

Chapter 1 - INTRODUCTION

PURPOSE OF PLAN

The current Mountlake Terrace Transportation Master Plan (TMP) was completed in November 2007. In the past thirteen years, the City of Mountlake Terrace's population has increased by 6%; with future estimates the population of the City will increase 18% by the year 2035. The 2020 TMP update is necessary to address the changing conditions Mountlake Terrace will experience with the introduction of light rail to the City, the development of the Town Center and the overall growth the community will experience with land use zoning modifications that increase allowable densities. The update will include an analysis of Mountlake Terrace's current transportation needs and create a vision for its transportation system to accommodate future demand with improved accessibility and safe and efficient mobility throughout the city.

The 2020 TMP update is structured into seven primary components:

- Compliance with State regulations and consistency with regional planning guidelines;
- A robust public outreach effort;
- Development of Mountlake Terrace's unique transportation goals and policies;
- Analysis of existing transportation facilities and future potential needs for automobiles, pedestrians, bicyclists and public transit users;
- Environmental and safety objectives;
- Maintenance and operation needs; and,
- Implementation and funding strategies.

The primary focus of the update defines projects to improve safety, connectivity, operational, and infrastructure needs that are essential for a comprehensive and effective multi-modal transportation network. The 2020 TMP update will also examine the existing transportation system and explore new policies, regulations and technologies that preserve and maintain the City's existing facilities in order to identify needs to be considered when developing the City's budget.

The update will be a living document, which will address all modes of transportation in Mountlake Terrace and promote new priorities, strategies, and guidance for responding to transportation issues, implementing capital improvement programs and budgeting improvements.

COMMUNITY CHARACTERISTICS

Table 1-1 shows past (2000), current (2020), and Snohomish County Countywide planning policy forecast (2035) population and employment numbers for the City. As shown, the City can expect a population growth of four times the rate and employment rate three times the rate in the next 15 years from what it has experienced in previous 20 years.

TABLE 1-1 – MOUNTLAKE TERRACE PAST & FORECASTED POPULATION AND EMPLOYMENT

Time Period	Population		Employment	
	2000	2020	2000	2020
2000 - 2020	20,362	21,420	6,643	7,487
Annual Growth Rate	0.25%		1.0%	
	2020	2035	2020	2035
	2020 - 2035	21,420	24,767	7,487
Annual Growth Rate	0.6%		1.6%	

Due to the City’s limited supply of vacant land, growth in both population and employment is expected to be concentrated in the Town Center District, the Freeway/Tourist District and the General Commercial District of the Melody Hill subarea. Growth projections for population and jobs will periodically be adjusted in upcoming years as these three districts develop and new information becomes available.

Land use assumptions for this plan include information contained in other elements of the Comprehensive Plan. Key assumptions are:

- Mountlake Terrace is a compact community within a larger urban area of the growing Central Puget Sound region.
- The City’s population is anticipated to grow at approximately 1% annually, and employment at about 1.5% annually. The percent will vary from year to year.
- Some nearby communities will grow at a faster rate than Mountlake Terrace.
- The City’s population and employment will continue to grow, consistent with the 2035 projections.
- The Town Center, Freeway/Tourist and Melody Hill areas will fill in with more commercial and mixed-use development.
- Single-family residential use, where it is currently zoned, will continue at typical urban densities and will remain the primary land use in those areas.
- Parks and open space, where currently zoned, will continue to be the primary land use in those areas.
- Pedestrian and bicycle facilities and transit services are expanding and will be implemented throughout the City.

Periodically, the City will need to reassess the land use assumptions should population and/or employment growth, funding, or other circumstances change over time.

COMMUNITY VISION

Mountlake Terrace's goals and policies identified in the current Comprehensive Plan create the City's community vision and are outlined in individual elements that make up the City's transportation, planning, economic, environmental, recreational, livability, housing and utility facets.

The goals and policies of the Transportation Element are identified and discussed in Chapter 4 of this plan. They are multi-faceted and encompass the needs and tools that will be used to provide the City with an effective, efficient and safe transportation network to move people and goods throughout the City and region.

The following sub-sections describe the major planning components that influence efforts to build and maintain a comprehensive and effective local transportation network within Mountlake Terrace.

REGIONAL TRANSPORTATION

Continued regional population growth is anticipated. In 2020, the population of the central Puget Sound region (made up of Snohomish, King, Pierce, and Kitsap Counties) was approximately 4.2 million. By 2035, the population of the four counties is projected to reach 5.1 million people (PSRC). As traffic congestion continues to increase, the need for viable, alternate modes of transportation also increases. In an effort to accommodate this growth, Sound Transit's light rail will expand to connect more communities region-wide.

The transportation system in the Puget Sound region is a multi-modal system for pedestrians, bicyclists, motor vehicles, ferries, rail, and airplanes. It consists of facilities, services, and programs under the jurisdiction of various governmental entities. Figure 1.1 – Regional Map illustrates the location of Mountlake Terrace in relationship to other parts of the region.



FIGURE 1-1 – REGIONAL MAP

A vast network of streets, roads, and highways traverse the region, moving both people and goods. I-5 and I-405 are the region's primary north-south travel corridors and SR 2, SR 520 and I-90 are the region's primary east-west corridors. Locally, Mountlake Terrace is connected to adjacent communities via arterials and collectors such as 212th, 214th, 220th, 228th and 244th Streets SW, and 44th, 52nd, 56th and 66th Avenues W. The city's streets also lead to connections with arterials outside the city boundaries, such as SR-99, SR-104 (King County line) and SR 524 (196th Street SW).

In addition to the street and highway system, regional mobility is enhanced by public transit, carpooling/vanpooling systems, the ferry system, air and railroad transportation, and facilities for non-motorized transportation such as bicycle routes and walking trails.

Public transit in Mountlake Terrace includes a variety of services from different providers. Community Transit buses provide service from Mountlake Terrace to locations in Everett and Seattle. Sound Transit express buses provide frequent, all day, bi-directional service to regional destinations like Seattle, Lynnwood and South Everett. A few miles from Mountlake Terrace, ferry service is available in Edmonds to the Kitsap Peninsula and in Mukilteo to Whidbey Island. Less than 30 miles to the south, Sea-Tac International Airport is a gateway to global access. Sound

Transit also runs regional express lines for commuters and is currently expanding its primary service infrastructure – Link light rail.

Sound Transit’s Link light rail line is a critical element of this region’s long-term transportation network. Voters approved the initial phase of the system in 1996; by 2009, Sound Transit opened the first segment of Seattle’s Link, a 15.6-mile line from downtown Seattle to Sea-Tac Airport. This line also serves Seattle’s SODO industrial area and the Beacon Hill and Rainier Valley neighborhoods. Currently, approximately 30,000 passengers ride the train every weekday.

In 2008, voters approved the extensions of light rail to Lynnwood in the north, Redmond to the east and south of Sea-Tac Airport. Included in this phase, Link’s expansion to the north includes two individual projects. The first will add three more stations from the existing terminus at Husky Stadium on the University of Washington’s campus to Northgate. After the Northgate extension opens in 2021, the second project, the Lynnwood Link Extension, will extend light rail into Snohomish County, serving four stations, Shoreline South/145th, Shoreline North/185th, Mountlake Terrace and Lynnwood City Center. When opened in 2024, riders will enjoy fast, frequent and reliable service between south Snohomish County and the University of Washington, downtown Seattle, the Eastside, Sea-Tac Airport and more. With a station located at the heart of the Town Center, Mountlake Terrace will become a prominent destination in the Puget Sound Region.

TRANSPORTATION AND LAND USE

Transportation and land use are interrelated since the characteristics of a specific land use establishes the type and level of transportation services that will complement the land use. For example, in low-density zoning such as single-family residences, frequent transit service is usually not utilized and is not cost-effective. Similarly, for commercial or industrial zoning, designating an established truck route nearby will provide these areas with the needed transportation infrastructure.

Therefore, a creative mix of transportation infrastructure and services will complement the demands of the local population and growing economy when adjacent land uses are utilized when determining the type of transportation systems and services needed throughout Mountlake Terrace. Transportation planning should provide a circulation system that supports growth and/or redevelopment targeted by the City’s land use goals in the Comprehensive Plan and sub-area plans.

Land use planning at both the local and regional level are also used to forecast future transportation demands. Projected employment and population growth translate to additional traffic volumes in specific geographic areas. As the population grows in Mountlake Terrace, city planners have, subsequently, rezoned the sub-area of the Town Center. Within the Town Center, high intensity land uses, including office, retail and residential zoning will generate significant demands on non-motorized transportation modes and the need to supply the infrastructure in the immediate area to support it. Consequently, the close proximity of different land uses to each will allow individuals to accomplish many tasks (work, shop, doctor’s appointments, live, haircut) without using a vehicle.

Particularly exciting is the synergistic relationship that will develop between Mountlake Terrace residents and the City's proximity to light rail. The introduction of light rail will require a comprehensive and complementary transportation network to accommodate two objectives;

- 1] Support the mix of transportation amenities for the Town Center area with its concentrated blend of high-density housing, retail and employment development, and
- 2] Connect the residents living in Town Center and other areas of the City with the increased opportunity to access regional cultural and economic destinations in Puget Sound.

The resulting transportation system, coupled with its relationship to proposed future land uses, will provide an equitable balance of transportation for all Mountlake Terraces residents regardless of the travel mode they utilize. This nexus of transportation and land use will support sustainability and provide convenient, environmental-friendly, and comprehensive travel both within Mountlake Terrace and to other destinations in the Puget Sound area.

TRAFFIC SAFETY

Roadway safety is a complex issue, and any efforts to improve safety must address not only the roadway's design but also the roadway's user behavior, interaction between different modes of travel (automobile drivers, pedestrians and bicyclist), and the enforcement of traffic safety rules and regulation.

A popular multidisciplinary approach to road safety is sometimes referred to as the "four E's;" Engineering, Education, Enforcement, and Evaluation. These E's broadly represent the various disciplines that bring together stakeholders who care about making the road safe for all users.

ENGINEERING

The design of safe roadways is a collaborative effort between transportation planners and engineers.

Transportation planning plays a critical role in determining the shape of the transportation system and provides an early opportunity for professionals to address safety needs. Before a road project is designed or built, it is influenced by comprehensive and strategic transportation plans that are coordinated to ensure that the system being developed is one that matches the vision of the local community. Planners work with stakeholders such as the general public, business owners, policy makers, and advocates to establish plans for how the transportation system can best serve every member of the community.

Transportation engineers work on the design, construction and system preservation of the roadways. In particular, engineers are in charge of designing roads that minimize the chance that crashes will occur while balancing the needs for efficiency and mobility. Engineers also work to design roads and intersection in such a way that minimizes crash severity and injury risk when crashes do occur. Engineers affect the safety of the built environment by incorporating safety into the planning phase; selecting design alternatives that prioritize safety considerations; using design elements that maximize the safety of the roadway or intersection; and, ensuring construction safety, operation, and maintenance of the roadways.

Infrastructure improvements are varied and targeted to meet the needs of a specific safety measure. Some examples include the following:

- Roadway Edge Treatments – Curbs are used to deflect automobile drivers back onto the travel lane when they stray and planting strips provide a cushion between pedestrians and drivers. These measures are used to prevent drivers from hitting pedestrians and roadside obstacles such as utility poles, large trees or fire hydrants. Where curbs are not implemented, a paved shoulder without obstructions allow vehicles to maintain control of their vehicle if they veer off the traveled way. Roadway edge striping with or without deflective markers also assist drivers to stay within the travel lane.
- Intersection Control Measures – Traffic signals, roundabouts and stop signs provide all travel modes to safely maneuver through an intersection and minimize or eliminate conflicts. The type of intersection control used depends on a number of factors including traffic volumes of all modes, proximity to schools or other sensitive areas and the location of the intersection in respect to its adjacent land uses.
- Traffic Calming Program – In February 2007, the City Council adopted the Mountlake Terrace *Traffic Calming Guide* for staff and residents to use as a resource to consistently and uniformly respond to neighborhood traffic safety issues. Its intent is focused on improving safety on local, residential roadways with two primary approaches:
 - Controlling excessive speeding on residential roadways
 - Deterring the use of residential roadways as an alternative cut-through route when unfavorable conditions exist on the adjacent arterial and collector roadways that are designed more appropriately for that type of traffic.

The program includes a study of a neighborhood petitioned by its residents to examine the identified safety issue. If the study reveals infrastructure improvements are necessary, the City's traffic calming toolbox include infrastructure improvements such as striping, intersection bulb-outs and traffic circles, turning restrictions, raised crosswalks and other elements that may be installed in the neighborhood to improve safety.

- Other Design Features – Roadway illumination, striping, crosswalk design and use, signage, medians, sidewalks, ADA accessibility and many other factors contribute to the design of safe roadway network for all modes of travel.

EDUCATION

Public education and communications campaigns are commonly used to improve road user attitudes and awareness. The structure and delivery methods of these campaigns vary, but generally involve materials (media advertisements, informational brochures, posters, presentations, etc.) to inform people of a desired behavior and the benefits of such behavior. An often effective use of communication campaigns is often done at schools. Since schools are the foundation of learning for young people, educating them about traffic safety is a useful addition to their curriculum.

Another method to educate drivers of their unsafe behavior is the use of speed radar signs. These are either permanent or mobile signs or trailers that identify the driver's speed as their vehicle passes it. The use of speed radar signs is a form of real-time education that informs the driver's travelling speed and compare it to the speed limit sign that accompanies it. Permanent speed radar signs are used in areas where a consistent problem of speeding exists and other factors such as roadway geometrics or a high percentage of younger pedestrians is present. The constant reminder often has long-lasting success in reducing driver speeds in these areas. The use of mobile speed

radar signs are advantageous to our community since they allow the sign to be moved in less sensitive areas; they are often rotated to several unique locations throughout the year.

Signs (“CLICK IT OR TICKET”) or audible messages activated at crosswalks (“LOOK BOTH WAYS BEFORE CROSSING STREET) are another useful tool to use that remind people of safety behavior that may be forgotten periodically.

ENFORCEMENT

Law enforcement efforts aimed at a particular behavior have been shown to be effective. Generally referred to as “high-visibility enforcement” these campaigns increase the perceived enforcement of a particular law. When people believe there is a high probability of being caught, they are more likely to follow the law. The one substantial limitation is that the Police Department cannot use a significant amount of time enforcing several individual locations. However, they can target these locations and handout tickets to violators over a short period of time and then return to the same location sporadically. The key to increased law enforcement for curtailing a specific behavior that is jeopardizing traffic safety is through this combination of awareness and time periods of heavy and recurring enforcement.

The awareness can be achieved through social media, the city’s website and reports that the City publicizes on a periodic basis. It also typically is spread by word of mouth throughout the community. The benefits of heavy and sporadic enforcement keeps the public compliant with fines and the uncertainty of when the enforcement will return.

EVALUATION

The final E is important since it allow the City, to monitor all the safety programs, procedures and data to evaluate the success of Mountlake Terrace’s traffic safety efforts. High-collision intersections are a safety focus too. Typically, the City considers high-collision intersections to be those with at least five collisions per year. Where high collision intersections are identified, the City examines and prioritizes ways to increase safety levels. Collision rates and safety mitigation are examined in the Safety Assessment section of Chapter 5.

TARGET ZERO

The federal government requires each state to have a Strategic Highway Safety Plan (SHSP); Target Zero is Washington’s. The Target Zero plan represents a bold vision: zero deaths and serious injuries on Washington’s roadways by 2030. Federal law requires that our SHSP be coordinated with the state’s Highway Safety Plan, Commercial Vehicle Safety Plan, and the Highway Safety Improvement Program. This coordination includes harmonizing certain performance measures and targets. The role of the State’s SHSP is to support the state’s efforts to achieve these targets by establishing appropriate goals and objectives, outlining emphasis areas, and presenting effective strategies

TRANSPORTATION SOCIAL EQUITY

The importance of incorporating social equity and environmental justice objectives into transportation policy and planning analysis is also a crucial facet of a superior transportation system. The people in Mountlake Terrace are diverse and have varying transportation needs. Some

residents require facilities for high occupancy vehicles and transit, while others require facilities for single occupancy vehicles.

Accessibility for disabled individuals, youth, and seniors is also paramount when designing transportation infrastructure. Transportation services are designed to meet requirements of the Americans with Disability Act (ADA). The City recently adopted their ADA Self-Assessment Transition Plan in 2020.

Social equity refers to the equitable distribution of impacts (benefits, disadvantages and costs). **Environmental justice** is a subset of social equity analysis that focuses on illegal discrimination against disadvantaged groups. This is often the lens through which transportation equity impacts are analyzed. More comprehensive analysis considers additional impacts, including delay and risk that motor vehicle traffic imposes on pedestrians and cyclists, various costs that automobile dependency and sprawl impose on non-drivers, and subsidies for motor vehicle travel which are often overall regressive. Research has shown how various biases in the transport planning process tend to favor mobility over accessibility and automobile travel over other modes. These biases reduce transport system diversity, and, ultimately, the accessibility options available to non-drivers. They also exacerbate various external costs that are particularly harmful to disadvantaged people. Comprehensive analysis can help identify more integrated, win-win solutions, which achieve a variety of social, economic and environmental objectives. This can help build broader coalitions among diverse interest groups.

The City recognizes the importance of including social equity and environmental justice analysis when developing their transportation planning and policies to ensure that all residents are accommodated equally. These efforts are usually addressed in the public outreach phase of a project.

ENVIRONMENTAL FACETS

LOW IMPACT DEVELOPMENT

If not sensitively designed, transportation facilities can harm the environmental quality of adjacent areas. Surface runoff from parking areas and roadways can degrade both fresh water and marine water. Vehicle exhaust degrades air quality, especially as congestion increases. Noise levels can impact residential neighborhoods. Since environmental effects do not follow jurisdictional boundaries, transportation in nearby areas also can impact Mountlake Terrace. To mitigate impacts, the City endeavors that transportation facilities are designed and constructed to minimize environmental impacts, for example, by using the least amount of paving necessary, encouraging transit and car-pooling, requiring adequate storm controls, and providing for low-impact options like walking and bicycling. The City's emphasis on a multimodal transportation system aims to reduce pollution and greenhouse gas emissions.

ELECTRIC VEHICLES

Compared to today's internal combustion engine vehicles and even hybrid vehicles, electric vehicles significantly reduce air pollution, have lower fuel costs, and reduce dependence on foreign energy. Because of these benefits, along with increased availability of electric vehicles (EVs), I-5 has become one of the nation's first "electric highways." With help from a federal grant, the State installed DC charging stations strategically placed at 40-60 mile intervals along I-5 so that electric vehicles can make the entire 276-mile trip from the Canadian border to the Oregon state line. In

addition, the Washington section of I-5 is planned to be part of a larger “West Coast Highway” stretching from southern California to Vancouver, B.C. Charging stations have also been installed from I-5 to Wenatchee (SR 2) and Cle Elum (I-90). Other state highways may be added to the EV network as electric vehicle use increases.

With more electric vehicles coming on the market and significant federal and private investment in electric vehicle charging infrastructure, the City of Mountlake Terrace has been proactive in encouraging the use of electric vehicles. In 2010, the City Council approved the Electric Vehicle Strategy and adopted new development codes to help provide the necessary infrastructure (charging stations). Convenient installation of charging stations is essential for people to be able to rely on electric vehicles. These measures are part of, ongoing efforts to ensure more sustainable city budgets, environmental justice, and quality of life

FUNDING AND BUDGETS

ECONOMIC VITALITY

An inadequate transportation system increases costs of business, thus deterring economic activity. A good transportation system improves local and regional mobility, provides alternative transportation choices, minimizes congestion and collisions, and allows efficient movement of goods and freight. The provision of a good transportation system with adequate infrastructure for motorized and non-motorized modes (including walking and bicycling), as well as public transportation, is critical to the economic vitality of an area.

FINANCING OF PROJECTS

Improvements to the transportation system are dependent on available resources. Typically, financing has come from a combination of federal and state grants and loans, city revenues, and fees. In recent years, the passage of various state tax initiatives has reduced funding for state and local transportation. At the federal level, budget cuts have reduced transportation funds too.

TRANSPORTATION PLANNING STRATEGIES

COMPLETE STREETS

The concept of “Complete Streets” is to provide a transportation network that provides equitable access to all users throughout the City. Mountlake Terrace’s ongoing efforts to enhance the transportation system for walkers, bicyclists, transit, and vulnerable users, combine to meet the larger goal of providing complete streets. This is being implemented as street improvements are made over time. Implementation of complete street principals is provided for in city code development regulations, Chapter 19.95, Transportation Code, and MTMC.

Creating a well-designed and comprehensive transportation infrastructure for pedestrians and bicyclists in a community has gained popularity in the past several decades. Non-motorized modes create a number of benefits to our residents that include:

- 1] Improving the health of the individual and families;
- 2] Creating a more sustainable environment by reducing greenhouse gas emission;
- 3] Encouraging social interaction and a sense of community; and,

- 4] Discouraging the number of vehicular trips, which, consequently reduces the need for creating and maintaining a costly roadway network.

Walking and bicycling should be convenient, safe, and pleasant. To encourage walking, a community can provide a streetscape sensitive to pedestrians. This effort is enhanced by

- 1] Separating vehicular traffic from sidewalks with planter strips;
- 2] Limiting pedestrian exposure to vehicular traffic at crosswalks by reducing the crosswalk length;
- 3] Providing street furniture in high traffic areas and central business districts; and
- 4] Establishing adequate street-lighting to support safety for pedestrians and bicyclists at night
- 5] Creating an inclusive bicycle facilities network throughout the City to improve cycling safety and connectivity; and,

Designing and creating pedestrian and bicycle infrastructure to eliminate gaps in these facilities so that access to commercial destinations and transit facilities is feasible and eliminates the need of using an automobile for every trip.

TRANSPORTATION MANAGEMENT

Finding creative solutions to deal with growth in population, traffic congestion, and achieving federal air quality standards, is an ongoing effort. One element of this effort that remains constant is finding ways to make our existing transportation system as efficient as possible. This is the role of Transportation System Management (TSM) and includes strategies that minimize additional infrastructure by promoting alternative transportation modes, redirecting travel to different times of day, reducing the need for making single-occupancy vehicle (SOV) trips, improving mobility, reducing travel time.

Despite common perception, few places have a consistent traffic problem – they have a peak hour transportation demand problems. The majority of workers, students, and visitors use roadways at the same time – generally between 7:30 AM and 9:30 AM in the morning and 4:30 PM and 6:30 PM in the evening. This means that streets and highways are congested and challenged to operate efficiently during these peak hours of the weekdays, but generally have abundant capacity during all other times of the weekdays and during all hours of weekend days.

Transportation Demand Management (TDM) is a general term for strategies that increase overall system efficiency, most often by encouraging a shift from single-occupant vehicle (SOV) trips to non-SOV modes, or shifting trips out of peak periods. TDM seeks to reduce auto trips – and hopefully vehicle miles traveled – by increasing travel options, by providing incentives and information to encourage and help individuals modify their travel behavior, or by reducing the physical need to travel through transportation-efficient land uses. The cumulative impact of a comprehensive set of TDM strategies can have a significant benefit on system efficiency, accommodation of new growth, and success of a metropolitan area. TDM programs are usually implemented by public agencies, employers, or via public private partnerships. Examples of TDM strategies are discussed in the following sub-sections.

- **ALTERNATIVE WORK SCHEDULES**

Alternative Work Schedules refer to a variety of schedule options that provide an alternative to the standard 8:00 AM to 5:00 PM workweek. Adjustable work hours can

assist employees in balancing the demands of the workplace with their personal responsibilities and as well as help alleviate commuting frustrations by broadening the capacity needs of roadways by time of day or day of the week. Examples of alternative work schedules include:

- i] Flexible work schedules where employees begin shifts at different times of the day, and
- ii] Compressed work schedules where employees work 80 hours in a ten day work period. For example a 9/80 work schedule consists of eight 9-hour days, one 8-hour day, and one day off in a 2-week period.

▪ **TRAVELER INFORMATION SERVICES**

Traveler information is transforming the way transportation professionals can manage travel demand. Traveler information services has gained popularity over the past decade with the development and use of advanced technologies able to detect, analyze, and disseminate traffic and transit conditions. The traditional information mainstays of radio and TV traffic broadcasts are now being supplemented in many places with travel websites, real-time roadside and "next-bus" displays, e-mail and personal digital assistant alerts. Detailed and up-to-the-minute information is changing when, where, and how we travel and, consequently, helps distribute traffic without building new infrastructure

▪ **ROAD DIETS**

Road diets involve a reduction in the width or number of vehicular travel lanes and reallocate that space for other uses such as bicycle lanes, pedestrian crossing islands, left turn lanes, or parking. Safety and operational benefits for vehicles and pedestrians include

- a] Decreasing vehicle travel lanes for pedestrians to cross,
- b] Providing room for a pedestrian crossing median,
- c] Improving safety for bicyclists when bicycle lanes are added,
- d] Providing an opportunity for on-street parking (which also serves as a buffer between pedestrians and vehicles),
- e] Reducing rear-end and side-swipe crashes,
- f] Improving speed limit compliance, and
- g] Decreasing crash severity when crashes do occur.

▪ **TRAFFIC CALMING**

Traffic calming is a combination of measures that reduce the negative effects of motor vehicle use, alter driver behavior, and improve conditions for non-motorized street users. Traffic calming measures are variable and consist of physical design and other measures put in place on existing roads to reduce vehicle speeds and improve safety for pedestrians and cyclists. For example, vertical deflections (speed humps, speed tables, and raised intersections), horizontal shifts, and roadway narrowing are intended to reduce speed and enhance the street environment for non-motorists. Closures that obstruct traffic movements in one or more directions, such as median barriers, are intended to reduce cut-through traffic. Traffic calming measures can be implemented at an intersection, street, neighborhood, or area-wide level.

TSM actions include a wide range of transportation improvements, from basic traffic engineering to a variety of transit improvements, parking strategies, and pricing policies. Under Department of Transportation (DOT) regulations, urban areas with populations greater than 50,000, are required to develop TSM plans that document their strategy for improving air quality, conserving energy, and increasing the efficiency of the overall transportation system.

TSM places emphasis on reducing traffic congestion by increasing the person-trip capacity of existing transportation systems. Examples of TSM strategies include in the following subsections.

- **TRAFFIC FLOW IMPROVEMENTS**

Roadway restriping, spot widening, channelization, intersection bulb-outs, supplementary turn lanes and elimination of on-street parking are techniques currently used to improve the flow of traffic without new road construction.

- **PUBLIC TRANSIT IMPROVEMENTS**

Additional or modified transit routes, scheduling improvements, bus shelters and public transit access improvements all promote the use of using public transit to get to work, school or other destinations. Consequently, automobile use is reduced by enhancing the appeal of using an alternative travel mode.

- **RIDESHARING**

Whether administered through a local agency or a private employer, ridesharing programs encourage carpooling with the use of incentives and information-sharing platforms to match drivers with similar origins and destinations.

- **PEDESTRIAN AND BICYCLE FACILITIES**

Improving pedestrian and bicycle infrastructure also provide a means to promote an alternative mode to driving alone. These non-motorized travel modes become more appealing when comprehensive sidewalk and bicycle lane networks are improved by eliminating gaps in the network and providing balanced coverage throughout the city, placing bicycle lockers at public transit transfer points and improving operational and safety enhancements for these modes with features such as flashing beacons at crosswalks or bicycle detection at signalized intersections.

- **INTELLIGENT TRANSPORTATION SYSTEMS**

Intelligent Transportation Systems (ITS) technologies advance transportation safety and mobility by integrating advanced communications technologies into transportation infrastructure and into vehicles. Examples of ITS include traffic signal coordination, transit signal priority, traveler information services and adaptive traffic signal control systems in which traffic signal timing changes, or adapts based on real-time traffic demand.

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