City of San Diego
ACTIVE TRANSPORTATION IN LIEU FEE NEXUS STUDY

Prepared for

The City *of* SAN DIEGO

Prepared by

EFS ENGINEERING, INC.

In association with

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Introduction

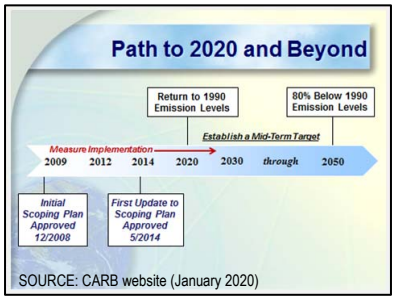
Purpose

The purpose of this Nexus Study is to document and summarize information supporting the development and implementation of an impact fee program to reduce vehicle miles traveled (VMT) generated by future development in the City of San Diego (City). The proposed "Active Transportation In Lieu Fee" will be used to fund a variety of multi-modal improvements to reduce the effects of future project-generated VMT, including, but not limited to, regional greenhouse gas (GHG) emissions.

Background

The following section provides a brief summary of legislative actions, plans, and policies relevant to the development of the proposed Active Transportation In Lieu Fee.

Assembly Bill 32 (Nunez, 2006)



On September 27, 2006, Governor Schwarzenegger signed Assembly Bill 32 (AB 32), also known as the *California Global Warming Solutions Act of 2006*. AB 32, embodied in California Health and Safety Code §38500 et seq., required the State of California Air Resources Board (CARB) to adopt regulations requiring the reporting and verification of statewide GHG and monitoring and enforcement of compliance. CARB was further required to adopt a statewide GHG emissions limit (1990 level), to be achieved by 2020, and even further reductions (80%) by 2050. The rules and regulations were to be based on maximum technologically feasible and cost-effective greenhouse gas emission reductions. These GHG reduction efforts would set in motion California's vision for a sustainable, low-carbon future.

Assembly Bill 1358 (Leno, 2008)

On September 30, 2008, Governor Schwarzenegger signed Assembly Bill 1358 (AB 1358), also known as the *California Complete Streets Act of 2008*. AB 1358 required cities and counties to include complete streets policies as part of their general plans

so that roadways are designed to safely accommodate all users, including bicyclists, pedestrians, transit riders, children, older people, and disabled people, as well as motorists.

Senate Bill 375 (Steinberg, 2008)

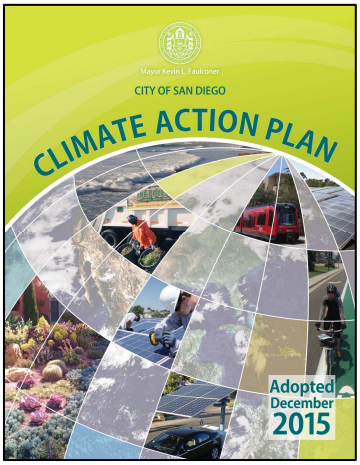
On September 30, 2008, Governor Schwarzenegger also signed Senate Bill 375 (SB 375), also known as the *Sustainable Communities and Climate Protection Act of 2008*. SB 375 directed CARB to set regional targets for reducing GHG emissions, and called on cities and counties to be active participants in developing regional plans to achieve those targets. Aligning the regional plans throughout the state is intended to help California achieve the GHG reduction goals promulgated by AB 32. SB 375 also provided for *California Environmental Quality Act* (CEQA) incentives to encourage projects that are consistent with regional plans that achieve GHG emission reductions, and emphasized the importance of coordinating regional housing allocations with regional transportation planning, without disrupting local authority over land use decisions.

Senate Bill 743 (Steinberg)

On September 27, 2013, Governor Brown signed Senate Bill 743 (SB 743). SB 743 changes the way that transportation impacts are analyzed under CEQA. Specifically, SB 743 calls for an amendment to the *Guidelines for the Implementation of the California Environmental Quality Act* (CEQA Guidelines) to provide an alternative to level of service (LOS) for evaluating transportation impacts. Within areas served by transit, the alternatives must "promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses" (California Public Resources Code §21099(b)(1)). Further, transportation impacts may include "vehicle miles traveled, vehicle miles traveled per capita, automobile trip generation rates, or automobile trips generated." Under the amended CEQA Guidelines, auto delay (or LOS) may no longer be considered a significant impact under CEQA. The purpose of

SB 743 is to focus mitigation on reducing overall vehicle miles travelled rather than accommodating additional trips.

City of San Diego Climate Action Plan (2015)

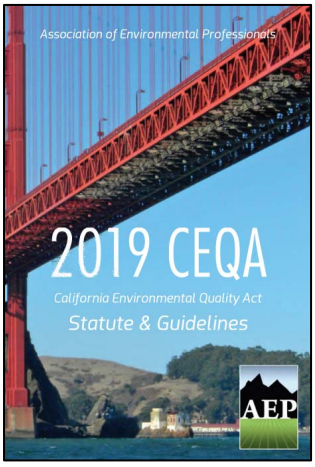


In December 2015, the City adopted a *Climate Action Plan* (CAP). Fundamentally, the CAP serves four primary purposes: (1) provides a roadmap to achieve GHG reductions, (2) conforms to California laws and regulations, (3) implements the City's General Plan, and (4) provides CEQA tiering (coverage) for new development's GHG emissions.

The CAP identified five specific and measurable strategies to reduce GHG emissions to achieve 2020 and 2035 targets:

- Energy & Water Efficient Buildings
- Clean & Renewable Energy
- Bicycling, Walking, Transit & Land Use
- Zero Waste (Gas & Waste Management)
- Climate Resiliency

Guidelines for the Implementation of the California Environmental Quality Act (2019)



In December 2018, the State of California Natural Resources Agency revised the CEQA Guidelines for consistency with SB 743. SB 743 fundamentally changed the way in which transportation-related impacts are identified under CEQA. One of the most significant changes is a shift from traffic operations (level of service or delay) to VMT as a basis for determining significant impacts. All jurisdictions within the State of California are required to implement CEQA significance thresholds that are consistent with SB 743, and supported with substantial evidence, prior to July 1, 2020.

Statutory Framework

Local agencies may charge development impact fees pursuant to the *Mitigation Fee Act* (California Government Code §66000 et seq.) to finance the cost of public facilities or services needed to serve or mitigate the effects of development. A development impact fee is a monetary exaction, not a property-related tax or special assessment within the meaning of *Proposition 218* (California Constitution, Article XIII). Impact fees are a commonly-used and well-accepted means of mitigating the impacts created by future growth. Public agencies regularly levy impact fees on new development to fund a variety of public facilities, including roads, sewer and water facilities, libraries, parks, and schools.

The proposed Active Transportation In Lieu Fee has been developed and will be implemented in accordance with the *Mitigation Fee Act*. Prior to establishing, increasing, or imposing an impact fee, the *Mitigation Fee Act* requires the local agency to make the following findings:

- Identify the purpose of the fee (Government Code §66001(a)(1)).
- Identify the use for the fee and the facilities to be built (Government Code §66001(a)(2)).
- Determine a reasonable relationship between the fee's use and the type of development project on which the fee is imposed (Government Code §66001(a)(3)).
- Determine a reasonable relationship between the need for the public facility and the type of development project (Government Code §66001(a)(4)).
- Determine a reasonable relationship between the amount of the fee and the cost of the facility attributable to development (Government Code §66001(b)).

For purposes of the subject fee program, a statement of requisite findings is presented in the "Program Implementation" section of this report.

Fee Development Process

In preparation for the implementation of SB 743, the City is developing an Active Transportation In Lieu Fee to provide a means by which all future development can reduce VMT-related project impacts. The Active Transportation In Lieu Fee will fund and construct an array of multi-modal infrastructure that will help to reduce citywide VMT to levels consistent with California's climate change goals and the City's CAP.

The remainder of this report summarizes the process by which the Active Transportation In Lieu Fee was developed, as presented in the following sections:

- Impacts of Future Development
- Improvements to Reduce Impacts
- Fee Rate Calculation
- Program Implementation

Impacts of Future Development

Vehicle Miles Traveled

Vehicle miles traveled (VMT), a measurement of the total distance travelled by a vehicle, is routinely used in transportation planning for a variety of analytical purposes. VMT can be analyzed on a per capita, per employee, and net VMT basis. With the passage of SB 743, transportation impact analysis has shifted from LOS to VMT as the primary metric for evaluating development projects. This shift better aligns with the state's goals of reducing GHG emissions, encouraging infill development, and improving public health through greater use of active transportation. This shift is also consistent with the goals and policies outlined in the City's CAP.

VMT Impacts

Future development and growth within the City will increase VMT in the region. "VMT correlates with a broad array of impacts to the environment, human health, and fiscal health. Increased VMT per capita increases emissions of greenhouse gases and other air pollutants, leads to high rates of vehicle collisions, driver stress and mental illness, and health outcomes such as obesity from lack of physical activity." (*Vehicle-Miles Traveled (VMT) Impacts on the Environment, Human Health, and Fiscal Health*; Currey, Ganson, Miller, Fesler; 2015)

It is estimated that transportation accounts for 55% of the City's GHG emissions (2010 baseline). By implementing VMT-efficient multi-modal transportation improvements, the City can meaningfully address a significant portion of its GHG emissions.

The State of California Governor's Office of Planning and Research (OPR) has indicated that a fifteen percent (15%) reduction in VMT is "generally achievable and is supported by evidence that connects this level of reduction to the State's emissions goals." (*Technical Advisory on Evaluating Transportation Impacts in CEQA*; OPR; December 2018) The proposed Active Transportation In Lieu Fee will be used to reduce VMT in conformity with state law and in furtherance of the City's CAP.

Improvements to Reduce Impacts

Facilities Screening Process

Identifying VMT-reducing infrastructure for potential inclusion in the Active Transportation In Lieu Fee was achieved through a multi-step screening process to ensure that the identified infrastructure was reflective of the City's needs in furthering program objectives. Factors considered during the initial screening process included:

- Infrastructure must be linked to a published, peer-reviewed study that demonstrates quantifiable VMT reductions
- Infrastructure must be suitable for implementation in VMT-efficient areas of the City
- Infrastructure must be implementable at a community-wide level (excludes infrastructure improvements only suitable at a project or parcel level)
- Infrastructure must be implementable by the City of San Diego
- Program-based (non-infrastructure) VMT reduction strategies were not eligible for consideration

Based on a review of existing and planned City infrastructure, current industry best practices, and research on the types of infrastructure that deliver measurable VMT reduction, a draft list of potential infrastructure types was developed. The purpose of this list was to garner City feedback for further refinement and to remove potential infrastructure types that may be inappropriate given the project's context and intent. From the initial list of projects, certain infrastructure types were excluded from further consideration based on a lack of demonstrable VMT reduction potential, or inconsistency with the purpose of the Active Transportation In Lieu Fee.

Identified Program Facilities

Following the screening process, a refined list of program-eligible infrastructure was developed. Based on a review of the current literature and other available resources, a VMT reduction range was assigned to each facility type. **Table 1** summarizes the refined

list of eligible program facilities and their estimated VMT reducing potential.

TABLE 1: Eligible Program Facilities & VMT Reducing Potential

MOBILITY MODE	FACILITY TYPE	VMT REDUCING POTENTIAL
Bicycle / Micro Mobility	Network – Protected Bikeways (Class I, Class IV)	0%-5%
	Network – Semi-Protected Bikeways (Buffered Class II)	0%-5%
	Network – Bicycle Parking	0%-5%
	Wayfinding Signage	0%-5%
	NEV Network	0%-5%
Transit	Transit-Only Lanes	0%-7%
	Queue Jumper Lanes	0.0%-0.4%
	Transit Signal Priority	0.0%-0.4%
	Microtransit / Neighborhood Shuttle	0.1%-8.2%
	Wayfinding Signage	0%-5%
Pedestrian	Enhancements	0%-2%
	Gap Closure	1.4%
	Wayfinding Signage	0%-5%

SOURCE: See **Tables 2 & 4** contained in *VMT Reduction Elasticity Memorandum – Technical Summary* (Chen Ryan Associates; April 20, 2020), included as **Appendix A**.

The list of eligible program facilities shown in **Table 1** is not meant to be static or exhaustive. New and evolving technologies and facility types may be considered to the extent that they are functionally equivalent (or superior) and consistent with the purpose for which the proposed fee will be collected.

Fee Rate Calculation

Facilities Cost Analysis

Costs were compiled for numerous sample "eligible" projects across various mobility modes and facility types. For each sample project, the VMT reduction potential was quantified. From this information, a unit cost (expressed in terms of cost per VMT reduced) was calculated for each of the sample projects. For each mobility mode, the average unit cost of various sample projects was calculated to determine unit costs by mobility mode. The calculated unit costs for each mobility mode are summarized in **Table 2**.

TABLE 2: Unit Costs by Mobility Mode

MOBILITY MODE	FACILITY TYPE	UNIT COST ($ / VMT Reduced)
Bicycle / Micro Mobility	Network – Protected Bikeways (Class I, Class IV)	$1,436
	Network – Semi-Protected Bikeways (Buffered Class II)	
	Network – Bicycle Parking	
	Wayfinding Signage	
	NEV Network	
Transit	Transit-Only Lanes	$1,320
	Queue Jumper Lanes	
	Transit Signal Priority	
	Microtransit / Neighborhood Shuttle	
	Wayfinding Signage	
Pedestrian	Enhancements	$1,408
	Gap Closure	
	Wayfinding Signage	

SOURCE: See **Table 4** contained in *Mobility Choices: Reduced VMT Unit Cost Memorandum – Technical Summary* (Chen Ryan Associates; April 20, 2020), included as **Appendix B**.

The unit costs by mobility mode were weighted based on target mode share allocations. The target mode share allocations were based on several of factors, including the mode share goals of the City's CAP, reasonable community investment patterns, and overall VMT-reducing efficiency. The resultant composite unit cost is shown in **Table 3**.

TABLE 3: Composite Unit Cost (for All Mobility Modes)

MOBILITY MODE	UNIT COST ($ / VMT Reduced)	TARGET MODE SHARE	COMPOSITE UNIT COST ($ / VMT Reduced)
Bicycle / Micro-Mobility	$1,436	18%	$1,400
Transit	$1,320	25%	
Pedestrian	$1,408	7%	

SOURCE: See **Table 5** contained in *Mobility Choices: Reduced VMT Unit Cost Memorandum – Technical Summary* (Chen Ryan Associates; April 20, 2020), included as **Appendix B**.

Proposed Fee Rate

This Nexus Study and accompanying technical analyses support a proposed maximum fee rate of $1,400 per VMT reduced. This amount assumes that the identified improvements will be implemented in VMT-efficient areas of the City. This assumption is both fair and reasonable, and is consistent with achieving overall program objectives in a fiscally prudent and cost-effective manner.

The fee applicable to a given project will depend on the total project-generated VMT and the City's target VMT reduction level. As VMT generation varies by location, project type (land use), and project size, development of a suitable VMT calculator will be an important tool for program implementation. Programmatically, proximity to transit priority areas or other incentivized zones are also factors to consider.

Annual Cost-Indexing

The unit costs contained in this report are based on a "Los Angeles Construction Cost Index" (LACCI) of 12,144.49 (*Engineering News Record*; January 2020). It is recommended that the fee rates be indexed annually in order to keep up with future increases in the cost of construction.

Program Implementation

Statement of Findings

The following information is provided to assist the City with satisfaction of the requisite statutory findings contained in §66001 of the *Mitigation Fee Act* with regard to implementation of the proposed Active Transportation In Lieu Fee:

Purpose of the Fee. The purpose of the fee is to reduce and/or mitigate project-generated VMT. This purpose is consistent with the goals and objectives of the City's CAP, and the guiding principles embodied in SB 743.

Use of the Fee. The fee will be used to fund a variety of multi-modal improvements categorically identified and described in this Nexus Study. These improvements will be implemented in the areas of the City that will result in greater VMT reduction potential (VMT-efficient areas) than areas of the City where the measures would yield lower VMT reductions (VMT-inefficient areas).

Reasonable Use (Benefit). The cumulative effects of future development will impact the City's mobility network and regional GHG emission levels. Such impacts are difficult to mitigate on a project-by-project basis. This fee will benefit future development by funding additional multi-modal improvements to reduce and/or mitigate project-related VMT impacts, in a fiscally prudent and cost-effective manner, consistent with the City's CAP.

Reasonable Need (Burden). The cumulative effects of future development will impact the City's mobility network and regional GHG emission levels. The burden created by future development necessitates additional multi-modal improvements to reduce and/or mitigate VMT impacts, consistent with OPR guidance and the City's CAP.

Reasonable Apportionment. The reasonable relationship between the fee for a specific project and the cost of multi-modal improvements attributable to the project is based on the overall VMT generated by the project. Apportioning program costs based

on each project's VMT is consistent with current principles of transportation impact analysis.

Periodic Reporting

Provisions set forth in §66001(c) and §66006(b)(1)) of the *Mitigation Fee Act* require that each agency imposing an impact fee make specific information available to the public annually within 180 days of the last day of the fiscal year. This information includes the following:

- A brief description of the type of fee in each account or fund;
- The amount of the fee;
- The beginning and ending balance of the account or fund.
- The amount of the fees collected and the interest earned;
- An identification of each public improvement on which fees were expended and the amount of each expenditure;
- An identification of the approximate date in which the construction of the public improvement will commence;
- A description of any inter-fund transfer or loan and the public improvement on which the transferred funds will be expended; and
- The amount of the funds made and any allocations of unexpended fees that are not refunded.

In addition, the provisions set forth in §66001(d) of the *Mitigation Fee Act* require that each agency imposing an impact fee make specific findings every five years following receipt of monies, to the extent that such monies are deposited and remain unspent.

Other Considerations

VMT Reduction Threshold

Equally as important as the development of a project-specific VMT calculation tool is the establishment of a reasonable VMT reduction threshold. Reducing VMT to levels fifteen percent (15%)

below the regional average (VMT per capita or VMT per employee, depending on the land use) appears to be most reasonable and consistent with the legislative intent and OPR guidance.

Future Project Economics/Viability

The proposed fee will have an effect on future development. To the extent that the fee provides a mechanism by which development can mitigate, in whole or in part, statutorily-defined transportation impacts, projects could benefit by reduced processing times and project costs. Some projects could be adversely impacted by the proposed fee due to location, project type or other factors. An analysis of the economic implications of the proposed fee on a variety of project types and locations could provide additional insight as to project viability and the need for special considerations, if any.

Supplemental Funding

The Active Transportation In Lieu Fee is intended to fund categorically identified facilities, or portions thereof, needed to mitigate, in whole or in part, VMT impacts created by future development in the City. Direct impact project mitigation measures and other revenue sources may also be used to augment funding of these facilities. Sources of additional revenue may include, but are not limited to:

- General and special taxes (including property taxes, TransNet, Gas Tax, HUTA, and other sales/use taxes)
- State and federal grant monies
- General fund

The existence and availability of additional funding sources may help the City leverage their other infrastructure dollars. For example, grant programs often require a high level of difficult-to-find matching funds. Having an Active Transportation In Lieu Fee demonstrates a committed plan of action for facility improvements and the revenues can provide a ready source for

matching funds. Both of these factors can provide a competitive edge when vying for grants or other similar allocations.

Inter-Agency Coordination

Construction of eligible facilities may involve varying degrees of inter-agency coordination. The financial aspects and timing of construction activities for such projects will require considerable attention and coordination.

APPENDICES

APPENDIX A

VMT Reduction Elasticity Memorandum – Technical Summary

CHEN RYAN

TO:	Heidi Vonblum, City of San Diego
FROM:	Stephen Cook, PE, Chen Ryan Associates
DATE:	April 20, 2020
RE:	VMT Reduction Elasticity Memorandum – Technical Summary

1. Introduction

The purpose of this memorandum is to document of the findings of research performed in support of creating a VMT Impact Fee Program for the City of San Diego, including determination of VMT-reducing infrastructure, as well as methodologies for quantifying and calculating VMT reductions associated with the implementation of qualifying infrastructure within the more efficient areas of the City. *Please note this is a technical summary of the memorandum intended to be included in the appendix of the fee program nexus study. The full version of the memorandum, incorporated herein by reference, includes additional language on policy and background that is not presented here*.

2. VMT Reducing Infrastructure Types that are Eligible for the Program

This section summarizes how the VMT Reducing Infrastructure that will be included in the VMT Impact Fee Program was selected.

2.1. Infrastructure Selection Requirements

As the first step of identifying VMT-reducing infrastructure for potential inclusion in the VMT Impact Fee Program, several selection requirements were identified to ensure that all infrastructure included in the Program is reflective of the City's needs in furthering program objectives. In particular, infrastructure is subject to the following requirements for consideration:

- *Infrastructure is linked to a reputable, quantitative study that demonstrates VMT reduction.* This requirement ensures that the magnitude of the VMT reductions associated with the fee program is reliable and defensible. This is important when establishing the nexus for the fee program and determining the cost to reduce VMT.
- *Chosen infrastructure must be suitable for implementation in urban areas of the City of San Diego.* Since all infrastructure funded by the VMT Impact Fee Program will be implemented within higher density and urban areas, only infrastructure typical for these areas should be included in developing the fee for the VMT Impact Fee Program. Infrastructure associated with greenfield development such as roadway extensions or widenings, even to incorporate multi-modal connections, were not included due to the limited right-of-way available within the VMT Impact Fee Program areas. Therefore, all infrastructure costs included in the VMT Impact Fee Program are based on projects that fit within the City's existing right-of-way via retrofit or reconfiguration.
- *Program-based VMT reduction strategies are not eligible for consideration for the VMT Impact Fee Program.* Since the funding from the VMT Impact Fee Program may not be consistent from both a timing or quantity basis, programs that require consistent funding such as transit pass subsidies, discounted bikeshare programs, or guaranteed ride home programs may not be feasible to include in the program since their funding would not be secure. However, funds from the program could be used as seed money to help implement and buy equipment for transportation related programs (such as a local shuttle system) if a long-term funding source is

established (such as a business district) to pay for the programs program's operations and maintenance costs.

- *Infrastructure must be implementable at a community-wide level, and cannot include infrastructure improvements only suitable at a project or parcel level.* The funds for this program can only be used on City of San Diego facilities that benefit the community as a whole. Therefore, property specific VMT reducing measures such as Amazon lockers, employee showers, and carpool/vanpool incentives would not be eligible for program funds. It should be noted that these types of property specific measures will be required and implemented through the City's VMT ordinance.
- *Chosen infrastructure must be wholly implementable by the City of San Diego.* Since the City would not be able to control how program funds would be spent outside of their jurisdiction, all funds must be spent fully on City controlled infrastructure. Therefore, infrastructure or programs controlled by other jurisdictions such as Metropolitan Transit System (MTS) and Caltrans would not be eligible for program funds.

2.2. List of Potential Infrastructure Types

Based upon a review of existing and planned City infrastructure, current industry best practices, and research on the types of infrastructure that deliver measurable benefit to VMT reduction, a draft list of potential infrastructure types was developed. The purpose of this list was to garner City feedback for further refinement, or removal of potential infrastructure types that may be inappropriate given the project's context and intent. Potential infrastructure types are presented in **Table 1**.

Table 1 Potential Infrastructure Types for Program Inclusion

Mode	Facility Type	Description
Bicycle / Micro Mobility	Protected Bikeways (Class I, Class IV)	Class I, also referred to as a Multi-Use Path or a Bike Path, provides for bicycle travel on a paved right-of-way completely separated from the street. A Class IV Bikeway, also referred to as a separated bikeway or cycle track, is for the exclusive use of bicycles and is physically separated from vehicular traffic.
	Semi-Protected Bikeways (Buffered Class II)	A Buffered Bike Lane is a conventional bike lane which is paired with a designated buffer separating the bicycle lane from the adjacent vehicular traffic.
	Unbuffered Class II Bike Lanes	Provides a striped lane designated for the exclusive or semi-exclusive use of bicycles with through travel by motor vehicles or pedestrians prohibited, but with pedestrian and motorist crossflows permitted. The minimum bike lane width where parking stalls are marked is 5 feet. The minimum width for a shared bike lane and parking lane is 11 feet.
	Class III Bicycle Routes	Provides shared use of traffic lanes with cyclists and motor vehicles, identified by signage and street markings such as “sharrows”. Bike routes are best suited for low-speed, low-volume roadways with an outside lane width of 14 feet.
	Bicycle Parking	Bicycle parking encompasses several types of infrastructure ranging from bicycle racks to secure lockers. Effective bicycle parking allows for the bike frame and at least one wheel to be locked, it supports the frame in two places, and it prevents the bicycle wheel from tipping.
	Micro Mobility Network	Micro mobility refers to modes of transportation which are capable of carrying one or two passengers and are small/light, such as bicycles, electric scooters, and Neighborhood Electric Vehicles (NEVs). A Micro Mobility Network provides an interconnected series of streets or paths with infrastructure designed to accommodate the micro mobility vehicles.
	Wayfinding Signage	Wayfinding signage provides its intended audience (which may be any combination of cyclists, pedestrians, or autos) information about the shortest or most efficient path to popular destinations. Some wayfinding schemes also report distance and/or an estimated amount of time to a destination for a pedestrian or cyclist.

Table 1 Potential Infrastructure Types for Program Inclusion

Mode	Facility Type	Description
Bicycle / Micro Mobility	NEV Network	Neighborhood electric vehicles (NEVs) are small electric vehicles that typically operate within a defined service area and fulfill trips that are short-distance in nature, typically less than two miles long. NEVs help to facilitate connections to and from transit stations and provide users with an alternative to driving for short trips.
Transit	Transit-Only Lanes	Transit-Only lanes are a portion of the street designated by signs and roadway markings for the exclusive use of transit vehicles. Sometimes the transit use is preferential and limited to use by other vehicles is permitted.
	Queue Jumper Lanes	Queue jump lanes combine short dedicated transit facilities with either a leading bus interval or active signal priority to allow buses to easily enter traffic flow in a priority position. Applied thoughtfully, queue jump treatments can reduce delay considerably, resulting in run-time savings and increased reliability.
	Transit Signal Priority	Transit Signal Priority (TSP) is a general term for a set of operational improvements that use technology to modify traffic signal timing or phasing when transit vehicles are present either conditionally for late runs or unconditionally for all arriving transit. TSP benefits are significantly amplified when implemented alongside other strategies such as dedicated transit lanes.
	Microtransit / Neighborhood Shuttle	A transit service offers flexible routing and/or flexible scheduling of minibus vehicles. Possible pick-up/drop-off stops are restricted (usually within a geofenced area), and transit can be provided either as scheduled stop-to-stop service or on-demand curb-to-curb service. Free Ride Everywhere Downtown (FRED) is a local example of on-demand curb-to-curb service, where the Hillcrest Lunchtime Loops is an example of as scheduled stop-to-stop service. It should be noted that only the seed money to start these programs would be available through the VMT Impact Fee Program

Table 1 Potential Infrastructure Types for Program Inclusion

Mode	Facility Type	Description
Transit	Wayfinding Signage	Wayfinding signage provides its intended audience (which may be any combination of cyclists, pedestrians, or autos) information about the shortest or most efficient path to popular destinations. Some wayfinding schemes also report distance and/or an estimated amount of time to a destination for a pedestrian or cyclist.
Pedestrian	Enhancements	Pedestrian Enhancements refer to the following three improvements on pedestrian projects: *Pedestrian Scale Lighting*: designed and located to illuminate a sidewalk, pathway or other area that is used by pedestrians. Light sources placed closer to the surface to be lit, helps people on foot navigate sidewalks and further encourage walking. *Expanding Sidewalks:* In areas with high pedestrian demand within the existing right-of-way, the expansion of sidewalks creates a wider space to allow greater pedestrian movement. Additionally, wider sidewalks create greater safety, accessibility, and encourage walking. Wider sidewalks can activate streets both socially and economically. *Shade trees:* It has been shown that shade trees reduce urban traffic speeds, provide a safer walking environment by forming distinct edges to sidewalks so motorists can distinguish between the roadway and pedestrian space. Additionally, they create a more pleasant walking environment by providing protection from the elements. Street trees clean the air since they filter automobile exhaust and emissions. Trees also lower urban temperatures by mitigating the temperature rise caused by asphalt and concrete.
	Gap Closure	The sidewalk network can be expanded by filling the gaps in the sidewalk network caused by missing sidewalks. Complete sidewalk networks encourage walking by reducing sections in which pedestrians are forced to walk in the roadway or on shoulders due to missing sidewalks.

Table 1 Potential Infrastructure Types for Program Inclusion

Mode	Facility Type	Description
Pedestrian	Wayfinding Signage	Wayfinding signage provides its intended audience (which may be any combination of cyclists, pedestrians, or autos) information about the shortest or most efficient path to popular destinations. Some wayfinding schemes also report distance and/or an estimated amount of time to a destination for a pedestrian or cyclist.
Auto	Parking Reduction	Car ownership rates can be influenced by reducing the number of parking spaces available both at the origin and destination point of the trip. This strategy is most successful if coupled with increased transit and active transportation infrastructure.
	Parking Cost Increase	VMT can be affected by an increase in on-street parking costs. This can be achieved in a number of ways, by setting on-street parking rates commensurate with off-street parking, by staggering the cost to park making the first hour the cheapest and every subsequent hour more expensive, or by dynamically pricing the cost of parking based on demand.
	Curbside Management	Curb management means adopting policies which implement changes to allow for more dynamic uses such as prioritizing transit and safe bicycling infrastructure, designating areas for deliveries, passenger pick-ups, green stormwater infrastructure, and public spaces.
	ITS Improvements	Intelligent transport systems vary in technologies applied, from basic management systems such as car navigation, parking guidance and information systems to more advanced applications that integrate live data and feedback from a number of other sources.
	Key Gap Closure	Constructing new roadways to close key gaps in the mobility network may reduce VMT by offering a more direct path of travel to roadway users. Destination pairs with gaps, which must now be circumvented by longer, circuitous routes, will become more accessible with a shorter trip.

Table 1 Potential Infrastructure Types for Program Inclusion

Mode	Facility Type	Description
Emerging Technologies	SMART Corridors	• Sustainable Mobility for Adaptable and Reliable Transportation (SMART) Corridors further SANDAG's 5 Big Moves strategy especially related to Complete Corridors. A SMART Corridor is a major arterial roadway that provides access to or between at least two freeways, whereby mobility improvements are made for transit and other congestion-reducing mobility forms through the repurposing of roadway space. This repurposing creates facilities with general purpose lanes plus flexible lanes, that may be used by a combination of non-single occupancy vehicles, such as autonomous/connected vehicles, or other emerging mobility concepts. SMART corridors would increase safety, capacity, and efficiency; provide dedicated space for efficient transit and other pooled services; manage demand in real-time; and maximize use of existing roadways. The lane configuration and type of use is contingent upon time of need. o SMART corridors always have flexible lanes and transit • Flexible (Flex) Lanes: designating space (i.e., general purpose lanes) along a Major Arterial roadway to be used by a combination of non-single occupancy vehicles, such as autonomous/connected vehicles, or other emerging mobility concepts. o Flex lanes do not need to be part of a SMART corridor and connect freeway to freeway o Does not necessarily need to be accompanied by signal enhancements
	Connected and Autonomous Vehicle Infrastructure	Roadway infrastructure enhancements, both on the systems (signals and communication) and the physical side (roadway condition and striping) that are required to safely and efficiently integrate connected and autonomous vehicles into the roadway network.

Table 1 Potential Infrastructure Types for Program Inclusion

Mode	Facility Type	Description
Other/Multiple Categories	Protected Intersections	A protected intersection allows separation between cyclists, pedestrians, and cars. Vehicles turning right are separated by a buffer from crossing cyclists and pedestrians, providing increased reaction times and visibility. Drivers looking to turn right have better visibility to cyclists and pedestrians as they can look to the side for conflicts instead of over their shoulders.
Other/Multiple Categories	Mobility Hubs	Mobility Hubs are places of connectivity where different modes of travel – walking, biking, transit and shared mobility – converge. Mobility Hubs provide an integrated suite of mobility services, amenities, and technologies to bridge the distance between high-frequency transit and an individual's place of origin or destination.

2.3. Refinement of Potential Infrastructure Types

Certain infrastructure types identified in Table 1 were determined to be unsuitable for further consideration. Primarily, this was due to some types being too new or partially implemented, so as to not have a clear quantification of VMT reduction capability. Others were deemed to be out of scope with the aim of the VMT Impact Fee program. The following types of infrastructure were not considered further:

Class II (Unbuffered) and Class III Bicycle Routes – Literature and studies that link reductions in VMT to the expansion of the bicycle network, typically find that the most substantial reductions in VMT are associated with increases in rider comfort and decreases in stress levels. Based on Level of Traffic Stress (LTS) standards, Unbuffered Class II Bike Lanes and Class III Bicycle Routes are not effective enough at reducing rider stress, on roadway facilities with speed limits of 30 mph or greater, to levels at which VMT reductions would be effective. The majority of the City's bicycle network is located on Mobility Element Roadways with speed limits over 30 mph. Therefore, improvements that include Unbuffered Class II Bike Lanes and Class III Bicycle Routes were not included in the VMT Impact Fee Program because they will not effectively reduce VMT.

Connected and Autonomous Vehicle Infrastructure – While it is speculated by some that connected and autonomous vehicle technology could potentially lower VMT by selecting more efficient routes, allowing for better rideshare matching, and providing first mile/last mile solutions. These effects cannot be measured or guaranteed at this time. Therefore, these types of improvements are not currently included in the VMT Impact Fee Program.

Parking Reduction – Literature and studies have found that car ownership rates can be influenced by reducing the number of parking spaces available, both at the origin and destination points of the trip. However, at the time of this writing, no correlation has been established between reducing the number of public parking spaces available and an associated reduction in communitywide VMT. It should be noted that a correlation has been established between reducing private or on-site parking and a reduction in parcel/project related VMT; however, this fee program does not have the authority to enforce that. Therefore, public parking reductions were not included in the VMT Impact Fee Program due to insufficient evidence to justify an approximation of VMT reduction.

Parking Cost Increase – Similar to the Parking Reduction strategy, literature and studies have found that VMT can be affected by an increase in private off-street parking costs. However, at the time of this writing, there is insufficient evidence to justify an approximation of VMT reduced by increasing public or on-street metered parking costs. Therefore, the Parking Cost Increase strategy was not included in the program.

Curbside Management – This infrastructure type generally serves to improve the organization of pick-up and drop-off operations for taxis or transportation network companies (TNCs) such as Uber or Lyft or provide additional parking on evenings or peak times. Thus, curbside management treatments still have an inherent ability to bolster VMT-producing automotive travel. While TNC use may serve as first or last-mile travel to or from transit, a large number of TNC trips are made door-to-door, effectively negating meaningful VMT savings.

Vehicle-focused ITS Improvements – These treatments generally improve the flow of vehicular traffic by increasing a roadway's capacity through technological means, without physical expansion. Thus, vehicular-focused ITS improvements could induce additional demand, as roadways with these treatments will be able to handle additional traffic.

SMART Corridors – At the time of this writing, SMART Lanes represent a very recently adopted improvement type with no implemented example within the City. As such, there is insufficient ability to quantify the VMT-reducing effects of this infrastructure type.

Key Roadway Gap Closure – It is not the intent of this VMT Impact Fee Program to invest in automobile-centric infrastructure, and all new roadway projects in the city would include appropriate pedestrian, bicycle, and transit improvements as part of the project. Thus, while gap closure may lead to shorter trips by car, bicycle, pedestrian, and transit, it was determined that this type of infrastructure would not be included in the program.

It should also be noted that the following VMT reducing infrastructure was initially considered, but screened out due to the criteria outlined in Section 2.1:

Transit Pass Subsidies – The VMT Fee program would not be able to guarantee consistent funding for this program.

Expansion of Transit Services – Transit service within the region is planned by SANDAG, and implemented and operated by MTS; therefore, the City does not have ability to implement new or expand transit services.

Increase Transit Frequency – Transit service within the region is planned by SANDAG and implemented and operated by MTS; therefore, the City does not have ability to increase transit frequencies.

Vanpool / Carpool Incentives and Programming – The VMT Fee program would not be able to guarantee consistent funding or monitoring of this program. It should be noted that similar programs are included in the City's TDM ordinance, where they will be implemented at a property specific level.

Parking Cash Out - The VMT Fee program would not be able to guarantee consistent funding for this program. It should be noted that similar programs are included in the City's TDM ordinance, where they will be implemented at a property specific level.

Bikeshare Programs - The VMT Fee program would not be able to guarantee consistent funding for this program. It should be noted that similar programs are included in the City's TDM ordinance, where they will be implemented at a property specific level.

Guaranteed Ride Home - The VMT Fee program would not be able to guarantee consistent funding for this program. It should be noted that similar programs are included in the City's TDM ordinance, where they will be implemented at a property level.

2.4. Program Eligible Infrastructure

Following the removal of the infrastructure types presented in the preceding section, the following, refined list of program-eligible infrastructure is presented as **Table 2**.

Table 2 Program Eligible Infrastructure

Mode	Facility Type
Bicycle / Micro-Mobility	Network - Protected Bikeways (Class I, Class IV)
	Network - Semi-Protected Bikeways (Buffered Class II)
	Network - Bicycle Parking
	Wayfinding Signage
	NEV Network

Table 2 Program Eligible Infrastructure

Mode	Facility Type
Transit	Transit Only Lanes
	Queue Jumper Lanes
	Transit Signal Priority
	Microtransit / Neighborhood Shuttle
	Wayfinding Signage
Pedestrian	Enhancements
	Gap Closure
	Wayfinding Signage

3. VMT Reduction Analysis Methods

Research was performed to ensure that a trusted, verifiable source, which quantifies VMT reductions, exists for each of the VMT Reducing Infrastructure Types identified in Table 2. Further, the research process also identified and documented the potential range and magnitude of VMT reductions associated with each infrastructure type (Reduction Elasticity). This section documents the tools and resources that will be used to quantify the associated VMT Reduction Elasticity for each VMT Reducing Facility Type.

3.1. Methods and Research

As noted in Section 2.1, infrastructure types included in the VMT Impact Fee Program must be linked to reputable, quantifiable studies that demonstrate VMT reductions. To achieve this goal, numerous manuals, guidelines, research studies, and white papers were reviewed to establish quantifiable links between VMT reductions, and the facility types included in Table 2. Attachment B provides the references, a brief description, and link to the source document for each of the sources that were used to quantify VMT reductions.

3.2. Available Tools

The documents reviewed in Section 3.1 and included Attachment B provide context and background on the research that has been conducted on VMT reduction strategies to this point. The following tools utilize and condense much of the identified research and have become resources for both the region and the State in quantifying VMT reductions:

1. San Diego Association of Governments (SANDAG) VMT Reduction Calculator Tool
   https://www.icommutesd.com/planners/tdm-local-governments
   - This tool, released in 2019, estimates the percent reduction in vehicle miles traveled (VMT) resulting from the application of mobility management strategies.

   The tool operates at two geographic scales: project/site-level and community/city-level. Depending on the project location and project type, users can select appropriate strategies of interest for mitigating transportation impacts. It should be noted, however, that some strategies reduce VMT from specific trips such as employee commute trips.

2. California Air Pollution Control Officers Association's (CAPCOA) *Quantifying Greenhouse Gas Mitigation Measures* report

http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

- This report was prepared in 2010 to provide a common platform of information and tools to support local governments pertaining to greenhouse gas mitigation. As such, the primary purpose of these measures is not to determine VMT reduction; however, it has proven useful since the unit of VMT is often extrapolated into pounds of carbon dioxide emissions. Further, as a means of providing a resource of estimating emissions reduction, VMT elasticity is provided for many mitigation measures.

The tools outlined above will be utilized as the main resources to calculate the associated VMT reduction with the VMT Reducing Infrastructure. Infrastructure types and the reduction calculation tool source are presented in **Table 3.** Additional research, as presented in Section 3.3, is being conducted to determine a reduction source for the several infrastructure types.

Table 3 Program Eligible Infrastructure - Reduction Source

Mode	Facility Type	Reduction Tool
Bicycle / Micro-Mobility	Network - Protected Bikeways (Class I, Class IV)	• SANDAG VMT Reduction Calculator Tool
	Network - Semi-Protected Bikeways (Buffered Class II)	• SANDAG VMT Reduction Calculator Tool
	Network - Bicycle Parking	• CAPCOA
	Wayfinding Signage	• CAPCOA (SDT-1)
	NEV Network	• SANDAG VMT Reduction Calculator Tool
Transit	Transit Only Lanes	• Research
	Queue Jumper lanes	• SANDAG VMT Reduction Calculator Tool
	Transit Signal Priority	• SANDAG VMT Reduction Calculator Tool
	Micro transit / Neighborhood Shuttle	• SANDAG VMT Reduction Calculator Tool
	Wayfinding Signage	• CAPCOA (SDT-1)
Pedestrian	Enhancements	• CAPCOA (SDT-1)
	Gap Closure	• SANDAG VMT Reduction Calculator Tool
	Wayfinding Signage	• CAPCOA (SDT-1)

3.3. VMT Reduction Elasticity Associated with Program Eligible Infrastructure

Based on the literature reviewed in Section 3.1 and the available tools presented in Section 3.2, a general VMT reduction elasticity was assigned to each facility type, as shown in **Table 4.** A series of sample projects will be reviewed for each facility type to gain a better understanding of the exact VMT reductions specific to the City of San Diego and more tuned in to the types of facilities in which the VMT Impact Program will fund, this process is further explained in Section 4.0.

Table 4 Program Eligible Infrastructure – Reduction Elasticity

Mode	Facility Type	Reduction Elasticity
Bicycle / Micro-Mobility	Network - Protected Bikeways (Class I, Class IV)	0%-5%
	Network - Semi-Protected Bikeways (Buffered Class II)	0%-5%
	Network - Bicycle Parking	0%-5%
	Wayfinding Signage	0%-5%
	NEV Network	0%-5%
Transit	Transit Only Lanes	0.0-7%
	Queue Jumper Lanes	0.0-0.4%
	Transit Signal Priority	0.0-0.4%
	Microtransit / Neighborhood Shuttle	0.1%-8.2%
	Wayfinding Signage	0%-5%
Pedestrian	Enhancements	0-2%
	Gap Closure	1.4%
	Wayfinding Signage	0%-5%

APPENDIX B

Mobility Choices: Reduced VMT Unit Cost Memorandum – Technical Summary

CHEN RYAN

TO: Heidi Vonblum, City of San Diego

FROM: Stephen Cook, PE, Chen Ryan Associates

DATE: April 20, 2020

RE: Mobility Choices: Reduced VMT Unit Cost Memorandum – Technical Summary

1. Introduction

The purpose of this memorandum is to establish a unit cost to reduce a vehicle mile traveled (Cost/RVMT) within the more VMT efficient areas of the City of San Diego (more dense and urban areas). *Please note this is a technical summary of the memorandum intended to be included in the appendix of the fee program nexus study. The full version of the memorandum, incorporated herein by reference, includes additional language on policy and background that is not presented here*.

2. Methodology

As documented in the *VMT Reduction Elasticity Memorandum* Table 1 presents the program-eligible infrastructure that was identified for inclusion in the Mobility Choices Fee Program:

Table 1 Program Eligible Infrastructure

Mode	Facility Type
Bicycle / Micro-Mobility	Network - Protected Bikeways (Class I, Class IV)
	Network - Semi-Protected Bikeways (Buffered Class II)
	Network - Bicycle Parking
	Wayfinding Signage
	NEV Network
Transit	Transit Only Lanes
	Queue Jumper Lanes
	Transit Signal Priority
	Microtransit / Neighborhood Shuttle
	Wayfinding Signage
Pedestrian	Enhancements
	Gap Closure
	Wayfinding Signage

To develop a unit cost per reduced VMT for the program, a large group of sample projects were identified. The sample projects consisted of a mix of eligible facility types (identified above) spread throughout the different VMT efficient areas within the City. The associated reduction in VMT (RVMT) was calculated for each sample project, as well as a planning level cost estimate to implement the project. The cost to implement the project was then divided by the VMTs reduced by the project to get the resulting Cost/RVMT. Finally, the Cost/RVMT was normalized, based on the City's CAP mode share goals, across all the facility types to identify a Citywide Cost/RVMT.

A more detailed, step-by-step description of the process for determining the Citywide Cost/RVMT is described below:

Step 1: Identify Sample Projects:
For each facility listed in Table 1, multiple sample projects were identified. Sample projects were chosen to represent different locations within the City's VMT efficient areas. Additional detail and documentation on how the sample projects were selected, as well as the sources used to identify the projects are provided in Section 3.

Step 2: Calculate the Reduction in VMT associated with Each Sample Project:
To understand and identify the magnitude and variation in VMT reduction associated with each of the facility types identified in Table 1, the RVMT was calculated for each sample project. This process helps to identify the VMT reduction effectiveness of each facility type and how that effectiveness varies within the different areas of the City. This variation also allows the program's unit cost to be developed from a larger sample size providing a more thorough and accurate metric.

The sources utilized to calculate the RVMT for each of the facility types are documented in Table 3 of the *VMT Reduction Elasticity Memorandum, dated 01/08/20*. This memo takes those sources and applies them to the sample projects identified in Section 3 to provide a more robust assessment of the actual potential VMT reductions that can be anticipated with the construction/implementation of these facilities within the different applicable areas of the City. Specific RVMT calculations for each sample project are provided in Attachment B of this memo.

Step 3: Establish a Planning Level Cost Estimate for Each Sample Project
Planning level cost estimates were either identified or developed for each sample project. Program level costs were either gathered from the source document of the sample project (i.e. Community Plan, Specific Plan, IFS, TUNL, etc.) or derived based on unit cost estimates or other similar projects. The sources for the cost estimates are identified in the Sample Project Sheets, included as Attachment C.

Step 4: Calculate the Cost/RVMT for Each Sample Project
The cost to reduce a mile of vehicular travel associated with each sample project was calculated by dividing the cost estimate, derived in Step 3, by the associated reduced VMT, calculated in Step 2. The Cost/RVMT was averaged across all of the sample projects for each facility type and then averaged again for each mode, resulting in a Cost/RVMT for each mode.

Step 5: Develop a Citywide Cost/RVMT
The average Cost/RVMT per mode was determined by averaging together all sample projects for each of the three modes. The program assumes that the average cost per mode was normalized based on the mode share goals outlined in the City's Climate Action Plan (CAP). Normalizing the costs by mode share goal aims at developing an average Cost/RVMT at the citywide level, based on the specific modes and the goals for their associated demands. Finally, since the City's Community Plan Mobility Elements will strive to achieve the CAPs mode share goals, normalizing and allocating the project costs used to develop the fees in the same manner should help the fee program to maintain consistency with future City plans.

3. Sample Project Identification

The first step of determining a Cost/RVMT requires identification of sample projects that serve as good examples of the type of facility that they are intended to represent. These sample projects were refined from various projects and planning documents such as Public Facilities Financing Plans (PFFPs) and Impact Fee Studies (IFSs), Community Plans, Specific Plans, and Urban Greening Plans, within the City of San

Diego. Sources for each sample project are identified in their associated sample project sheets which are included in Attachment B.

Sample Project Criteria

Projects selected to represent an infrastructure type were chosen to ensure that several aims of the project were met. These included the following:

1. Ensuring that projects were analyzed across different place types (Downtown, transit priority areas, etc.).

2. Ensuring that projects analyzed represented a broad geographical spread throughout the more dense and urban areas of the City of San Diego.

3. Ensuring that several representative projects for each facility type were identified to ensure a robust sample was examined.

3.1. Sample Project Sources

Projects were primarily gleaned from existing planning documents at the Citywide and Community level, but also included specific projects as was appropriate to analyze specific infrastructure types that are planned at a zonal or localized level. Sources included the following:

- Community Plans
- Specific Plans
- Master Plans
- Corridor Studies
- Green Streets Plans
- City's Transportation Unfunded Needs List (TUNL)
- SANDAG's Regional Transportation Plan

Additionally, planned sample projects could not be found for some facility types, such as neighborhood shuttles[1], NEV network, micro mobility network and mobility hubs because they have not yet been implemented in the City. In these cases, sample projects were developed based on discussions with City Staff. It should be noted that these are not planned projects at this point, and are only being used to determine the potential effectiveness of these facility types.

3.2. Sample Projects

The selected sample projects used to determine project cost, VMT reduction potential, and subsequent cost per unit of VMT reduction are presented in **Table 2**. The sample projects are organized by the mode and the facility type they represent. As shown, representing each mode and facility type with multiple projects ensured that at least two projects per facility type were included for Cost/RVMT calculation. In some cases, where a large degree of implementation is anticipated, such as with bicycle facilities, up to

[1] Note: Program funds can only be used for shuttle startup costs such as equipment acquisition and signage. Shuttle programs, if implemented, must be paired with an on-going funding source, such as a parking district, or business improvement district to provide funding for operations and maintenance costs.

seven sample projects were identified throughout the City. It should be noted that the projects included in Table 2 are purely for sampling and calculation purposes, and were selected to provide a wide variety of project types and locations. It should not be assumed that program funds will only be used for these projects or that these projects are prioritized for program funding in any way.

Table 2 Sample Projects by Mode and Facility Type

Mode	Facility Type	#	Sample Project
Bicycle / Micro-Mobility	Bicycle & Micro-Mobility Network	1B	Southeastern CP Network
		2B	Encanto CP Network
		3B	Downtown CP Network
		4B	Mission Valley Network
		5B	Midway CP Network
		6B	Linda Vista CATS Network
		7B	Kearny Mesa CP Network
		8B	Golden Hill CP Network
		9B	North Park CP Network
		10B	Uptown CP Network
		11B	San Ysidro CP Network
	Wayfinding Signage	12B	Downtown Community
		13B	Old Town Community
		14B	San Ysidro Community
	NEV Network	15B	Uptown Community
		16B	Downtown Community
Transit	Transit Only Lanes	1T	Clairemont Mesa Blvd
		2T	BRT On Clairemont Dr
	Queue Jumper Lanes	3T	Garnet Avenue / Grand Avenue
		4T	Friars Road
	Transit Signal Priority	5T	University Avenue from First Avenue to 70th Street
		6T	Genesee Avenue from SR-163 to Nobel Drive
		7T	54th Street/Euclid Avenue from Logan Avenue to Monroe Avenue
	Microtransit / Neighborhood Shuttle	8T	Uptown Community Shuttle
		9T	North Park Community Shuttle
		10T	Mission Valley Community Shuttle
		11T	La Jolla Community Shuttle
		12T	Kearny Mesa Community Shuttle
	Wayfinding Signage	13T	Downtown Community
		14T	Old Town Community
		15T	San Ysidro Community
Pedestrian	Enhancements	1P	University Avenue
		2P	Rosecrans Street
		3P	Downtown Green Streets
		4P	43rd & Fairmount
	Gap Closure	5P	Mission Valley Pedestrian Network
		6P	Kearny Mesa Pedestrian Network
		7P	Midway Pedestrian Network
		8P	Old Town Pedestrian Network
	Wayfinding Signage	9P	Downtown Community
		10P	Old Town Community
		11P	San Ysidro Community

4. Sample Project Analysis

This section analyzes the sample projects identified in Table 2 to identify both the RVMT that would be associated with the sample projects, as well as the costs to implement them. From these figures we can derive the Cost/RVMT for each facility type.

As noted previously, Attachment B contains individual project sheets for each sample project. Each Sample Project Sheet provides the following information:

- Project Description
- Project Source
- Potentially Affected VMT
- Percent VMT Reduction
- Calculated RVMT
- Project Cost Estimate
- Source of Project Cost Estimate
- Project Cost/RVMT

4.1. VMT Reduction

The RVMT per sample project and the cost to implement the project are presented in Table 3. The sources utilized to calculate the RVMT for each of the facility types are documented in Table 3 of the *VMT Reduction Elasticity Memorandum, dated 01/08/20.* Calculation worksheets displaying the analysis source, assumptions and RVMT calculations for each sample project are included in Attachment B. As noted previously, the sources of the sample project costs are included in Attachment C.

Table 3 VMT Reduction by Project and Associated Cost

Mode	Facility Type	#	Sample Project	VMT Reduced	Project Cost
Bicycle / Micro-Mobility	Bicycle & Micro-Mobility Network	1B	Southeastern CP Network	7,900	$2,840,184
		2B	Encanto CP Network	2,500	$3,132,445
		3B	Downtown CP Network	34,900	$10,500,000
		4B	Mission Valley Network	3,800	$6,000,000
		5B	Midway CP Network	2,200	$1,574,100
		6B	Linda Vista CATS Network	300	$442,000
		7B	Kearny Mesa CP Network	1,100	$8,442,900
		8B	Golden Hill CP Network	900	$1,086,700
		9B	North Park CP Network	4,100	$647,680
		10B	Uptown CP Network	1,800	$2,796,600
		11B	San Ysidro CP Network	1,000	$364,200
	Wayfinding Signage	12B	Downtown Community	1,300	$333,333
		13B	Old Town Community	20	$33,333
		14B	San Ysidro Community	310	$1,183,333
	NEV Network	15B	Uptown Community	3,600	$1,070,000
		16B	Downtown Community	3,500	$1,070,000
Transit	Transit Only Lanes	1T	Clairemont Mesa Blvd	19,300	$31,155,000
		2T	BRT On Clairemont Dr	3,000	$24,420,000
	Queue Jumper Lanes	3T	Garnet Avenue / Grand Avenue	510	$600,000
		4T	Friars Road	2,500	$300,000
	Transit Signal Priority	5T	University Avenue from First Avenue to 70th Street	4,100	$910,000
		6T	Genesee Avenue from SR-163 to Nobel Drive	5,100	$880,000
		7T	54th Street/Euclid Avenue from Logan Avenue to Monroe Avenue	3,200	$980,000
	Microtransit / Neighborhood Shuttle[1]	8T	Uptown Community Shuttle	220	$350,000
		9T	North Park Community Shuttle	250	$350,000
		10T	Mission Valley Community Shuttle	500	$350,000
		11T	La Jolla Community Shuttle	120	$350,000
		12T	Kearny Mesa Community Shuttle	410	$350,000
	Wayfinding Signage	13T	Downtown Community	22,900	$333,333
		14T	Old Town Community	100	$33,333
		15T	San Ysidro Community	4,800	$1,183,333
Pedestrian	Enhancements	1P	University Avenue	200	$612,628
		2P	Rosecrans Street	1,500	$2,798,000
		3P	Downtown Green Streets	7,500	$25,750,000
		4P	43rd & Fairmount	300	$403,036

Table 3 VMT Reduction by Project and Associated Cost

Mode	Facility Type	#	Sample Project	VMT Reduced	Project Cost
Pedestrian	Gap Closure	5P	Mission Valley Pedestrian Network	34,100	$91,113,798
		6P	Kearny Mesa Pedestrian Network	28,400	$1,383,149
		7P	Midway Pedestrian Network	8,600	$1,008,058
		8P	Old Town Pedestrian Network	1,000	$70,330
	Wayfinding	9P	Downtown Community	11,500	$333,333
		10P	Old Town Community	20	$33,333
		11P	San Ysidro Community	1,000	$1,183,333

Note:
[1]Assumes implementation costs only, operations and maintenance costs will need to be funded through other sources.

4.2. Cost Per reduced VMT

Table 4 presents the Cost/RVMT on a per-project and per- mode. Cost/RVMT is calculated by dividing the average project costs by the average VMT reduction calculated per mode as presented in Table 4.

Table 4 Cost Per Reduced VMT by Mode

Mode	Facility Type	#	Sample Project	Cost/RVMT	
				Project	Mode
Bicycle / Micro-Mobility	Bicycle & Micro-Mobility Network	1B	Southeastern CP Network	$360	$1,436
		2B	Encanto CP Network	$1,253	
		3B	Downtown CP Network	$301	
		4B	Mission Valley Network	$1,579	
		5B	Midway CP Network	$716	
		6B	Linda Vista CATS Network	$1,474	
		7B	Kearny Mesa CP Network	$7,675	
		8B	Golden Hill CP Network	$1,207	
		9B	North Park CP Network	$158	
		10B	Uptown CP Network	$1,554	
		11B	San Ysidro CP Network	$364	
	Wayfinding Signage	12B	Downtown Community	$256	
		13B	Old Town Community	$1,667	
		14B	San Ysidro Community	$3,817	
	NEV Network	15B	Uptown Community	$297	
		16B	Downtown Community	$306	
Transit	Transit Only Lanes	1T	Clairemont Mesa Blvd	$1,614	$1,320
		2T	BRT on Clairemont Dr	$8,140	
	Queue Jumper Lanes	3T	Garnet Avenue/ Grand Avenue	$1,176	
		4T	Friars Road	$120	
	Transit Signal Priority	5T	University Avenue from First Avenue to 70th Street	$222	
		6T	Genesee Avenue from SR-163 to Nobel Drive	$173	
		7T	54th Street/Euclid Avenue from Logan Avenue to Monroe Avenue	$306	
	Microtransit / Neighborhood Shuttle	8T	Uptown Community Shuttle	$1,591	
		9T	North Park Community Shuttle	$1,400	
		10T	Mission Valley Community Shuttle	$700	
		11T	La Jolla Community Shuttle	$2,917	
		12T	Kearny Mesa Community Shuttle	$854	
	Wayfinding Signage	13T	Downtown Community	$15	
		14T	Old Town Community	$333	
		15T	San Ysidro Community	$247	
Pedestrian	Enhancements	1P	University Avenue	$3,063	$1,408
		2P	Rosecrans Street	$1,865	
		3P	Downtown Green Streets	$3,433	
		4P	43rd & Fairmount	$1,343	
	Gap Closure	5P	Mission Valley Pedestrian Network	$2,672	
		6P	Kearny Mesa Pedestrian Network	$49	
		7P	Midway Pedestrian Network	$117	
		8P	Old Town Pedestrian Network	$70	
	Wayfinding Signage	9P	Downtown Community	$29	
		10P	Old Town Community	$1,667	
		11P	San Ysidro Community	$1,183	

5. Unit Cost

The average Cost/RVMT per mode was determined by averaging together all sample projects for each of the three modes, as displayed in Table 5. The average cost per mode was normalized to determine an average Cost/RVMT. The normalization was based on a series of factors including the City of San Diego's CAP mode share goals, anticipated City investment patterns and efficiency.

Table 5 displays the assumed normalized rates used to calculate the Citywide Cost/RVMT.

Table 5 Total Cost / RVMT Within the City of San Diego

Mode	Target Mode share	Cost/RVMT	Total Cost/RVMT
Bicycle / Micro-Mobility	18%	$1,436	$1,400
Transit	25%	$1,320	
Pedestrian	7%	$1,408	