average trip length of 3.0 miles was computed based on data provided by Sun Metro. The trip lengths were distributed evenly in the reduced VMT.

The final estimated emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

3.1 System/Service Expansion

Daily Emission Reduction (for each pollutant) = A + B – C – D

$$\mathbf{A = VT_R * TEF_{AUTO}}$$

Reduction in auto start emissions from trips reduced

$$\mathbf{B= VMT_R * EF_B}$$

Reduction in auto running exhaust emissions from VMT reductions

$$\mathbf{C = VT_{BUS} * TEF_{BUS}}$$

Increase in emissions from additional bus starts

$$\mathbf{D = VMT_{BUS} * EF_{BUS}}$$

Increase in emissions from additional bus running exhaust emissions

Where

$VT_R = N_{TR} * F_{T, SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute

Variables:

EF_B: Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO) (grams/mile)

EF_{BUS}: Speed-based running exhaust emission factor for transit vehicle (NO_x, VOC, or CO) (grams/mile)

$F_{T, SOV}$: Percentage of people using a transit vehicle that previously were vehicle drivers (decimal)

N_{TR}: New transit ridership

TEF_{AUTO}: Auto trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TEF_{BUS}: Bus (or other transit vehicle) trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TL_W: Average auto trip length (miles)

VMT_{BUS}: VMT by transit vehicle

VMT_R: Reduction in daily automobile VMT

VT_{BUS}: Daily vehicle trips by transit vehicle

VT_R: Reduction in number of daily automobile vehicle trips

Analysis

$VT_R = (800 * 2) * 0.50 = 800$ trips/day

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = 800 * 3.0 = 2{,}400$ vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

Summary of Results

The emissions analysis result for the project is shown in Table 1. There are significant emissions benefits for all four pollutants. The results indicate an estimated air quality benefit from Phase 1 of the El Paso Streetcar project.

Table 1. Estimated Emission Reductions for El Paso Streetcar – Phase 1

Pollutant	Emissions Reduction (kg/day)
CO	12.339
NOx	0.977
VOC	0.792
PM_{10}	0.141

Emission Reduction Analysis for City of El Paso Proposed CMAQ Project

Bicycle Connectivity Infrastructure Improvements Phase 2

April 2016

Prepared for

By

Texas A&M Transportation Institute

Task Summary

The Texas A&M Transportation Institute (TTI) Arlington office was tasked by the City of El Paso to perform a mobile source emissions analysis for a proposed project in the El Paso metropolitan region. The city is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement the project.

The project will construct 5.38 miles of bike lane infrastructure improvements in the region.

Individual Project Analysis

The emissions analysis for the project is presented below. The project name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy.

Given the short time available to conduct this analysis, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ applications, but more time and effort would increase the accuracy of the emissions benefits. As a result, this analysis should not be used for conformity purposes.

Bicycle Connectivity Infrastructure Improvements - Phase 2

The Bicycle Connectivity Infrastructure Improvements – Phase 2 project will install 5.38 miles of bicycle facilities in the El Paso region. These facilities encourage an alternative form of transportation in the region. The infrastructure will be installed within City right-of-way and no property acquisition is anticipated.

The project will construct bicycle facilities citywide to include: buffered bike lanes, conventional bike lanes, bicycle boulevards, shared lane markings, and protected bicycle lanes. The project will include associated signage, wayfinding, striping, and intersection treatments.

The limits of the improvements are five roadways: Lomaland from Trawood to Pellicano; Pellicano from George Dieter to Lomaland; Trawood from Springwood to Yarbrough; Tierra Este from RC Poe to Pebble Hills; Pendale from Yermoland to North Loop.

Data Sources

The City of El Paso provided several items containing project information and data for the analysis: project description and scope plus current average speed data for the affected roadways. These resources provided the research team with a better understanding of the proposed project and potential emissions benefits.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014 Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." This inventory file is currently being updated by TTI with 2014 data and the research team was granted access to these newer inputs for this analysis. The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

TTI staff used 2009 American Community Survey data to compute a bicycle mode share for El Paso, recent BikeTexas studies along with a future growth rate for the mode in the region.

Analysis Methods

TTI staff used the analysis method provided in the August 2008 version of the MOSERs Guide, Equation 11.1 – *Bicycle and Pedestrian Lanes or Paths*.

Stated in words, the average annual daily traffic (AADT) of the corridor is multiplied by the percentage of drivers shifting to bicycle mode, multiplied by the bike facility length, multiplied by the speed-based running exhaust emission factor for participants' trip before utilizing the bike lane.

The detailed equation is provided below in Strategy Equation.

The analysis year used is 2020. *For planning purposes, the emissions benefit of a static program will decline over time.* Without the increased use of the bike lanes over the project lifetime, any benefits accrued by the mode shift to bicycles may be negated by the increased emissions from potential higher traffic volumes in the corridor over time.

Assumptions in the MOVES2014 output for the project included:

- Output created for VOC, CO, NOx, and PM-10.
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs), gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- Running exhaust and evaporative emissions and start emissions rates were calculated.
- Considering the project area and the type of trips reduced through the strategy, emissions on Road Type 5, urban unrestricted access were analyzed.
- Overall average speed in the five roadways is assumed to be 30 mph (Speed bin 7).
- The analysis period is from 7:00 a.m. to 7:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10. Use of the bicycle lanes can occur throughout the day, but the greatest impact on emissions will occur with any peak hour or daytime mode shift.
- The vehicle-miles traveled (VMT) reduced as a result of the mode shift to bicycle were distributed proportionally across the 12 hours and by vehicle types and fuel types in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects. TTI staff determined a valid percentage mode shift from automobile to bicycle by participants in El Paso region. The characteristics of this new facility may provide impetus for significant mode shift, but planners should use available data.

The following assumptions were made for the project:

- Total light-duty passenger vehicle and light-duty passenger truck AADT of 35,088 is estimated for all five roadways. This figure is based on 2012 and 2013AADT and ADT traffic counts from TxDOT and the City of El Paso. AADT is estimated based on the data plus a professional estimate of traffic growth and an averaging of the counts. It assumes 80% of the daily traffic along the roadways occurs in the 12-hour daytime period under analysis. It assumes 86% of the traffic is passenger vehicles.
- The current percent bicycle mode share for the El Paso region is estimated to be 2.0% and can serve as an optimistic mode share increase for the new bike facilities.
- The 0.02 increase in mode share represents new cyclists (vehicle trips replaced).
- Bike lane facility length of 5.38 miles is computed.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Equation 11.1, Bicycle and Pedestrian Lanes or Paths

Daily Emission Reduction = AADT * PMS * L * EF_B

The average annual daily traffic of the corridor multiplied by the percentage of drivers shifting to bike/pedestrian multiplied by the average bicycle trip length multiplied by the speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program.

Final unit of measure: grams/day
Source: Capitol Area MPO (CAMPO)

Variables: **AADT:** Average annual daily traffic in corridor (vehicles/day)

EF_B: Speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program (NO_x, VOC, or CO) (grams/mile)

L: Length of facility (miles)

PMS: Percentage mode shift from driving to bike/pedestrian (decimal)

Analysis

Results

Daily Emission Reduction = AADT * PMS * L * EF_B

Note: For presentation purposes, the individual emissions rates are not given in the results below.

For CO:

35,088 * 0.02 * 5.38 * EF_B = 7662.547 grams/day

Daily emission reduction is equal to 7.663 kg/day

For NOx:

35,088 * 0.02 * 5.38 * EF_B = 648.762 grams/day

Daily emission reduction is equal to 0.649 kg/day

For VOC:

35,088 * 0.02 * 5.38 * EF_B = 252.473 grams/day

Daily emission reduction is equal to 0.252 kg/day

For PM-10:

35,088 * 0.02 * 5.38 * EF_B = 210.588 grams/day

Daily emission reduction is equal to 0.211 kg/day

Summary of Results

The overall emissions analysis results for the project are shown in Table 1. The estimated emissions benefits from the new bike lanes are modest and are dependent on increased use of bicycles as a travel mode in the city and region, but an emissions benefit in the El Paso region can be expected from this project.

Table 1. Estimated Emissions Benefits from Bicycle Infrastructure Improvements – Phase 2

Pollutant	Emissions Reduction (kg/day)
CO	7.663
NOx	0.649
VOC	0.252
PM_{10}	0.211

Emission Reduction Analysis for Sun Metro Proposed CMAQ Project

Dyer RTS Operations Assistance Phase 2

April 2016 (Updated April 2018)

Prepared for

By

Task Summary

The Texas A&M Transportation Institute (TTI) El Paso office was tasked by Sun Metro to perform a mobile source emissions analysis for a proposed project in the El Paso nonattainment area. The transit agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement it.

The project is operational assistance for the second phase of the Rapid Transit Service, BRIO, in the Dyer corridor in northeast El Paso region.

Individual Project Analysis

The emissions analysis for the project is presented below. The strategy name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy equation.

Given the short time available to conduct these analyses, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for submission but more time available and effort would increase the accuracy of the emissions benefits. As a result, this analysis should not be used for conformity purposes.

Dyer RTS Operations Assistance - Phase 2

Sun Metro transit agency is proposing operational assistance for the future 12-mile BRIO line in the Dyer corridor in northeast El Paso. The RTS line begins at the Downtown Transfer Center and ends at the future Northeast Transfer Center. Eight buses will operate along the route with 22 stations.

Data Sources

Sun Metro provided several data sources to the TTI team: a map of the proposed route, previous emissions analysis for the route, the mileage, hours of operation, and operating costs for the route.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014 Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

Transit passenger characteristics were derived from the American Public Transportation Association report *A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys* published in May 2007.

Analysis Methods

TTI staff used an analysis method provided in the August 2008 version of the MOSERs Guide, equation 3.2 - *System/Service Operational Improvements*. The detailed equation is provided below in Strategy Equation.

Stated in words, the equation measures the reduction in start emissions and running exhaust emissions from a change in mode during the operating period and subtracting any additional emissions from the transit vehicles. The benefit is derived through attracting single occupant passenger vehicle drivers to utilize transit as their mode of travel.

The analysis year used is 2020. *For planning purposes, the emissions benefit of a static program will decline over time.*

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs) vehicle types, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- The project is implemented after the RTS is initiated; therefore no transit vehicle emissions are included in the analysis.
- Running exhaust, running evaporative, and start emissions (Process ID 1, 2, 11, 12, 13, 15)
- Considering the project area and the type of trips reduced through the strategy, primarily, freeway commuting, emissions on Road Type 4, urban restricted access.
- Average speed on IH-10 during operating hours (peak and off-peak) is assumed 30 mph.
- The analysis period is AM peak hours of 6:00-9:00 a.m., off-peak daytime hours from 9:00 a.m.-3:00 p.m. and PM peak hours of 3:00-8:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10.
- The vehicle trips reduced (VT_R) and vehicle-miles travelled reduced (VMT_R) were distributed proportionally across the 14 hours of model analysis and by vehicle type and fuel type in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

- Based on ridership data provided by Sun Metro, an average daily ridership of 3,450 was assumed.
- APTA ridership survey reports show 55% of transit passengers to be commuting. The RTS project focuses on capturing new commute traffic, so 75% of riders are assumed to be traveling to work and back totaling 2,588 per day.
- The analysis assumes 35% of these commute passengers are former single occupant vehicle (SOV) drivers. This translates to 26.25% of all passengers. This should be considered optimistic. The APTA survey report showed 14.3% of transit roadway passengers would drive alone as an alternative if no transit service was available. However this new service actively seeks SOV commuters.
- An average trip length of 14.9 miles was computed based on data provided by Sun Metro. The trip lengths were distributed evenly in the reduced VMT.

The final estimated emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

3.2 System/Service Operational Improvements

Daily Emission Reduction (for each pollutant) = A + B – C – D

$A = VT_R * TEF_{AUTO}$

Reduction in auto start emissions from trips reduced

$B = VMT_R * EF_B$

Reduction in auto running exhaust emissions from VMT reductions

$C = VT_{BUS} * TEF_{BUS}$

Increase in emissions from additional bus starts

$D = VMT_{BUS} * EF_{BUS}$

Increase in emissions from additional bus running exhaust emissions

Where

$VT_R = N_{TR} * F_{T, SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute

Variables:

EF_B: Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO) (grams/mile)

EF_{BUS}: Speed-based running exhaust emission factor for transit vehicle (NO_x, VOC, or CO) (grams/mile)

$F_{T, SOV}$: Percentage of people using a transit vehicle that previously were vehicle drivers (decimal)

N_{TR}: New transit ridership

TEF_{AUTO}: Auto trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TEF_{BUS}: Bus (or other transit vehicle) trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TL_W: Average auto trip length (miles)

VMT_{BUS}: VMT by transit vehicle

VMT_R: Reduction in daily automobile VMT

VT_{BUS}: Daily vehicle trips by transit vehicle

VT_R: Reduction in number of daily automobile vehicle trips

Analysis

$VT_R = (3{,}450 * 2) * 0.35 = 2{,}415$ trips/day

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = 2{,}415 * 12.0 = 28{,}980$ vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

Summary of Results

The emissions analysis result for the project is shown in Table 1. There are significant emissions benefits for all four pollutants. The results indicate an estimated air quality benefit from the Dyer RTS operational assistance.

Table 1. Dyer RTS Operational Assistance – Phase 2 Emission Reductions

Pollutant	Emissions Reduction (kg/day)
CO	72.787
NOx	5.788
VOC	3.626
PM_{10}	1.555

Emission Reduction Analysis for City of El Paso Proposed CMAQ Project

Montana Pedestrian Enhancements

April 2016

Prepared for

By

Texas A&M Transportation Institute

Task Summary

The Texas A&M Transportation Institute (TTI) Arlington office was tasked by the City of El Paso to perform a mobile source emissions analysis for a proposed project in the El Paso metropolitan region. The city is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement the project.

The project will construct 1.7 miles of pedestrian infrastructure enhancements along a future bus rapid transit service.

Individual Project Analysis

The emissions analysis for the project is presented below. The project name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy.

Given the short time available to conduct this analysis, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ applications, but more time and effort would increase the accuracy of the emissions benefits. As a result, this analysis should not be used for conformity purposes.

Montana Pedestrian Enhancements

The project will provide for the design and construction of pedestrian enhancements along the future Montana rapid transit service (RTS) route to include the installation of sidewalks and landscaping. The project will enhance a total of 1.7 miles of the route from the Five Points Transfer Center at Piedras Street and Montana Avenue, east on Montana to Airway to Convair to Viscount to Hawkins to Montana, continuing east on Montana to the Far East Transfer Center at RC Poe & Edgemere.

Data Sources

The City of El Paso provided several items containing project information and data for the analysis: project description and scope plus current average speed data for the affected roadways. These resources provided the research team with a better understanding of the proposed project and potential emissions benefits.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014 Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." This inventory file is currently being updated by TTI with 2014 data and the research team was granted access to these newer inputs for this analysis. The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

Analysis Methods

TTI staff used the analysis method provided in the August 2008 version of the MOSERs Guide, Equation 11.1 – *Bicycle and Pedestrian Lanes or Paths*.

Stated in words, the average annual daily traffic (AADT) of the corridor is multiplied by the percentage of drivers shifting to pedestrian mode, multiplied by the pedestrian facility length, multiplied by the speed-based running exhaust emission factor for participants' trip before utilizing the sidewalk.

The detailed equation is provided below in Strategy Equation.

The analysis year used is 2020. *For planning purposes, the emissions benefit of a static program will decline over time.* Without the increased pedestrian use of the facilities over the project lifetime, any benefits accrued by the mode shift to walking may be negated by the increased emissions from potential higher traffic volumes in the corridor over time.

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10.

- Light-duty passenger vehicles and light-duty passenger trucks (SUVs), gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- Running exhaust and evaporative emissions and start emissions rates were calculated.
- Considering the project area and the type of trips reduced through the strategy, emissions on Road Type 5, urban unrestricted access were analyzed.
- Average speed along Alameda is assumed to be 30 mph (Speed bin 7).
- The analysis period is from 7:00 a.m. to 7:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10. Use of the sidewalks can occur throughout the day, but the greatest impact on emissions will occur with any peak hour or daytime mode shift.
- The vehicle-miles traveled (VMT) reduced as a result of the mode shift to pedestrian were distributed proportionally across the 12 hours and by vehicle types and fuel types in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects. TTI staff determined a valid percentage mode shift from automobile to pedestrian by participants in El Paso region. The characteristics of this new facility may provide impetus for significant mode shift, but planners should use available data.

The following assumptions were made for the project:

- Total light-duty passenger vehicle and light-duty passenger truck AADT of 161,680 is estimated for the Montana corridor. This figure is based on 2012 and 2013AADT and ADT traffic counts from TxDOT and the City of El Paso. Future AADT is estimated based on the data plus a professional estimate of traffic growth and an averaging of the counts. It assumes 80% of the daily traffic along the roadways occurs in the 12-hour daytime period under analysis. It assumes 86% of that traffic is passenger vehicles.
- The current percent pedestrian commuter mode share for the El Paso region is estimated to be 2.0% and can serve as the mode share increase for the new pedestrian facilities.
- The 0.02 increase in mode share represents new pedestrians (VMT replaced).
- Pedestrian facility length of 1.7 miles is computed.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Equation 11.1, Bicycle and Pedestrian Lanes or Paths

Daily Emission Reduction = AADT * PMS * L * EF_B

The average annual daily traffic of the corridor multiplied by the percentage of drivers shifting to bike/pedestrian multiplied by the average bicycle/pedestrian trip length multiplied by the speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program.

Final unit of measure: grams/day
Source: Capitol Area MPO (CAMPO)

Variables: **AADT:** Average annual daily traffic in corridor (vehicles/day)

EF_B: Speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program (NO_x, VOC, or CO) (grams/mile)

L: Length of facility (miles)

PMS: Percentage mode shift from driving to bike/pedestrian (decimal)

Analysis

Results

Daily Emission Reduction = AADT * PMS * L * EF_B

Note: For presentation purposes, the individual emissions rates are not given in the results below.

For CO:

161,680 * 0.02 * 1.7 * EF_B = 11,176.581 grams/day

Daily emission reduction is equal to 11.177 kg/day

For NOx:

161,680 * 0.02 * 1.7 * EF_B = 946.328 grams/day

Daily emission reduction is equal to 0.946 kg/day

For VOC:

161,680 * 0.02 * 1.7 * EF_B = 368.257 grams/day

Daily emission reduction is equal to 0.368 kg/day

For PM-10:

161,680 * 0.02 * 1.7 * EF_B = 307.164 grams/day

Daily emission reduction is equal to 0.307 kg/day

Summary of Results

The overall emissions analysis results for the project are shown in Table 1. The estimated emissions benefits from the new pedestrian facilities are modest and are dependent on increased use of walking as a travel mode in the city and region, but an emissions benefit in the El Paso region can be expected from this project.

Table 1. Estimated Emissions Benefits from Montana Pedestrian Enhancements

Pollutant	Emissions Reduction (kg/day)
CO	11.177
NOx	0.946
VOC	0.368
PM_{10}	0.307

Emission Reduction Analysis for Sun Metro Proposed CMAQ Project

Montana RTS Operations Assistance

April 2016

Prepared for

By

Task Summary

The Texas A&M Transportation Institute (TTI) El Paso office was tasked by Sun Metro to perform a mobile source emissions analysis for a proposed project in the El Paso nonattainment area. The transit agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement it.

The project is operations assistance for the first year of the future Rapid Transit Service, BRIO, in the Montana corridor in east El Paso region.

Individual Project Analysis

The emissions analysis for the project is presented below. The strategy name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy equation.

Given the short time available to conduct these analyses, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for submission but more time available and effort would increase the accuracy of the emissions benefits. As a result, *this analysis should not be used for conformity purposes*.

Montana RTS Operations Assistance

Sun Metro transit agency is proposing operations assistance for the first year of the future 16.8-mile BRIO line in the Montana corridor in east El Paso region. The RTS line begins at the Five Points Terminal and ends at the future Far East Transfer Center. Twelve buses will operate along the route with 26 stations.

Data Sources

Sun Metro provided several data sources to the TTI team: a map of the proposed route, the bus mileage, anticipated ridership, and hours of operation for the route.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014 Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

Transit passenger characteristics were derived from the American Public Transportation Association report *A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys* published in May 2007.

Analysis Methods

TTI staff used an analysis method provided in the August 2008 version of the MOSERs Guide, equation 3.1 - *System/Service Expansion*. The detailed equation is provided below in Strategy Equation.

Stated in words, the equation measures the reduction in start emissions and running exhaust emissions from a change in mode during the operating period and subtracting any additional emissions from the transit vehicles. The benefit is derived through attracting single occupant passenger vehicle drivers to utilize transit as their mode of travel.

The analysis year used is 2019. *For planning purposes, the emissions benefit of a static program will decline over time.*

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs) vehicle types, gasoline and diesel-fueled, and transit buses are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- Transit vehicle (source type 42) emission rates were included as this will be a new service.
- Running exhaust, running evaporative, and start emissions (Process ID 1, 2, 11, 12, 13, 15)

- Considering the project area and the type of trips reduced through the strategy, primarily, freeway commuting, emissions on Road Type 4, urban restricted access, was used for the passenger vehicles. Road type 5, urban unrestricted access, was used for the transit vehicles.
- Average speed on IH-10 during operating hours (peak and off-peak) is assumed 30 mph.
- Average transit vehicle speed is assumed 20 mph (speed bin 5) based on data received from Sun Metro.
- The analysis period is AM peak hours of 6:00-9:00 a.m., off-peak daytime hours from 9:00 a.m.-3:00 p.m. and PM peak hours of 3:00-8:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10.
- The vehicle trips reduced (VT_R) and vehicle-miles travelled reduced (VMT_R) were distributed proportionally across the 14 hours of model analysis and by vehicle type and fuel type in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

- Based on ridership data provided by Sun Metro, an average daily ridership of 3,300 was assumed.
- The analysis assumes 52% of these commute passengers are former single occupant vehicle (SOV) drivers. This should be considered optimistic. The APTA survey report showed 14.3% of transit roadway passengers would drive alone as an alternative if no transit service was available. However this new service actively seeks SOV commuters.
- An average trip length of 12.6 miles was computed based on data provided by Sun Metro. The trip lengths were distributed evenly in the reduced VMT.

The final estimated emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

3.1 System/Service Expansion

Daily Emission Reduction (for each pollutant) = A + B – C – D

$A = VT_R * TEF_{AUTO}$

Reduction in auto start emissions from trips reduced

$B = VMT_R * EF_B$

Reduction in auto running exhaust emissions from VMT reductions

$$\mathbf{C = VT_{BUS} * TEF_{BUS}}$$

Increase in emissions from additional bus starts

$$\mathbf{D = VMT_{BUS} * EF_{BUS}}$$

Increase in emissions from additional bus running exhaust emissions

Where

$VT_R = N_{TR} * F_{T, SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute

Variables:

EF_B:	Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO) (grams/mile)
EF_{BUS}:	Speed-based running exhaust emission factor for transit vehicle (NO_x, VOC, or CO) (grams/mile)
$F_{T, SOV}$:	Percentage of people using a transit vehicle that previously were vehicle drivers (decimal)
N_{TR}:	New transit ridership
TEF_{AUTO}:	Auto trip-end emission factor (NO_x, VOC, or CO) (grams/trip)
TEF_{BUS}:	Bus (or other transit vehicle) trip-end emission factor (NO_x, VOC, or CO) (grams/trip)
TL_W:	Average auto trip length (miles)
VMT_{BUS}:	VMT by transit vehicle
VMT_R:	Reduction in daily automobile VMT

VT_{BUS}: Daily vehicle trips by transit vehicle

VT_R: Reduction in number of daily automobile vehicle trips

Analysis

For presentation purposes, the MOVES calculation results and extensive results from the equation calculations are not presented in the results below.

$VT_R = (3{,}300 * 2) * 0.52 = 3{,}432$ trips/day

Number of transit riders multiplied by 2 multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = 3{,}432 * 12.6 = 43{,}243$ vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

Summary of Results

The emissions analysis result for the project is shown in Table 1. There are significant emissions benefits for all four pollutants. The results indicate an estimated air quality benefit from the Montana RTS operations assistance project.

Table 1. Montana RTS Operations Assistance Emission Reductions

Pollutant	Emissions Reduction (kg/day)
CO	100.325
NOx	2.929
VOC	5.553
PM_{10}	1.629

Emission Reduction Analysis for TxDOT Proposed CMAQ Project

Operational Improvements at Montana Avenue/Paisano Drive Intersection

May 2016

Prepared for

Texas Department of Transportation

By

Texas A&M Transportation Institute

Task Summary

The Texas A&M Transportation Institute (TTI) was tasked by the Texas Department of Transportation (TxDOT) to perform a mobile source emissions analysis for a proposed project in the El Paso metropolitan region. The state agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement the project.

The project will construct operational improvements to the intersection of Montana Avenue and Paisano Drive.

Individual Project Analysis

The emissions analysis for the project is presented below. The project name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy.

Given the short time available to conduct this analysis, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ applications, but more time and effort would increase the accuracy of the emissions benefits. As a result, *this analysis should not be used for conformity purposes.*

Operational Improvements at Montana Avenue/Paisano Drive Intersection

The proposed improvements at the Montana Avenue and Paisano Drive intersection consist of modifying the signalized intersection between southbound Paisano Drive and eastbound Montana Avenue into a T-intersection between eastbound Montana Avenue and both directions of Paisano Drive. This improvement eliminates the existing weaving on eastbound Montana Avenue between Paisano Drive and Magruder Street, provides route continuity for US 62, increases eastbound and southbound capacity, and provides a crosswalk for Montana Avenue across Paisano Drive.

Data Sources

TxDOT provided several items containing project information and data for the analysis: a project description and scope plus the design plans for the intersection. These resources provided the research team with a better understanding of the proposed project and potential emissions benefits.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014a Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." This inventory file is currently being updated by TTI with 2014 data and the research team was granted access to these newer inputs for this analysis. The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

Analysis Methods

TTI staff used a modified version of the analysis method provided in the August 2008 version of the MOSERs Guide, Equation 7.2 - *Traffic Operations*. The equation attempts to estimate the improvements in idling emission and speed changes as a result of operational improvements. For this particular project, focus was placed on the changes in idling emissions and delay reduction. The modified equation is provided below in Strategy Equation.

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10.
- The analysis year used is 2022. The project is requested for fiscal year 2020 with construction by 2021.
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs), motorcycles, light commercial trucks, single unit short and long-haul trucks, and combination short and long-haul trucks, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 11, 21, 31, 32, 52, 53, 61, 62).
- Running exhaust and evaporative emissions, brake wear, and tire wear emissions rates were calculated.
- Considering the project area and the type of emissions reduced through the strategy, emissions on Road Type 5, urban unrestricted access were analyzed.

- Idling speed in MOVES2014a is speed bin 1.
- The analysis period is from 6:00 a.m. to 6:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10. Use of the intersection occurs throughout the day, but the greatest impact on emissions will occur with any peak hour or daytime mode shift.
- The idling emissions reduced as a result of project were distributed across the 12 hours and by vehicle types and fuel types in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects. TTI staff attempted to determine a valid delay reduction from the intersection improvement.

The following assumptions were made for the project:

- In reviewing the data and information provided, the primary emissions benefit from this project is the reduction in delay from operational improvements.
- Projected AADT of 43,890 is estimated for Montana Ave.; 29,365 for Paisano Drive. This figure is derived from 2012 TxDOT traffic counts 2013 City of El Paso traffic counts. Future AADT is estimated based on the data plus an annual growth rate of 1.105%. It assumes 80% of the daily traffic along the roadways occurs in the 12-hour daytime period under analysis: 35,110 for Montana Ave.; 23,490 for Paisano Drive.
- 6 peak hours and 6 off-peak hours are assumed in the analysis period. Traffic volumes in the peak hours are assumed to be twice off-peak hours. Two-thirds of the estimated AADT is distributed in the 6 peak hours; one-third in the off peak hours.
- Average delay reduction is assumed to be 20 seconds in peak hours and 10 seconds in off-peak hours. Benefits will accrue for all approaches to the intersection.
- Total facility length of 0.5 miles is computed.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Equation 7.2, Traffic Operations (modified)

Daily Emission Reduction = $(I_P + I_{OP}) * EF_I$

Change in idling exhaust emissions from improved traffic flow during the peak and off-peak periods

Where

$I_P = (N_{PH} * V_{H,P} * DR_P)/3600$ seconds per hour
$I_{OP} = (N_{OPH} * V_{H,OP} * DR_{OP})/3600$ seconds per hour

Reduction of idling in the peak and off-peak period

Final unit of measure: grams/day

Source: Texas A&M Transportation Institute (modified from CARB and FHWA Southern Resource Center)

Variables:

DR_P:	Estimated delay reduction during peak period (seconds)
DR_{OP}:	Estimated delay reduction during off-peak period (seconds)
EF_I:	Idling emission factor (grams/hour)
I_P:	Peak hour reduction in idling emissions (vehicle-hours)
I_{OP}:	Off-peak hour reduction in idling emissions (hours)
N_{PH}:	Number of peak hours
N_{OPH}:	Number of off-peak hours
$V_{H,P}$:	Number of vehicles that pass through the intersection per hour during the peak period
$V_{H,OP}$:	Number of vehicles that pass through the intersection per hour during the off-peak period

Analysis

Daily Emission Reduction = $(I_P + I_{OP}) * EF_I$

Note: For presentation purposes, the individual emissions rates are not given in the results below.

As stated in the *Variables* section above, the numbers presented below represent the delay reduction in seconds during peak and off-peak hours. These numbers were calculated by distributing the projected AADT for each roadway, assuming 80% of the total occurs in the 12 hour analysis period and distributing it though the 12 hours (6 peak, 6 off-peak). For example, as shown on page 3, future 2022 AADT for Montana Ave is 43,890. Thus, 43,890 * 0.80 = 35,110 vehicles

Since no traffic simulation model exists for this intersection, researchers made the assumption using professional experience that approximately 2/3 of the 35,110 vehicles will be circulating during the peak periods. For example, on Montana Avenue, 31,000 * (2/3) = 23,406 distributed through the 6 hours to get the numbers of vehicles per hour.

$V_{H,P}$ = 23,406/6 = 3,901 vehicles-hour
$V_{H,OP}$ = 11,703/6 = 1,950 vehicles-hour

The two variables are then summed for both roadways: 6,511 during peak hours, 3,255 for off-peak.

Where

I_P = (6 * 6,511 * 20)/3600 seconds per hour
I_{OP} = (6 * 3,255 * 10)/3600 seconds per hour

(217.03 + 54.25) = 271.28

For CO:

271.28 * EF_I = 22,001.750 grams/day

Daily emission reduction is equal to 22.002 kg/day

For NOx:

271.28 * EF_I = 5,322.266 grams/day

Daily emission reduction is equal to 5.322 kg/day

For VOC:

271.28 * EF_I = 1,989.442 grams/day

Daily emission reduction is equal to 1.989 kg/day

For PM-10:

271.28 * EF_I = 1,552.226 grams/day

Daily emission reduction is equal to 1.552 kg/day

Summary of Results

The overall emissions analysis results for the project are shown in Table 1. An emissions benefit in the El Paso region can be expected from this project.

Table 1. Estimated Emissions Benefits from Operational Improvements at Montana Ave/Paisano Dr. Intersection

Pollutant	Emissions Reduction (kg/day)
CO	22.002
NOx	5.322
VOC	1.989
PM_{10}	1.552

Emission Reduction Analysis for TxDOT Proposed CMAQ Project

Bluetooth Detectors and Radar Vehicle Sensing Devices (RVSDs) on US 54

May 2016

Prepared for

By

Task Summary

The Texas A&M Transportation Institute (TTI) was tasked by the Texas Department of Transportation (TxDOT) to perform a mobile source emissions analysis for a proposed project in the El Paso metropolitan region. The state agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement the project.

Individual Project Analysis

The emissions analysis for the project is presented below. Data sources and analysis assumptions are provided. The equation used from the Texas Guide to Accepted Mobile Source Emission Reduction Strategies (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy.

Given the short time available to conduct this analysis, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ applications, but more time and effort would increase the accuracy of the emissions benefits. As a result, this analysis should not be used for conformity purposes.

Bluetooth Detectors and Radar Vehicle Sensing Devices (RVSDs) on US 54

This project consists of installation of Bluetooth Detectors and Radar Vehicle Sensing Devices(RVSDs) along 3.9 miles of US 54 for data gathering to display travel time messages on US 54 dynamic message signs (DMS) from Loop 375 (Transmountain) to FM 2529 (McCombs).

Data Sources

TxDOT provided items containing project information and data including project descriptions, cost estimates, design plans. These resources provided the research team with a better understanding of the proposed project and potential emissions benefits.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014a Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." This inventory file is currently being updated by TTI with 2014 data and the research team was granted access to these newer inputs for this analysis. The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

Traffic data for the various roadways was garnered from 2012 TxDOT traffic count data for the El Paso District available online. A growth rate was estimated and applied to the numbers.

Analysis Methods

TTI staff used the analysis method provided in the August 2008 version of the MOSERs Guide, Equation 7.4 – *Intelligent Transportation Systems (ITS)*. The equation estimates the sum of each ITS link's change in running exhaust emissions resulting from improved traffic flow due to the ITS improvements. The equation is provided below in Strategy Equation.

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10.
- The analysis year is 2021.
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs), motorcycles, light commercial trucks, single unit short and long-haul trucks, and combination short and long-haul trucks, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 11, 21, 31, 32, 52, 53, 61, 62).
- Running exhaust and evaporative emissions, break wear and tire wear emissions rates were calculated.
- Considering the project area and the type of emissions reduced through the strategy, emissions on Road Type 4, urban restricted access were analyzed.
- An average speed improvement from 45 mph to 50 mph is assumed (speed bin 10 to speed bin 11) as a result of implementation.

- The analysis period is from 6:00 a.m. to 6:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10. The effects of the ITS can occur throughout the day, but the greatest impact on emissions will occur with any peak hour or daytime activity.
- The emissions reduced as a result of project were distributed across the 12 hours and by vehicle types and fuel types in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

The following assumptions were made for the project:

- An average total AADT of 155,030 is estimated for the roadway segments affected by installation of the equipment. This figure is estimated based on 2012 TxDOT traffic counts. Future AADT is estimated based on the estimated current number plus application of a 1.105 percent annual growth factor.
- Assumes 80% of the daily traffic along the roadways occurs in the 12-hour daytime period under analysis. Thus, projected 2021 AADT is 124,020.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Equation 7.4, Intelligent Transportation Systems (ITS)

Daily Emission Reduction = $\sum_{i=1}^{n}[\mathbf{L}_i * \mathbf{ADT}_i * (\mathbf{EF}_B - \mathbf{EF}_A)_i]$

The sum of each ITS link's change in running exhaust emissions resulting from improved traffic flow.

Variables:

ADT_i: Average daily traffic for each affected roadway

EF_A: Speed-based running exhaust emission factor after implementation (NO_x and VOC) (grams/mile)

EF_B: Speed-based running exhaust emission factor before implementation (NO_x and VOC) (grams/mile)

L_i: Length of each freeway affected by ITS (miles)

N: Number of affected corridors

Summary of Results

The emissions analysis results for the project are shown in Table 1.

Table 1. Estimated Emissions Benefits from Bluetooth Detectors and Radar Vehicle Sensing Devices (RVSDs) on US 54

Pollutant	Emissions Reduction (kg/day)
CO	2.434
NOx	0.398
VOC	0.081
PM10	0.400

For CMAQ application purposes, an emissions benefit must be shown for a project. ITS projects create a dilemma for planners. The system is often built through implementation of individual pieces in phases. Some of the pieces, particularly communications cable and wiring, do not create an emissions reduction in and of themselves. Only when connected and active with cameras and message signs do they begin to fulfill their role in emissions reductions. Maricopa Association of Governments (MAG) in Phoenix, Arizona developed a simple, straightforward way to apportion benefits for ITS components for CMAQ application and reporting purposes:

Allocate the Project's total benefits to each element based on the individual element's cost or its effective centerline miles.

1. Cost or,
2. Effective centerline miles or,
3. Effective coverage area (sq. miles)

Here are the project details for this analysis:

ITS Project	Cost (dollars)	Centerline Miles
US 54 Bluetooth Detectors and Sensing Devices	730,000	3.9

Emission Reduction Analysis for Sun Metro Proposed CMAQ Project

Alameda RTS Operations Assistance Phase 2

April 2016 (Updated April 2018)

Prepared for

By

Texas A&M Transportation Institute

Task Summary

The Texas A&M Transportation Institute (TTI) El Paso office was tasked by Sun Metro to perform a mobile source emissions analysis for a proposed project in the El Paso nonattainment area. The transit agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement it.

The project is operational assistance for the second phase of the Rapid Transit Service, BRIO, in the Alameda corridor in east El Paso region.

Individual Project Analysis

The emissions analysis for the project is presented below. The strategy name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy equation.

Given the short time available to conduct these analyses, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for submission but more time available and effort would increase the accuracy of the emissions benefits. As a result, *this analysis should not be used for conformity purposes*.

Alameda RTS Operations Assistance - Phase 2

Sun Metro transit agency is proposing operational assistance for the future 14.9-mile BRIO line in the Alameda corridor in northeast El Paso. The RTS line begins at the Downtown Transfer Center and ends at the Mission Valley Transfer Center. Fourteen buses will operate along the route with 29 stations.

Data Sources

Sun Metro provided several data sources to the TTI team: a map of the proposed route, previous emissions analysis for the route, the mileage, hours of operation, and operating costs for the route.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014 Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

Transit passenger characteristics were derived from the American Public Transportation Association report *A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys* published in May 2007.

Analysis Methods

TTI staff used an analysis method provided in the August 2008 version of the MOSERs Guide, equation 3.2 - *System/Service Operational Improvements*. The detailed equation is provided below in Strategy Equation.

Stated in words, the equation measures the reduction in start emissions and running exhaust emissions from a change in mode during the operating period and subtracting any additional emissions from the transit vehicles. The benefit is derived through attracting single occupant passenger vehicle drivers to utilize transit as their mode of travel.

The analysis year used is 2020. *For planning purposes, the emissions benefit of a static program will decline over time.*

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs) vehicle types, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- The project is implemented after the RTS is initiated; therefore no transit vehicle emissions are included in the analysis.
- Running exhaust, running evaporative, and start emissions (Process ID 1, 2, 11, 12, 13, 15)
- Considering the project area and the type of trips reduced through the strategy, primarily, freeway commuting, emissions on Road Type 4, urban restricted access.
- Average speed on IH-10 during operating hours (peak and off-peak) is assumed 30 mph.
- The analysis period is AM peak hours of 6:00-9:00 a.m., off-peak daytime hours from 9:00 a.m.-3:00 p.m. and PM peak hours of 3:00-8:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10.
- The vehicle trips reduced (VT_R) and vehicle-miles travelled reduced (VMT_R) were distributed proportionally across the 14 hours of model analysis and by vehicle type and fuel type in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

- Based on ridership data provided by Sun Metro, an average daily ridership of 3,500 was assumed.
- APTA ridership survey reports show 55% of transit passengers to be commuting. The RTS project focuses on capturing new commute traffic, so 75% of riders are assumed to be traveling to work and back totaling 2,625 per day.
- The analysis assumes 35% of these commute passengers are former single occupant vehicle (SOV) drivers. This translates to 26.25% of all passengers. This should be considered optimistic. The APTA survey report showed 14.3% of transit roadway passengers would drive alone as an alternative if no transit service was available. However this new service actively seeks SOV commuters.
- An average trip length of 14.9 miles was computed based on data provided by Sun Metro. The trip lengths were distributed evenly in the reduced VMT.

The final estimated emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

3.2 System/Service Operational Improvements

Daily Emission Reduction (for each pollutant) = A + B – C – D

$A = VT_R * TEF_{AUTO}$

Reduction in auto start emissions from trips reduced

$B = VMT_R * EF_B$

Reduction in auto running exhaust emissions from VMT reductions

$C = VT_{BUS} * TEF_{BUS}$

Increase in emissions from additional bus starts

$D = VMT_{BUS} * EF_{BUS}$

Increase in emissions from additional bus running exhaust emissions

Where

$VT_R = N_{TR} * F_{T, SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute

Variables:

EF_B: Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO) (grams/mile)

EF_{BUS}: Speed-based running exhaust emission factor for transit vehicle (NO_x, VOC, or CO) (grams/mile)

$F_{T, SOV}$: Percentage of people using a transit vehicle that previously were vehicle drivers (decimal)

N_{TR}: New transit ridership

TEF_{AUTO}: Auto trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TEF_{BUS}: Bus (or other transit vehicle) trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TL_W: Average auto trip length (miles)

VMT_{BUS}: VMT by transit vehicle

VMT_R: Reduction in daily automobile VMT

VT_{BUS}: Daily vehicle trips by transit vehicle

VT_R: Reduction in number of daily automobile vehicle trips

Analysis

$VT_R = (3{,}500 * 2) * 0.35 = 2{,}450$ trips/day

Number of transit riders multiplied by 2 multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = 2{,}450 * 14.9 = 36{,}505$ vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

Summary of Results

The emissions analysis result for the project is shown in Table 1. There are significant emissions benefits for all four pollutants. The results indicate an estimated air quality benefit from the Alameda RTS Phase 2 operational assistance project.

Table 1. Alameda RTS Operational Assistance – Phase 2 Emission Reductions

Pollutant	Emissions Reduction (kg/day)
CO	86.446
NOx	6.936
VOC	4.125
PM_{10}	1.594

Emission Reduction Analysis for Sun Metro Proposed CMAQ Project

El Paso Streetcar Operations Assistance Phase 2

April 2016

Prepared for

By

Task Summary

The Texas A&M Transportation Institute (TTI) El Paso office was tasked by Sun Metro to perform a mobile source emissions analysis for a proposed project in the El Paso nonattainment area. The transit agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement it.

The project is the El Paso Streetcar - Phase 2 in the central region of the metropolitan area.

Individual Project Analysis

The emissions analysis for the project is presented below. The strategy name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy equation.

Given the short time available to conduct these analyses, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for submission but more time available and effort would increase the accuracy of the emissions benefits. As a result, *this analysis should not be used for conformity purposes*.

El Paso Streetcar – Phase 2

The proposed El Paso Streetcar Project consists of a two-mile, double-tracked corridor, beginning in the area near the Downtown Shopping District and International Bridges, traveling north through downtown to the University of Texas at El Paso area, the Cincinnati Entertainment District and back.

The guideway would be positioned within existing traffic lanes; along the right lane, adjacent to the curb or parking lane. The streetcar stops would be located two to three blocks apart along the right edge of traffic. A maintenance facility would be constructed within the Downtown Transfer Center.

Data Sources

Sun Metro provided several data sources to the TTI team: a map of the proposed route, projected ridership, the mileage, hours of operation, and operating costs for the route.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014 Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

Transit passenger characteristics were derived from the American Public Transportation Association report *A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys* published in May 2007.

Analysis Methods

TTI staff used an analysis method provided in the August 2008 version of the MOSERs Guide, equation 3.1 - *System/Service Expansion*. The detailed equation is provided below in Strategy Equation.

Stated in words, the equation measures the reduction in start emissions and running exhaust emissions from a change in mode during the operating period and subtracting any additional emissions from the transit vehicles. The benefit is derived through attracting single occupant passenger vehicle drivers to utilize transit as their mode of travel.

The analysis year used is 2020. *For planning purposes, the emissions benefit of a static program will decline over time.*

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs) vehicle types, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- The streetcar appears to be an electrified rail line; therefore no transit vehicle emissions are included in the analysis.
- Running exhaust, running evaporative, and start emissions (Process ID 1, 2, 11, 12, 13, 15)
- Considering the project area and the type of trips reduced through the strategy, primarily short distance, emissions on Road Type 5, urban unrestricted access.
- Average speed on surrounding roadways during operating hours (peak and off-peak) is assumed 30 mph.
- The analysis period is AM peak hours of 7:00-9:00 a.m., off-peak daytime hours from 9:00 a.m.-3:00 p.m. and PM peak hours of 3:00-7:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10.
- The vehicle trips reduced (VT_R) and vehicle-miles travelled reduced (VMT_R) were distributed proportionally across the 14 hours of model analysis and by vehicle type and fuel type in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

- Based on ridership data and a growth rate provided by Sun Metro, an average daily ridership of 824 was assumed.
- The analysis assumes 35% of the passengers in the analysis year are using the streetcar for a local trip for which they would have used a vehicle. This should be considered optimistic. The APTA survey report showed 14.3% of transit passengers would drive alone as an alternative if no transit service was available. However, this new service actively seeks SOV drivers.
- An average trip length of 3.0 miles was computed based on data provided by Sun Metro. The trip lengths were distributed evenly in the reduced VMT.

The final estimated emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

3.1 System/Service Expansion

Daily Emission Reduction (for each pollutant) = A + B – C – D

$$\mathbf{A = VT_R * TEF_{AUTO}}$$

Reduction in auto start emissions from trips reduced

$$\mathbf{B= VMT_R * EF_B}$$

Reduction in auto running exhaust emissions from VMT reductions

$$\mathbf{C = VT_{BUS} * TEF_{BUS}}$$

Increase in emissions from additional bus starts

$$\mathbf{D = VMT_{BUS} * EF_{BUS}}$$

Increase in emissions from additional bus running exhaust emissions

Where

$VT_R = N_{TR} * F_{T, SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute

Variables:

EF_B: Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO) (grams/mile)

EF_{BUS}: Speed-based running exhaust emission factor for transit vehicle (NO_x, VOC, or CO) (grams/mile)

$F_{T, SOV}$: Percentage of people using a transit vehicle that previously were vehicle drivers (decimal)

N_{TR}: New transit ridership

TEF_{AUTO}: Auto trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TEF_{BUS}: Bus (or other transit vehicle) trip-end emission factor (NO_x, VOC, or CO) (grams/trip)

TL_W: Average auto trip length (miles)

VMT_{BUS}: VMT by transit vehicle

VMT_R: Reduction in daily automobile VMT

VT_{BUS}: Daily vehicle trips by transit vehicle

VT_R: Reduction in number of daily automobile vehicle trips

Analysis

$VT_R = (824 * 2) * 0.35 = 577$ trips/day

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = 577 * 3.0 = 1{,}730$ vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

Summary of Results

The emissions analysis result for the project is shown in Table 1. There are significant emissions benefits for all four pollutants. The results indicate an estimated air quality benefit from Phase 2 of the El Paso Streetcar project.

Table 1. Estimated Emission Reductions for El Paso Streetcar – Phase 2

Pollutant	Emissions Reduction (kg/day)
CO	8.362
NOx	0.638
VOC	0.531
PM_{10}	0.101

Emission Reduction Analysis for City of El Paso Proposed CMAQ Project

Bicycle Infrastructure Citywide

February 2018

Prepared for

By

Texas A&M Transportation Institute

Task Summary

The Texas A&M Transportation Institute (TTI) was tasked by the City of El Paso to perform a mobile source emissions analysis for a proposed project in the El Paso metropolitan region. The city is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement the project.

The project will construct 42.2 miles of bike lane infrastructure improvements in the region.

Individual Project Analysis

The emissions analysis for the project is presented below. The project name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy.

It is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ applications, but more time and effort would increase the accuracy of the emissions benefits. As a result, this analysis should not be used for conformity purposes.

Bicycle Infrastructure Citywide

The Bicycle Infrastructure Citywide project will install 42.2 miles of bicycle lane improvements along 32 roadways in the El Paso region. The project will serve the City of El Paso by increasing its regional infrastructure coupled with existing transit projects, educational centers, and commercial developments. Bicycle facilities will support and provide connectivity to existing bicycle facilities Citywide with connection to mass transit centers and facilities, and provide an alternative method of transportation. The infrastructure will be installed within City right-of-way and no property acquisition is anticipated.

The project will construct bicycle facilities citywide to include: buffered bike lanes, conventional bike lanes, bicycle boulevards, shared lane markings, and protected bicycle lanes. The project will include associated signage, wayfinding, striping, and intersection treatments.

The limits of the improvements involve numerous roadways:

Limit from:
High Ridge from Resler; Escondido from Resler; Ojo de Agua from Westwind; Via Descanso from Ojo de Agua; Via Serena from Via Descanso; Marcus Uribe from Martin Luther King Jr; Sean Haggerty from US 54; Will Ruth from Dyer; Diana from US 54; Stahala from Diana; Hondo Pass from US 54; Magentic from Hondo Pass; Stanton from Cliff; Robinson from Oregon; Cotton from San Antonio; Sixth from Cotton; Val Verde from Paisano; Fonseca from Loop 375; Clark from Delta; Montwood from Viscount; Montwood from Zanzibar; Lomaland from Montwood; Phoenix from Hawkins; Alameda from Loop 375; Pellicano from George Dieter; Peter Cooper from Pellicano; George Dieter from Vista Del Sol; Bob Mitchell from George Dieter; Saul Kleinfeld from Turner; Nolan Richardson from Turner; Pebble Hills from Yarbrough; Lee Trevino from Edgemere

Limit to:
High Ridge to Franklin Hills; Escondido to Westwind; Ojo de Agua to Via Descanso; Via Descanso to Via Serena; Via Serena to High Ridge; Marcus Uribe to Benny Emler; Sean Haggerty to Rushing; Will Ruth to McCombs; Diana to Railroad; Stahala to Hondo Pass; Hondo Pass to Magnetic; Magnetic to Atlas; Stanton to Brentwood; Robinson to Piedmont; Cotton to Sixth; Sixth to Campbell; Fonseca to Delta; Clark to Trowbridge; Montwood to McRae; Montwood to Lee Trevino; Lomaland to Trawood; Phoenix to Giles; Pellicano to Loop 375; Peter Cooper to Ben Proctor; George Dieter to Edgemere; Bob Mitchell to Saul Kleinfeld; Saul Kleinfeld to Bob Mitchell; Nolan Richardson to Pebble Hills; Pebble Hills to Lisa Sherr; Lee Trevino to Trawood

The components of the project are part of the August 2016 City of El Paso Bike Plan.

Data Sources

The City of El Paso provided the project description and scope project information and data for the analysis. These resources provided the research team with a better understanding of the proposed project and potential emissions benefits.

The technical report *2014 On-Road Mobile Source Annual, Summer Weekday and Winter Workday Emissions Inventories: El Paso Area, TTI, August 2015* describes development of 2014 analysis year El

Paso MOVES2014-based actual on-road inventories, which were the basis for these MOVES runs, with respect to MOVES modeling procedures and MOVES input data. MOVES modeling set-ups and input data combinations are described starting on Page 29 of the report, in the section "Estimation of Summer and Winter Weekday Emissions Factors". Tables 19 through 22 and surrounding text contain the details. The MOVES modeling part of the process and the local/default input data combinations as described (Table 22) was used, updated where appropriate for model version (MOVES2014a versus MOVES2014) and for analysis year (CMAQ years 2021 versus 2014).

In particular, the actual fuel formulation sulfur values were adjusted to reflect "expected" future year values in place of 2014 actual average sulfur level values (i.e., to maintain consistency with the Tier 3 gasoline standard implemented in January 2017 and for consistency with Ultra Low Sulfur Diesel). It is also noteworthy that the age distributions and AVFT input data from the 2014 analysis were used, since these are based on the mid-year 2014 TxDMV vehicle registrations data, which is currently still "latest available".

TTI staff used American Community Survey data to compute a bicycle mode share for El Paso, along with a future growth rate for the mode in the region.

Analysis Methods

TTI staff used the analysis method provided in the August 2008 version of the MOSERs Guide, Equation 11.1 – *Bicycle and Pedestrian Lanes or Paths*.

Stated in words, the average annual daily traffic (AADT) of the corridor is multiplied by the percentage of drivers shifting to bicycle mode, multiplied by the bike facility length, multiplied by the speed-based running exhaust emission factor for participants' trip before utilizing the bike lane.

The detailed equation is provided below in Strategy Equation.

The analysis year used is 2026, the first year of operation. *For planning purposes, the emissions benefit of a static program will decline over time.* Without the increased use of the bike lanes over the project lifetime, any benefits accrued by the mode shift to bicycles may be negated by the increased emissions from potential higher traffic volumes in the corridor over time.

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10.
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs), gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- Running exhaust and evaporative emissions and start emissions rates were calculated. (Process ID 1, 2, 11, 12, 13, 15)
- Considering the project area and the type of trips reduced through the strategy, emissions on Road Type 5, urban unrestricted access were analyzed.
- Overall average speed in the seven roadways is assumed to be 30 mph (Speed bin 7).
- The analysis period is from 7:00 a.m. to 7:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10. Use of the bicycle lanes can

occur throughout the day, but the greatest impact on emissions will occur with any peak hour or daytime mode shift.
- The vehicle-miles traveled (VMT) reduced as a result of the mode shift to bicycle were distributed proportionally across the 12 hours and by vehicle types and fuel types in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects. TTI staff determined a valid percentage mode shift from automobile to bicycle by participants in El Paso region. The characteristics of this new facility may provide impetus for significant mode shift, but planners should use available data.

The following assumptions were made for the project:
- Light-duty passenger vehicle and light-duty passenger truck AADT of 195,444 is estimated. This figure is based on 2012 and 2013AADT and ADT traffic counts from TxDOT and the City of El Paso. AADT is estimated based on the data plus a professional estimate of traffic growth and an averaging of the counts. It assumes 80% of the daily traffic along the roadways occurs in the 12-hour daytime period under analysis. It assumes 86% of the traffic is passenger vehicles.
- The current percent bicycle mode share for the El Paso region is estimated to be 2.0% and can serve as an optimistic mode share increase for the new bike facilities.
- The 0.02 increase in mode share represents new cyclists (vehicle trips replaced).
- Bike lane facility length of 42.2 miles is computed.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Equation 11.1, Bicycle and Pedestrian Lanes or Paths

Daily Emission Reduction = AADT * PMS * L * EF_B

The average annual daily traffic of the corridor multiplied by the percentage of drivers shifting to bike/pedestrian multiplied by the average bicycle trip length multiplied by the speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program.

Final unit of measure: grams/day
Source: Capitol Area MPO (CAMPO)

Variables: **AADT:** Average annual daily traffic in corridor (vehicles/day)

EF_B: Speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program (NO_x, VOC, or CO) (grams/mile)

L: Length of facility (miles)

PMS: Percentage mode shift from driving to bike/pedestrian (decimal)

Analysis

Results

Daily Emission Reduction = AADT * PMS * L * EF_B

Note: Due to the large amount of data generated by the MOVES model and the required off-model computations, for presentation purposes the individual emissions rates are not provided in the results below.

For CO:

195,444 * 0.02 * 42.2 * EF_B = 231,128.805 grams/day

Daily emission reduction is equal to 231.129 kg/day

For NOx:

195,444 * 0.02 * 42.2 * EF_B = 13,351.197 grams/day

Daily emission reduction is equal to 13.351 kg/day

For VOC:

195,444 * 0.02 * 42.2 * EF_B = 6,515.939 grams/day

Daily emission reduction is equal to 6.516 kg/day

For PM-10:

195,444 * 0.02 * 42.2 * EF_B = 9,141.294 grams/day

Daily emission reduction is equal to 9.141 kg/day

Summary of Results

The overall emissions analysis results for the project are shown in Table 1. The estimated emissions benefits from the new bike lanes are significant and are dependent on increased use of bicycles as a travel mode in the city and region, therefore an emissions benefit in the El Paso region can be expected from this project.

Table 1. Estimated Emissions Benefits from Bicycle Infrastructure Citywide

Pollutant	Emissions Reduction (kg/day)
CO	231.129
NOx	13.351
VOC	6.516
PM_{10}	9.141

Emission Reduction Analysis for Sun Metro Proposed CMAQ Project

El Paso Streetcar Operations Assistance Phase 3

December 2017

Prepared for

By

Texas A&M Transportation Institute

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Task Summary

The Texas A&M Transportation Institute (TTI) El Paso office was tasked by Sun Metro to perform a mobile source emissions analysis for a proposed project in the El Paso nonattainment area. The transit agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement it.

The project is operations assistance for the third phase of the El Paso Streetcar in the central region of the metropolitan area.

Individual Project Analysis

The emissions analysis for the project is presented below. The strategy name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy equation.

It is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ program submission, but *this analysis should not be used for conformity purposes*.

El Paso Streetcar – Phase 3

The El Paso Streetcar project consists of a two-mile, double-tracked corridor, beginning in the area near the Downtown Shopping District and International Bridges, traveling north through downtown to the University of Texas at El Paso area, the Cincinnati Entertainment District and back.

The guideway would be positioned within existing traffic lanes; along the right lane, adjacent to the curb or parking lane. The streetcar stops would be located two to three blocks apart along the right edge of traffic. A maintenance facility would be constructed within the Downtown Transfer Center.

Data Sources

Sun Metro provided several data sources to the TTI team: a map of the proposed route, projected ridership, the mileage, hours of operation, and operating costs for the route.

The technical report *2014 On-Road Mobile Source Annual, Summer Weekday and Winter Workday Emissions Inventories: El Paso Area, TTI, August 2015* describes development of 2014 analysis year El Paso MOVES2014-based actual on-road inventories, which were the basis for these MOVES runs, with respect to MOVES modeling procedures and MOVES input data. MOVES modeling set-ups and input data combinations are described starting on Page 29 of the report, in the section "Estimation of Summer and Winter Weekday Emissions Factors". Tables 19 through 22 and surrounding text contain the details. The MOVES modeling part of the process and the local/default input data combinations as described (Table 22) was used, updated where appropriate for model version (MOVES2014a versus MOVES2014) and for analysis year (CMAQ years 2021 versus 2014).

In particular, the actual fuel formulation sulfur values were adjusted to reflect "expected" future year values in place of 2014 actual average sulfur level values (i.e., to maintain consistency with the Tier 3 gasoline standard implemented in January 2017 and for consistency with Ultra Low Sulfur Diesel). It is also noteworthy that the age distributions and AVFT input data from the 2014 analysis were used, since these are based on the mid-year 2014 TxDMV vehicle registrations data, which is currently still "latest available".

Transit passenger characteristics were derived from the American Public Transportation Association report *A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys* published in May 2007.

Analysis Methods

TTI staff used an analysis method provided in the August 2008 version of the MOSERs Guide, equation 3.1 - *System/Service Expansion*. The detailed equation is provided below in Strategy Equation.

Stated in words, the equation measures the reduction in start emissions and running exhaust emissions from a change in mode during the operating period and subtracting any additional emissions from the transit vehicles. The benefit is derived through attracting single occupant passenger vehicle drivers to utilize transit as their mode of travel.

The analysis year used is 2021. *For planning purposes, the emissions benefit of a static program will decline over time.*

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs) vehicle types, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- The streetcar appears to be an electrified rail line; therefore no transit vehicle emissions are included in the analysis.
- Running exhaust, running evaporative, and start emissions (Process ID 1, 2, 11, 12, 13, 15)
- Considering the project area and the type of trips reduced through the strategy, primarily short distance, emissions on Road Type 5, urban unrestricted access.
- Average speed on surrounding roadways during operating hours (peak and off-peak) is assumed 30 mph.
- The analysis period is AM peak hours of 7:00-9:00 a.m., off-peak daytime hours from 9:00 a.m.-3:00 p.m. and PM peak hours of 3:00-7:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10.
- The vehicle trips reduced (VT_R) and vehicle-miles travelled reduced (VMT_R) were distributed proportionally across the 14 hours of model analysis and by vehicle type and fuel type in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

- Based on ridership data and expected ridership growth, an average daily ridership of 850 was assumed.
- The analysis assumes 35% of the passengers in the analysis year are using the streetcar for a local trip for which they would have used a vehicle. This should be considered optimistic. The APTA survey report showed 14.3% of transit passengers would drive alone as an alternative if no transit service was available. However, this new service actively seeks SOV drivers.
- An average trip length of 3.0 miles was computed based on data provided by Sun Metro. The trip lengths were distributed evenly in the reduced VMT.

The final estimated emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Note: Due to the extensiveness of the MOVES model output data and to help presentation of results, the individual start rates and emission rates per distance (**TEF_{AUTO}** and **EF_B**) per vehicle type computed are not presented but are available for review if needed. As noted above, the streetcar appears to be an electrified rail line; therefore, no transit vehicle emissions are included in the analysis.

3.1 System/Service Expansion

Daily Emission Reduction (for each pollutant) = A + B

$$A = VT_R * TEF_{AUTO}$$

Reduction in auto start emissions from trips reduced

$$B = VMT_R * EF_B$$

Reduction in auto running exhaust emissions from VMT reductions

Where

$VT_R = N_{TR} * F_{T, SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute

Variables:

EF_B:	Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO) (grams/mile)
$F_{T, SOV}$:	Percentage of people using a transit vehicle that previously were vehicle drivers (decimal)
N_{TR}:	New transit ridership
TEF_{AUTO}:	Auto trip-end emission factor (NO_x, VOC, or CO) (grams/trip)
TL_W:	Average auto trip length (miles)

VMT_R: Reduction in daily automobile VMT

VT_R: Reduction in number of daily automobile vehicle trips

Analysis

$VT_R = (850 * 2) * 0.35 = 595$ trips/day

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = 595 * 3.0 = 1{,}785$ vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

Summary of Results

The emissions analysis result for the project is shown in Table 1. There are continued, significant daily emissions benefits for all four pollutants. The results indicate an estimated air quality benefit from Phase 3 of the El Paso Streetcar project.

Table 1. Estimated Emission Reductions for El Paso Streetcar – Phase 3

Pollutant	Emissions Reduction (kg/day)
CO	8.190
NOx	0.595
VOC	0.513
PM_{10}	0.104

Emission Reduction Analysis for Sun Metro Proposed CMAQ Project

Montana RTS Operations Assistance Phase 2

December 2017

Prepared for

By

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Task Summary

The Texas A&M Transportation Institute (TTI) El Paso office was tasked by Sun Metro to perform a mobile source emissions analysis for a proposed project in the El Paso nonattainment area. The transit agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ).

The project is operational assistance for the second phase of the Rapid Transit Service, BRIO, in the Montana corridor in east-central El Paso region.

Individual Project Analysis

The emissions analysis for the project is presented below. The strategy name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy equation.

It is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ program submission, but *this analysis should not be used for conformity purposes*.

Montana RTS Operations Assistance - Phase 2

Sun Metro transit agency is proposing operations assistance for the second phase of the 16.8-mile BRIO line in the Montana corridor in east El Paso region. The RTS line begins at the Five Points Terminal and ends at the future Far East Transfer Center. Twelve buses will operate along the route with 26 stations.

Data Sources

Sun Metro provided several data sources to the TTI team for the original analysis: a map of the proposed route, previous emissions analysis for the route, the mileage, hours of operation, and operating costs for the route.

The technical report *2014 On-Road Mobile Source Annual, Summer Weekday and Winter Workday Emissions Inventories: El Paso Area, TTI, August 2015* describes development of 2014 analysis year El Paso MOVES2014-based actual on-road inventories, which were the basis for these MOVES runs, with respect to MOVES modeling procedures and MOVES input data. MOVES modeling set-ups and input data combinations are described starting on Page 29 of the report, in the section "Estimation of Summer and Winter Weekday Emissions Factors". Tables 19 through 22 and surrounding text contain the details. The MOVES modeling part of the process and the local/default input data combinations as described (Table 22) was used, updated where appropriate for model version (MOVES2014a versus MOVES2014) and for analysis year (CMAQ years 2021 versus 2014).

In particular, the actual fuel formulation sulfur values were adjusted to reflect "expected" future year values in place of 2014 actual average sulfur level values (i.e., to maintain consistency with the Tier 3 gasoline standard implemented in January 2017 and for consistency with Ultra Low Sulfur Diesel). It is also noteworthy that the age distributions and AVFT input data from the 2014 analysis were used, since these are based on the mid-year 2014 TxDMV vehicle registrations data, which is currently still "latest available".

Transit passenger characteristics were derived from the American Public Transportation Association report *A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys* published in May 2007.

Analysis Methods

TTI staff used an analysis method provided in the August 2008 version of the MOSERs Guide, equation 3.2 - *System/Service Operational Improvements*. The detailed equation is provided below in Strategy Equation.

Stated in words, the equation measures the reduction in start emissions and running exhaust emissions from a change in mode during the operating period and subtracting any additional emissions from the transit vehicles. The benefit is derived through attracting single occupant passenger vehicle drivers to utilize transit as their mode of travel.

The analysis year used is 2021. *For planning purposes, the emissions benefit of a static program will decline over time.*

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs) vehicle types, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- The project is assumed to be implemented in the analysis; therefore, no transit vehicle emissions are included in the analysis.
- Considering the project area and the type of trips reduced through the strategy, primarily, freeway commuting, emissions on Road Type 4, urban restricted access was used.
- Average speed on IH-10 during RTS operating hours (peak and off-peak) is assumed 30 mph.
- The analysis period is AM peak hours of 6:00-9:00 a.m., off-peak daytime hours from 9:00 a.m.-3:00 p.m. and PM peak hours of 3:00-8:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10.
- The vehicle trips reduced (VT_R) and vehicle-miles travelled reduced (VMT_R) were distributed proportionally across the 14 hours of model analysis and by vehicle type and fuel type in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

- Based on ridership data provided by Sun Metro and factoring in ridership growth, an average daily ridership of 3,600 was assumed.
- APTA ridership survey reports show 52% of transit passengers to be commuting. The RTS project focuses on capturing new commute traffic, so 75% of riders are assumed to be traveling to work and back totaling 2,700 per day.
- The analysis assumes 35% of these commute passengers are former single occupant vehicle (SOV) drivers. This translates to 26.25% of all passengers. This should be considered optimistic. The APTA survey report showed 14.3% of transit roadway passengers would drive alone as an alternative if no transit service was available. However, this new service actively seeks SOV commuters.
- An average trip length of 12.6 miles was computed based on data provided by Sun Metro. The trip lengths were distributed evenly in the reduced VMT.

The final estimated emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Note: Due to the extensiveness of the MOVES model output data and to help presentation of results, the individual start rates and emission rates per distance (**TEF_{AUTO}** and **EF_B**) per vehicle type computed are not presented but are available for review if needed. Also, the project is assumed implemented by phase 3 thus transit vehicle emissions (parts C and D) are not included in this analysis.

3.2 System/Service Operational Improvements

Daily Emission Reduction (for each pollutant) = A + B

$A = VT_R * TEF_{AUTO}$

Reduction in auto start emissions from trips reduced

$B = VMT_R * EF_B$

Reduction in auto running exhaust emissions from VMT reductions

Where

$VT_R = N_{TR} * F_{T, SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute

Variables:

EF_B:	Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO) (grams/mile)
$F_{T, SOV}$:	Percentage of people using a transit vehicle that previously were vehicle drivers (decimal)
N_{TR}:	New transit ridership
TEF_{AUTO}:	Auto trip-end emission factor (NO_x, VOC, or CO) (grams/trip)
TL_W:	Average auto trip length (miles)

VMT_R: Reduction in daily automobile VMT

VT_R: Reduction in number of daily automobile vehicle trips

Analysis

$VT_R = (3{,}600 * 2) * 0.52 = 3{,}744$ trips/day

Number of transit riders multiplied by 2 multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = 3{,}744 * 12.6 = 47{,}174$ vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

Summary of Results

The emissions analysis result for the project is shown in Table 1. There are significant daily emissions benefits for all four pollutants. The results indicate an estimated air quality benefit from the Montana RTS Phase 2 operational assistance project.

Table 1. Montana RTS Operational Assistance – Phase 2 Emission Reductions

Pollutant	Emissions Reduction (kg/day)
CO	110.234
NOx	8.313
VOC	5.371
PM_{10}	2.522

Emission Reduction Analysis for Sun Metro Proposed CMAQ Project

Dyer RTS Operations Assistance Phase 3 Update

December 2017

Prepared for

By

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Task Summary

The Texas A&M Transportation Institute (TTI) El Paso office was tasked by Sun Metro to perform an updated mobile source emissions analysis for a proposed project in the El Paso nonattainment area. The transit agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ).

The project is operational assistance for the third phase of the Rapid Transit Service, BRIO, in the Dyer corridor in east El Paso region. The agency requested an update of the analysis using 2021 as the analysis year instead of the original 2020 data.

Individual Project Analysis

The emissions analysis for the project is presented below. The strategy name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy equation.

It is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ program submission, but *this analysis should not be used for conformity purposes*.

Dyer RTS Operations Assistance - Phase 3

Sun Metro transit agency is proposing operational assistance for the future 12-mile BRIO line in the Dyer corridor in northeast El Paso. The RTS line begins at the Downtown Transfer Center and ends at the future Northeast Transfer Center. Eight buses will operate along the route with 22 stations.

Data Sources

Sun Metro provided several data sources to the TTI team for the original analysis: a map of the proposed route, previous emissions analysis for the route, the mileage, hours of operation, and operating costs for the route.

The technical report *2014 On-Road Mobile Source Annual, Summer Weekday and Winter Workday Emissions Inventories: El Paso Area, TTI, August 2015* describes development of 2014 analysis year El Paso MOVES2014-based actual on-road inventories, which were the basis for these MOVES runs, with respect to MOVES modeling procedures and MOVES input data. MOVES modeling set-ups and input data combinations are described starting on Page 29 of the report, in the section "Estimation of Summer and Winter Weekday Emissions Factors". Tables 19 through 22 and surrounding text contain the details. The MOVES modeling part of the process and the local/default input data combinations as described (Table 22) was used, updated where appropriate for model version (MOVES2014a versus MOVES2014) and for analysis year (CMAQ years 2021 versus 2014).

In particular, the actual fuel formulation sulfur values were adjusted to reflect "expected" future year values in place of 2014 actual average sulfur level values (i.e., to maintain consistency with the Tier 3 gasoline standard implemented in January 2017 and for consistency with Ultra Low Sulfur Diesel). It is also noteworthy that the age distributions and AVFT input data from the 2014 analysis were used, since these are based on the mid-year 2014 TxDMV vehicle registrations data, which is currently still "latest available".

Transit passenger characteristics were derived from the American Public Transportation Association report *A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys* published in May 2007.

Analysis Methods

TTI staff used an analysis method provided in the August 2008 version of the MOSERs Guide, equation 3.2 - *System/Service Operational Improvements*. The detailed equation is provided below in Strategy Equation.

Stated in words, the equation measures the reduction in start emissions and running exhaust emissions from a change in mode during the operating period and subtracting any additional emissions from the transit vehicles. The benefit is derived through attracting single occupant passenger vehicle drivers to utilize transit as their mode of travel.

The analysis year used is 2021. *For planning purposes, the emissions benefit of a static program will decline over time.*

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs) vehicle types, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- The project is assumed to be implemented in the analysis; therefore, no transit vehicle emissions are included in the analysis.
- Considering the project area and the type of trips reduced through the strategy, primarily, freeway commuting, emissions on Road Type 4, urban restricted access was used.
- Average speed on IH-10 during RTS operating hours (peak and off-peak) is assumed 30 mph.
- The analysis period is AM peak hours of 6:00-9:00 a.m., off-peak daytime hours from 9:00 a.m.-3:00 p.m. and PM peak hours of 3:00-8:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10.
- The vehicle trips reduced (VT_R) and vehicle-miles travelled reduced (VMT_R) were distributed proportionally across the 14 hours of model analysis and by vehicle type and fuel type in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

- Based on ridership data provided by Sun Metro, an average daily ridership of 3,450 was assumed.
- APTA ridership survey reports show 55% of transit passengers to be commuting. The RTS project focuses on capturing new commute traffic, so 75% of riders are assumed to be traveling to work and back totaling 2,588 per day.
- The analysis assumes 35% of these commute passengers are former single occupant vehicle (SOV) drivers. This translates to 26.25% of all passengers. This should be considered optimistic. The APTA survey report showed 14.3% of transit roadway passengers would drive alone as an alternative if no transit service was available. However this new service actively seeks SOV commuters.
- An average trip length of 12.0 miles was computed based on data provided by Sun Metro. The trip lengths were distributed evenly in the reduced VMT.

The final estimated emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Note: Due to the extensiveness of the MOVES model output data and to help presentation of results, the individual start rates and emission rates per distance (**TEF_{AUTO}** and **EF_B**) per vehicle type computed are not presented but are available for review if needed. Also, the project is assumed implemented by phase 3 thus transit vehicle emissions (parts C and D) are not included in this analysis.

3.2 System/Service Operational Improvements

Daily Emission Reduction (for each pollutant) = A + B

$A = VT_R * TEF_{AUTO}$

Reduction in auto start emissions from trips reduced

$B = VMT_R * EF_B$

Reduction in auto running exhaust emissions from VMT reductions

Where

$VT_R = N_{TR} * F_{T, SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute

Variables:

EF_B:	Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO) (grams/mile)
$F_{T, SOV}$:	Percentage of people using a transit vehicle that previously were vehicle drivers (decimal)
N_{TR}:	New transit ridership
TEF_{AUTO}:	Auto trip-end emission factor (NO_x, VOC, or CO) (grams/trip)
TL_W:	Average auto trip length (miles)

VMT_R: Reduction in daily automobile VMT

VT_R: Reduction in number of daily automobile vehicle trips

Analysis

$VT_R = (3,450 * 2) * 0.35 = 2,415$ trips/day

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = 2,415 * 12.0 = 28,980$ vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

Summary of Results

The emissions analysis result for the project is shown in Table 1. There are significant daily emissions benefits for all four pollutants. The results indicate an estimated air quality benefit from the Dyer RTS Phase 3 operational assistance project.

Table 1. Dyer RTS Operational Assistance – Phase 3 Emission Reductions

Pollutant	Emissions Reduction (kg/day)
CO	68.691
NOx	5.170
VOC	3.380
PM_{10}	1.550

Emission Reduction Analysis for Sun Metro Proposed CMAQ Project

Alameda RTS Operations Assistance Phase 3 Update

December 2017

Prepared for

By

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Task Summary

The Texas A&M Transportation Institute (TTI) El Paso office was tasked by Sun Metro to perform an updated mobile source emissions analysis for a proposed project in the El Paso nonattainment area. The transit agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ).

The project is operational assistance for the third phase of the Rapid Transit Service, BRIO, in the Alameda corridor in east El Paso region. The agency requested an update of the analysis using 2021 as the analysis year instead of the original 2020 data.

Individual Project Analysis

The emissions analysis for the project is presented below. The strategy name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy equation.

It is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ program submission, but *this analysis should not be used for conformity purposes*.

Alameda RTS Operations Assistance - Phase 3

Sun Metro transit agency is proposing operational assistance for the future 14.9-mile BRIO line in the Alameda corridor in northeast El Paso. The RTS line begins at the Downtown Transfer Center and ends at the Mission Valley Transfer Center. Fourteen buses will operate along the route with 29 stations.

Data Sources

Sun Metro provided several data sources to the TTI team for the original analysis: a map of the proposed route, previous emissions analysis for the route, the mileage, hours of operation, and operating costs for the route.

The technical report *2014 On-Road Mobile Source Annual, Summer Weekday and Winter Workday Emissions Inventories: El Paso Area, TTI, August 2015* describes development of 2014 analysis year El Paso MOVES2014-based actual on-road inventories, which were the basis for these MOVES runs, with respect to MOVES modeling procedures and MOVES input data. MOVES modeling set-ups and input data combinations are described starting on Page 29 of the report, in the section "Estimation of Summer and Winter Weekday Emissions Factors". Tables 19 through 22 and surrounding text contain the details. The MOVES modeling part of the process and the local/default input data combinations as described (Table 22) was used, updated where appropriate for model version (MOVES2014a versus MOVES2014) and for analysis year (CMAQ years 2021 versus 2014).

In particular, the actual fuel formulation sulfur values were adjusted to reflect "expected" future year values in place of 2014 actual average sulfur level values (i.e., to maintain consistency with the Tier 3 gasoline standard implemented in January 2017 and for consistency with Ultra Low Sulfur Diesel). It is also noteworthy that the age distributions and AVFT input data from the 2014 analysis were used, since these are based on the mid-year 2014 TxDMV vehicle registrations data, which is currently still "latest available".

Transit passenger characteristics were derived from the American Public Transportation Association report *A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys* published in May 2007.

Analysis Methods

TTI staff used an analysis method provided in the August 2008 version of the MOSERs Guide, equation 3.2 - *System/Service Operational Improvements*. The detailed equation is provided below in Strategy Equation.

Stated in words, the equation measures the reduction in start emissions and running exhaust emissions from a change in mode during the operating period and subtracting any additional emissions from the transit vehicles. The benefit is derived through attracting single occupant passenger vehicle drivers to utilize transit as their mode of travel.

The analysis year used is 2021. *For planning purposes, the emissions benefit of a static program will decline over time.*

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs) vehicle types, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- The project is assumed to be implemented in the analysis; therefore, no transit vehicle emissions are included in the analysis.
- Considering the project area and the type of trips reduced through the strategy, primarily, freeway commuting, emissions on Road Type 4, urban restricted access was used.
- Average speed on IH-10 during RTS operating hours (peak and off-peak) is assumed 30 mph.
- The analysis period is AM peak hours of 6:00-9:00 a.m., off-peak daytime hours from 9:00 a.m.-3:00 p.m. and PM peak hours of 3:00-8:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10.
- The vehicle trips reduced (VT_R) and vehicle-miles travelled reduced (VMT_R) were distributed proportionally across the 14 hours of model analysis and by vehicle type and fuel type in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

- Based on ridership data provided by Sun Metro, an average daily ridership of 3,500 was assumed.
- APTA ridership survey reports show 55% of transit passengers to be commuting. The RTS project focuses on capturing new commute traffic, so 75% of riders are assumed to be traveling to work and back totaling 2,625 per day.
- The analysis assumes 35% of these commute passengers are former single occupant vehicle (SOV) drivers. This translates to 26.25% of all passengers. This should be considered optimistic. The APTA survey report showed 14.3% of transit roadway passengers would drive alone as an alternative if no transit service was available. However, this new service actively seeks SOV commuters.
- An average trip length of 14.9 miles was computed based on data provided by Sun Metro. The trip lengths were distributed evenly in the reduced VMT.

The final estimated emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Note: Due to the extensiveness of the MOVES model output data and to help presentation of results, the individual start rates and emission rates per distance (**TEF_{AUTO}** and **EF_B**) per vehicle type computed are not presented but are available for review if needed. Also, the project is assumed implemented by phase 3 thus transit vehicle emissions (parts C and D) are not included in this analysis.

3.2 System/Service Operational Improvements

Daily Emission Reduction (for each pollutant) = A + B

$A = VT_R * TEF_{AUTO}$

Reduction in auto start emissions from trips reduced

$B = VMT_R * EF_B$

Reduction in auto running exhaust emissions from VMT reductions

Where

$VT_R = N_{TR} * F_{T, SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute

Variables:

EF_B:	Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO) (grams/mile)
$F_{T, SOV}$:	Percentage of people using a transit vehicle that previously were vehicle drivers (decimal)
N_{TR}:	New transit ridership
TEF_{AUTO}:	Auto trip-end emission factor (NO_x, VOC, or CO) (grams/trip)
TL_W:	Average auto trip length (miles)

VMT_R: Reduction in daily automobile VMT

VT_R: Reduction in number of daily automobile vehicle trips

Analysis

$VT_R = (3{,}500 * 2) * 0.35 = 2{,}450$ trips/day

Number of transit riders multiplied by 2 multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = 2{,}450 * 14.9 = 36{,}505$ vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

Summary of Results

The emissions analysis result for the project is shown in Table 1. There are significant emissions benefits for all four pollutants. The results indicate an estimated air quality benefit from the Alameda RTS Phase 3 operational assistance project.

Table 1. Alameda RTS Operational Assistance – Phase 3 Emission Reductions

Pollutant	Emissions Reduction (kg/day)
CO	81.523
NOx	6.188
VOC	3.842
PM_{10}	1.948

Emission Reduction Analysis for City of El Paso Proposed CMAQ Project

Downtown Bicycle Improvements – Phase 1

April 2016

Prepared for

By

Texas A&M Transportation Institute

Task Summary

The Texas A&M Transportation Institute (TTI) Arlington office was tasked by the City of El Paso to perform a mobile source emissions analysis for a proposed project in the El Paso metropolitan region. The city is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement the project.

The project will construct 3.7 miles of bike lane infrastructure improvements in the downtown area.

Individual Project Analysis

The emissions analysis for the project is presented below. The project name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy.

Given the short time available to conduct this analysis, it is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ applications, but more time and effort would increase the accuracy of the emissions benefits. As a result, this analysis should not be used for conformity purposes.

Downtown Bicycle Improvements - Phase 1

The first phase of the Downtown Bicycle Improvements project will install 3.7 miles of bicycle facilities in downtown El Paso (south of I-10, north of Paisano, east of Union Depot, and west of Virginia). These facilities will assist the existing bike share and encourage an alternative form of transportation in the downtown area. The infrastructure will be installed within City right-of-way and no property acquisition is anticipated.

The project will construct bicycle facilities to include: buffered bike lanes, conventional bike lanes, bicycle boulevards, shared lane markings, and protected bicycle lanes. The project will include associated signage, wayfinding, striping, and intersection treatments. Bicycle facilities will support and provide connectivity to existing bike share station locations within downtown El Paso, provide access to Rapid Transit System and El Paso Streetcar stops, coordinating with the Bicycle Infrastructure Citywide (M080X), and to connect to existing bicycle infrastructure.

Campbell from Missouri to Paisano; El Paso from Franklin to Main; El Paso from Sheldon to Paisano; Main from Santa Fe to El Paso; Main from Oregon to Campbell; Mills from Sheldon to Virginia; Missouri from Santa Fe to Campbell; Myrtle from Stanton to Campbell; San Antonio from Anthony to Virginia; Sheldon from Santa Fe to El Paso; Virginia from Mills to San Antonio; Magoffin from San Antonio to Virginia

Data Sources

The City of El Paso provided several items containing project information and data for the analysis: project description and scope plus current average speed data for the affected roadways. These resources provided the research team with a better understanding of the proposed project and potential emissions benefits.

Emission rates used in the analyses were obtained from the U.S. Environmental Protection Agency's MOVES2014a model. TTI staff created MOVES2014a output files using their "MOVES2014 Statewide Non-Link On-Road Emissions Inventory for 2006, 2012, and 2018." This inventory file is currently being updated by TTI with 2014 data and the research team was granted access to these newer inputs for this analysis. The input files used to generate emission rates are consistent with those used for conformity analysis.

El Paso regional vehicle fleet mix fractions were derived from the TTI study *Production of Statewide Non-Link-Based, On-Road Emissions Inventories with the MOVES Model for the Eight-Hour Ozone Standard Attainment Demonstration Modeling*, conducted in August 2013.

TTI staff used 2009 American Community Survey data to compute a bicycle mode share for El Paso, along with a future growth rate for the mode in the region.

Analysis Methods

TTI staff used the analysis method provided in the August 2008 version of the MOSERs Guide, Equation 11.1 – *Bicycle and Pedestrian Lanes or Paths*.

Stated in words, the average annual daily traffic (AADT) of the corridor is multiplied by the percentage of drivers shifting to bicycle mode, multiplied by the bike facility length, multiplied by the speed-based running exhaust emission factor for participants' trip before utilizing the bike lane.

The detailed equation is provided below in Strategy Equation.

The analysis year used is 2017. *For planning purposes, the emissions benefit of a static program will decline over time.* Without the increased use of the bike lanes over the project lifetime, any benefits accrued by the mode shift to bicycles may be negated by the increased emissions from potential higher traffic volumes in the corridor over time.

Assumptions in the MOVES2014a output for the project included:

- Output created for CO, VOC, NOx, and PM-10.
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs), gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- Running exhaust and evaporative emissions and start emissions rates were calculated.
- Considering the project area and the type of trips reduced through the strategy, emissions on Road Type 5, urban unrestricted access were analyzed.
- Overall average speed in the twelve roadways is assumed to be 30 mph (Speed bin 7).
- The analysis period is from 7:00 a.m. to 7:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10. Use of the bicycle lanes can occur throughout the day, but the greatest impact on emissions will occur with any peak hour or daytime mode shift.
- The vehicle-miles traveled (VMT) reduced as a result of the mode shift to bicycle were distributed proportionally across the 12 hours and by vehicle types and fuel types in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects. TTI staff determined a valid percentage mode shift from automobile to bicycle by participants in El Paso region. The characteristics of this new facility may provide impetus for significant mode shift, but planners should use available data.

The following assumptions were made for the project:

- Light-duty passenger vehicle and light-duty passenger truck AADT of 20,158 is estimated. This figure is based on 2012 and 2013AADT and ADT traffic counts from TxDOT and the City of El Paso. AADT is estimated based on the data plus a professional estimate of traffic growth and an averaging of the counts. It assumes 80% of the daily traffic along the roadways occurs in the 12-hour daytime period under analysis. It assumes 86% of the traffic is passenger vehicles.
- The current percent bicycle mode share for the El Paso region is estimated to be 2.0% and can serve as an optimistic mode share increase for the new bike facilities.

- The 0.02 increase in mode share represents new cyclists (vehicle trips replaced).
- Bike lane facility length of 3.7 miles is computed.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Equation 11.1, Bicycle and Pedestrian Lanes or Paths

Daily Emission Reduction = AADT * PMS * L * EF_B

The average annual daily traffic of the corridor multiplied by the percentage of drivers shifting to bike/pedestrian multiplied by the average bicycle trip length multiplied by the speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program.

Final unit of measure: grams/day
Source: Capitol Area MPO (CAMPO)

Variables: **AADT:** Average annual daily traffic in corridor (vehicles/day)

EF_B: Speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program (NO_x, VOC, or CO) (grams/mile)

L: Length of facility (miles)

PMS: Percentage mode shift from driving to bike/pedestrian (decimal)

Analysis

Results

Daily Emission Reduction = AADT * PMS * L * EF_B

Note: For presentation purposes, the individual emissions rates are not given in the results below.

For CO:

20,158 * 0.02 * 3.7 * EF_B = 3,251.572 grams/day

Daily emission reduction is equal to 3.252 kg/day

For NOx:

20,158 * 0.02 * 3.7 * EF_B = 286.974 grams/day

Daily emission reduction is equal to 0.287 kg/day

For VOC:

20,158 * 0.02 * 3.7 * EF_B = 114.918 grams/day

Daily emission reduction is equal to 0.115 kg/day

For PM-10:

20,158 * 0.02 * 3.7 * EF_B = 83.437 grams/day

Daily emission reduction is equal to 0.083 kg/day

Summary of Results

The overall emissions analysis results for the project are shown in Table 1. The estimated emissions benefits from the new bike lanes are modest and are dependent on increased use of bicycles as a travel mode in the city and region, but an emissions benefit in the El Paso region can be expected from this project.

Table 1. Estimated Emissions Benefits from Downtown Bicycle Improvements – Phase 1

Pollutant	Emissions Reduction (kg/day)
CO	3.252
NOx	0.287
VOC	0.115
PM_{10}	0.083

Emission Reduction Analysis for City of El Paso Proposed CMAQ Project

Stanton Two-Way Cycle Track Roadway Improvements

February 2018

Prepared for

By

Texas A&M Transportation Institute

Task Summary

The Texas A&M Transportation Institute (TTI) was tasked by the City of El Paso to perform a mobile source emissions analysis for a proposed project in the El Paso metropolitan region. The city is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) to help implement the project.

The project will construct 0.76 miles of bicycle lane infrastructure improvements in the region.

Individual Project Analysis

The emissions analysis for the project is presented below. The project name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy.

It is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ applications, but more time and effort would increase the accuracy of the emissions benefits. As a result, this analysis should not be used for conformity purposes.

Stanton Two-Way Cycle Track Roadway Improvements

The Stanton Two-Way Cycle Track Roadway Improvements project will install 0.76 miles of two-way cycle track in downtown El Paso along Stanton St between San Antonio Ave. and Rio Grande Ave. Two-way cycle tracks (also known as protected bike lanes, separated bikeways, and on-street bike paths) are physically separated cycle tracks that allow bicycle movement in both directions on one side of the road. Two-way cycle tracks share some of the same design characteristics as one-way tracks, but may require additional considerations at driveway and side-street crossings.

The project will serve the City of El Paso by increasing its regional infrastructure coupled with existing transit projects, educational centers, and commercial developments. Bicycle facilities will support and provide connectivity to existing bicycle facilities Citywide with connection to mass transit centers and facilities, and provide an alternative method of transportation. The infrastructure will be installed within City right-of-way and no property acquisition is anticipated.

The components of the project are consistent with the August 2016 City of El Paso Bike Plan.

Data Sources

The City of El Paso provided the project description and scope project information and data for the analysis. These resources provided the research team with a better understanding of the proposed project and potential emissions benefits.

The technical report *2014 On-Road Mobile Source Annual, Summer Weekday and Winter Workday Emissions Inventories: El Paso Area, TTI, August 2015* describes development of 2014 analysis year El Paso MOVES2014-based actual on-road inventories, which were the basis for these MOVES runs, with respect to MOVES modeling procedures and MOVES input data. MOVES modeling set-ups and input data combinations are described starting on Page 29 of the report, in the section "Estimation of Summer and Winter Weekday Emissions Factors". Tables 19 through 22 and surrounding text contain the details. The MOVES modeling part of the process and the local/default input data combinations as described (Table 22) was used, updated where appropriate for model version (MOVES2014a versus MOVES2014) and for analysis year (CMAQ years 2021 versus 2014).

In particular, the actual fuel formulation sulfur values were adjusted to reflect "expected" future year values in place of 2014 actual average sulfur level values (i.e., to maintain consistency with the Tier 3 gasoline standard implemented in January 2017 and for consistency with Ultra Low Sulfur Diesel). It is also noteworthy that the age distributions and AVFT input data from the 2014 analysis were used, since these are based on the mid-year 2014 TxDMV vehicle registrations data, which is currently still "latest available".

TTI staff used American Community Survey data to compute a bicycle mode share for El Paso, along with a future growth rate for the mode in the region.

Analysis Methods

TTI staff used the analysis method provided in the August 2008 version of the MOSERs Guide, Equation 11.1 – *Bicycle and Pedestrian Lanes or Paths*.

Stated in words, the average annual daily traffic (AADT) of the corridor is multiplied by the percentage of drivers shifting to bicycle mode, multiplied by the bike facility length, multiplied by the speed-based running exhaust emission factor for participants' trip before utilizing the bike lane.

The detailed equation is provided below in Strategy Equation.

The analysis year used is 2027, the first year of operation. *For planning purposes, the emissions benefit of a static program will decline over time.* Without the increased use of the bike lanes over the project lifetime, any benefits accrued by the mode shift to bicycles may be negated by the increased emissions from potential higher traffic volumes in the corridor over time.

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10.
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs), gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- Running exhaust and evaporative emissions and start emissions rates were calculated. (Process ID 1, 2, 11, 12, 13, 15)
- Considering the project area and the type of trips reduced through the strategy, emissions on Road Type 5, urban unrestricted access were analyzed.
- Overall average speed in the seven roadways is assumed to be 30 mph (Speed bin 7).
- The analysis period is from 7:00 a.m. to 7:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10. Use of the bicycle lanes can occur throughout the day, but the greatest impact on emissions will occur with any peak hour or daytime mode shift.
- The vehicle-miles traveled (VMT) reduced as a result of the mode shift to bicycle were distributed proportionally across the 12 hours and by vehicle types and fuel types in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects. TTI staff determined a valid percentage mode shift from automobile to bicycle by participants in El Paso region. The characteristics of this new facility may provide impetus for significant mode shift, but planners should use available data.

The following assumptions were made for the project:

- Light-duty passenger vehicle and light-duty passenger truck AADT in the project area of 3,373 is estimated. This figure is based on 2012 and 2013 AADT and ADT traffic counts from TxDOT and the City of El Paso. AADT is estimated based on the data plus a professional estimate of traffic growth and an averaging of the counts. It then assumes 80%

of the daily traffic along the roadways occurs in the 12-hour daytime period under analysis. It finally assumes 86% of the traffic is passenger vehicles.

- The current percent bicycle mode share for the El Paso region is estimated to be 2.0% and can serve as an optimistic mode share increase for the new bike facilities.
- The 0.02 increase in mode share represents new cyclists (vehicle trips replaced).
- Bike lane facility length of 0.76 miles is computed.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Equation 11.1, Bicycle and Pedestrian Lanes or Paths

Daily Emission Reduction = AADT * PMS * L * EF_B

The average annual daily traffic of the corridor multiplied by the percentage of drivers shifting to bike/pedestrian multiplied by the average bicycle trip length multiplied by the speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program.

Final unit of measure: grams/day
Source: Capitol Area MPO (CAMPO)

Variables: **AADT:** Average annual daily traffic in corridor (vehicles/day)

EF_B: Speed-based running exhaust emission factor for participants' trip before participating in the bike/pedestrian program (NO_x, VOC, or CO) (grams/mile)

L: Length of facility (miles)

PMS: Percentage mode shift from driving to bike/pedestrian (decimal)

Analysis

Results

Daily Emission Reduction = AADT * PMS * L * EF_B

Note: Due to the large amount of data generated by the MOVES model and the required off-model computations, for presentation purposes the individual emissions rates are not provided in the results below.

For CO:

3,373 * 0.02 * 0.76 * EF_B = 804.469 grams/day

Daily emission reduction is equal to 0.804 kg/day

For NOx:

3,373 * 0.02 * 0.76 * EF_B = 45.026 grams/day

Daily emission reduction is equal to 0.045 kg/day

For VOC:

3,373 * 0.02 * 0.76 * EF_B = 23.487 grams/day

Daily emission reduction is equal to 0.023 kg/day

For PM-10:

3,373 * 0.02 * 0.76 * EF_B = 33.965 grams/day

Daily emission reduction is equal to 0.034 kg/day

Summary of Results

The overall emissions analysis results for the project are shown in Table 1. The estimated emissions benefits from the two-way cycle track facility is modest and is dependent on increased use of bicycles as a travel mode in the city and region, however an emissions benefit in the El Paso region can be expected from this project.

Table 1. Estimated Emissions Benefits from Stanton Two-Way Cycle Track Roadway Improvements

Pollutant	Emissions Reduction (kg/day)
CO	0.804
NOx	0.045
VOC	0.023
PM_{10}	0.034

Emission Reduction Analysis for City of El Paso Proposed CMAQ Project

Traffic Management Center Upgrade – Phase 1

February 2018

Prepared for

By

Texas A&M Transportation Institute

Task Summary

The Texas A&M Transportation Institute (TTI) was tasked by the City of El Paso to perform a mobile source emissions analysis for a proposed project in the El Paso metropolitan region. The city is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ) for the design phase to help implement the project.

The project will design and implement a citywide traffic signalization improvement program.

Individual Project Analysis

The emissions analysis for the project is presented below. The project name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy.

It is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ applications, but more time and effort would increase the accuracy of the emissions benefits. As a result, this analysis should not be used for conformity purposes.

Traffic Management Center Upgrade – Phase 1

The City of El Paso proposes a citywide traffic signal improvement program. The project includes the upgrade of the City of El Paso Traffic Management Center and Traffic Signal controller equipment city wide. This first phase is the design of the traffic signal upgrades to include evaluating latest technology used to control and communicate with traffic signal lights, adaptive technology, emergency preemption and mass transit priority. Field investigations will be necessary to evaluate any new construction needs to accommodate the new equipment footprint.

Phases 2-5 is the construction and implementation of the design for the upgraded signalized intersections throughout the City of El Paso.

Data Sources

The City of El Paso provided the project description and scope project information and data for the analysis. These resources provided the research team with a better understanding of the proposed project and potential emissions benefits.

The technical report *2014 On-Road Mobile Source Annual, Summer Weekday and Winter Workday Emissions Inventories: El Paso Area, TTI, August 2015* describes development of 2014 analysis year El Paso MOVES2014-based actual on-road inventories, which were the basis for these MOVES runs, with respect to MOVES modeling procedures and MOVES input data. MOVES modeling set-ups and input data combinations are described starting on Page 29 of the report, in the section "Estimation of Summer and Winter Weekday Emissions Factors". Tables 19 through 22 and surrounding text contain the details. The MOVES modeling part of the process and the local/default input data combinations as described (Table 22) was used, updated where appropriate for model version (MOVES2014a versus MOVES2014) and for analysis year (CMAQ years 2021 versus 2014).

In particular, the actual fuel formulation sulfur values were adjusted to reflect "expected" future year values in place of 2014 actual average sulfur level values (i.e., to maintain consistency with the Tier 3 gasoline standard implemented in January 2017 and for consistency with Ultra Low Sulfur Diesel). It is also noteworthy that the age distributions and AVFT input data from the 2014 analysis were used, since these are based on the mid-year 2014 TxDMV vehicle registrations data, which is currently still "latest available".

Traffic data for the city roadways was garnered from 2012 and 2016 TxDOT traffic count data for the El Paso District available online, along with El Paso MPO data. A growth rate was estimated and applied to the numbers.

Analysis Methods

TTI staff used the analysis method provided in the August 2008 version of the MOSERs Guide, Equation 7.4 – *Intelligent Transportation Systems (ITS)*. The equation estimates the sum of each ITS link's change in running exhaust emissions resulting from improved traffic flow due to the ITS improvements. In this case, a link is an individual intersection. As the projects are inter-connected

with each other and, in some cases, are installed on the same roadways, it is more conducive to analyzed them as one large project then apportion the any emissions benefit to each component. The equation is provided below in Strategy Equation.

The equation is valid for CMAQ purposes but a more robust analysis that models the hundreds of individual intersections would provide a more accurate estimate of the emissions benefits derived from the improvements.

Since the requested finding is for the design phase, no direct emissions benefit will derive from the planning, testing, and design of the program. Phases 2 through 5 will provide the actual reductions. The Maricopa Association of Governments, with TTI, developed a method to allocate a small portion of the estimated total emissions reduction from the program to the planning phase of projects that qualify for CMAQ funding. The CMAQ program does allow for funding of plans, but funding applications should still provide and estimated benefit. This method is used for the analysis below.

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10.
- The analysis year is 2030.
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs), motorcycles, light commercial trucks, single unit short and long-haul trucks, and combination short and long-haul trucks, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 11, 21, 31, 32, 41, 42, 43, 51, 52, 53, 54, 61, 62).
- Running exhaust and evaporative emissions, break wear and tire wear emissions rates were calculated.
- Considering the project area and the type of emissions reduced through the strategy, emissions on Road Type 5, urban unrestricted access were analyzed.
- An average city network speed improvement from 30 mph to 35 mph is assumed (speed bin 7 to speed bin 8) as a result of implementation.
- The analysis period is from 7:00 a.m. to 7:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10. The effects of the signalization program can occur throughout the day, but the greatest impact on emissions will occur with any peak hour or daytime activity.
- The emissions reduced as a result of project were distributed across the 12 hours and by vehicle types and fuel types in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

The following assumptions were made for the project:

- A 2030 average daily VMT of 21,500,000 is estimated for the roadway segments affected by installation of the equipment. Factoring in the disparate AADT and ADT numbers throughout the City, along with El Paso MPO regional VMT numbers, the estimate seems reasonable enough to capture the benefit from the project. Future VMT is estimated based on the estimated current number plus application of a 1.105 percent annual growth factor.

- Assumes 80% of the daily traffic along the roadways occurs in the 12-hour daytime period under analysis. It is also assumed that the traffic will be affected by 80% of the intersections in the City. Thus, projected 2030 citywide daily VMT affected by the program is 14,077,700.
- Total project length of 600 miles is computed.
- Five (5) percent of total estimate of emissions reduction applied to Phase 1.

The emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Equation 7.4, Intelligent Transportation Systems (ITS)

Daily Emission Reduction = $\sum_{i=1}^{n}[\mathbf{L}_i * \mathbf{ADT}_i * (\mathbf{EF}_B - \mathbf{EF}_A)_i]$

The sum of each ITS link's change in running exhaust emissions resulting from improved traffic flow.

Variables:

ADT_i: Average daily traffic for each affected roadway

EF_A: Speed-based running exhaust emission factor after implementation (NO_x and VOC) (grams/mile)

EF_B: Speed-based running exhaust emission factor before implementation (NO_x and VOC) (grams/mile)

L_i: Length of each freeway affected by signalization program (miles)

N: Number of affected corridors

For this analysis, the **L** and **ADT** are essentially the estimated VMT (14,077,770) affected by the project. The VMT was distributed through the 12-hour analysis period and multiplied by the result of the emission rate differences. This created a total estimated emissions reduction for the 2030 analysis year for the final, implemented project shown in the table below.

Pollutant	Emissions Reduction (kg/day)
CO	1,360.54
NOx	178.15
VOC	70.04
PM_{10}	203.03

Five percent of this total estimate was applied to Phase 1. The other 95 percent will be available for Phases 2-5 CMAQ applications.

Summary of Results

The emissions analysis results for the planning and design phase of the signalization project are shown in Table 1. As a reminder, for CMAQ application purposes, an emissions benefit should be shown for a project. Planning phases of projects create a dilemma for planners. The overall program is often built through implementation of individual phases. Planning and design phases do not create an emissions reduction in and of themselves. Only when constructed and operating do they begin to fulfill their role in emissions reductions. Five percent of the total estimated reductions for the traffic management center upgrade was applied to Phase 1. Nevertheless, the analysis shows a significant emissions benefit in the El Paso region can be expected from this project.

Table 1. Estimated Emissions Benefits from Traffic Management Center Upgrade – Phase 1

Pollutant	Emissions Reduction (kg/day)
CO	68.03
NOx	8.91
VOC	3.50
PM_{10}	10.15

Emission Reduction Analysis for Sun Metro Proposed CMAQ Project

Montana RTS Operations Assistance Phase 3

December 2017

Prepared for

By

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Task Summary

The Texas A&M Transportation Institute (TTI) El Paso office was tasked by Sun Metro to perform a mobile source emissions analysis for a proposed project in the El Paso nonattainment area. The transit agency is seeking funding from the Congestion Mitigation/Air Quality Improvement Program (CMAQ).

The project is operational assistance for the third phase of the Rapid Transit Service, BRIO, in the Montana corridor in east-central El Paso region.

Individual Project Analysis

The emissions analysis for the project is presented below. The strategy name is given along with a brief description of the project. Data sources and analysis assumptions are provided. The equation used from the *Texas Guide to Accepted Mobile Source Emission Reduction Strategies* (MOSERs Guide) is given for the strategy along with the variables of the equation and the equation itself. The results are then computed for the strategy equation.

It is recommended that the agency conduct a more detailed emissions study of the project as it develops further. The results presented below are valid for CMAQ program submission, but *this analysis should not be used for conformity purposes*.

Montana RTS Operations Assistance - Phase 3

Sun Metro transit agency is proposing operations assistance for the third phase of the 16.8-mile BRIO line in the Montana corridor in east El Paso region. The RTS line begins at the Five Points Terminal and ends at the future Far East Transfer Center. Twelve buses will operate along the route with 26 stations.

Data Sources

Sun Metro provided several data sources to the TTI team for the original analysis: a map of the proposed route, previous emissions analysis for the route, the mileage, hours of operation, and operating costs for the route.

The technical report *2014 On-Road Mobile Source Annual, Summer Weekday and Winter Workday Emissions Inventories: El Paso Area, TTI, August 2015* describes development of 2014 analysis year El Paso MOVES2014-based actual on-road inventories, which were the basis for these MOVES runs, with respect to MOVES modeling procedures and MOVES input data. MOVES modeling set-ups and input data combinations are described starting on Page 29 of the report, in the section "Estimation of Summer and Winter Weekday Emissions Factors". Tables 19 through 22 and surrounding text contain the details. The MOVES modeling part of the process and the local/default input data combinations as described (Table 22) was used, updated where appropriate for model version (MOVES2014a versus MOVES2014) and for analysis year (CMAQ years 2021 versus 2014).

In particular, the actual fuel formulation sulfur values were adjusted to reflect "expected" future year values in place of 2014 actual average sulfur level values (i.e., to maintain consistency with the Tier 3 gasoline standard implemented in January 2017 and for consistency with Ultra Low Sulfur Diesel). It is also noteworthy that the age distributions and AVFT input data from the 2014 analysis were used, since these are based on the mid-year 2014 TxDMV vehicle registrations data, which is currently still "latest available".

Transit passenger characteristics were derived from the American Public Transportation Association report *A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys* published in May 2007.

Analysis Methods

TTI staff used an analysis method provided in the August 2008 version of the MOSERs Guide, equation 3.2 - *System/Service Operational Improvements*. The detailed equation is provided below in Strategy Equation.

Stated in words, the equation measures the reduction in start emissions and running exhaust emissions from a change in mode during the operating period and subtracting any additional emissions from the transit vehicles. The benefit is derived through attracting single occupant passenger vehicle drivers to utilize transit as their mode of travel.

The analysis year used is 2022. *For planning purposes, the emissions benefit of a static program will decline over time.*

Assumptions in the MOVES2014a output for the project included:

- Output created for VOC, CO, NOx, and PM-10
- Light-duty passenger vehicles and light-duty passenger trucks (SUVs) vehicle types, gasoline and diesel-fueled, are included according to a projected regional VMT fleet mix (Source Type ID 21, 31)
- The project is assumed to be implemented in the analysis; therefore, no transit vehicle emissions are included in the analysis.
- Considering the project area and the type of trips reduced through the strategy, primarily, freeway commuting, emissions on Road Type 4, urban restricted access was used.
- Average speed on IH-10 during RTS operating hours (peak and off-peak) is assumed 30 mph.
- The analysis period is AM peak hours of 6:00-9:00 a.m., off-peak daytime hours from 9:00 a.m.-3:00 p.m. and PM peak hours of 3:00-8:00 p.m. on a winter weekday for CO; the same periods on a summer weekday for NOx, VOC, and PM-10.
- The vehicle trips reduced (VT_R) and vehicle-miles travelled reduced (VMT_R) were distributed proportionally across the 14 hours of model analysis and by vehicle type and fuel type in line with the vehicle fleet mix in the El Paso region.

TTI staff reviewed the project information to determine values for the individual variables in the MOSERs equation. The MOSERS Guide encourages planners to make conservative, justifiable assumptions about projects.

- Based on ridership data provided by Sun Metro and factoring in ridership growth, an average daily ridership of 3,700 was assumed.
- APTA ridership survey reports show 52% of transit passengers to be commuting. The RTS project focuses on capturing new commute traffic, so 75% of riders are assumed to be traveling to work and back totaling 2,775 per day.
- The analysis assumes 35% of these commute passengers are former single occupant vehicle (SOV) drivers. This translates to 26.25% of all passengers. This should be considered optimistic. The APTA survey report showed 14.3% of transit roadway passengers would drive alone as an alternative if no transit service was available. However, this new service actively seeks SOV commuters.
- An average trip length of 12.6 miles was computed based on data provided by Sun Metro. The trip lengths were distributed evenly in the reduced VMT.

The final estimated emission reductions are presented in kilograms per day (kg/day) in accordance to CMAQ project reporting requirements.

Strategy Equation

Note: Due to the extensiveness of the MOVES model output data and to help presentation of results, the individual start rates and emission rates per distance (**TEF_{AUTO}** and **EF_B**) per vehicle type computed are not presented but are available for review if needed. Also, the project is assumed implemented by phase 3 thus transit vehicle emissions (parts C and D) are not included in this analysis.

3.2 System/Service Operational Improvements

Daily Emission Reduction (for each pollutant) = A + B

$A = VT_R * TEF_{AUTO}$

Reduction in auto start emissions from trips reduced

$B = VMT_R * EF_B$

Reduction in auto running exhaust emissions from VMT reductions

Where

$VT_R = N_{TR} * F_{T, SOV}$

Number of new transit riders multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = VT_R * TL_W$

Number of vehicle trips reduced multiplied by the average auto trip length

Final unit of measure: grams/day
Source: Texas A&M Transportation Institute

Variables:

EF_B:	Speed-based running exhaust emission factor for affected roadway before implementation (NO_x, VOC, or CO) (grams/mile)
$F_{T, SOV}$:	Percentage of people using a transit vehicle that previously were vehicle drivers (decimal)
N_{TR}:	New transit ridership
TEF_{AUTO}:	Auto trip-end emission factor (NO_x, VOC, or CO) (grams/trip)
TL_W:	Average auto trip length (miles)

VMT_R: Reduction in daily automobile VMT

VT_R: Reduction in number of daily automobile vehicle trips

Analysis

$VT_R = (3{,}700 * 2) * 0.52 = 3{,}848$ trips/day

Number of transit riders multiplied by 2 multiplied by the percentage of riders shifting from single-occupant auto use

$VMT_R = 3{,}848 * 12.6 = 48{,}485$ vehicle-miles/day

Number of vehicle trips reduced multiplied by the average auto trip length

Summary of Results

The emissions analysis result for the project is shown in Table 1. There are significant, continued daily emissions benefits for all four pollutants. The results indicate an estimated air quality benefit from the Montana RTS Phase 3 operational assistance project.

Table 1. Montana RTS Operational Assistance – Phase 3 Emission Reductions

Pollutant	Emissions Reduction (kg/day)
CO	108.402
NOx	7.719
VOC	5.191
PM_{10}	2.588