VOLUME I - **DRAFT FINAL REPORT**

MAY 2016

CITY OF LAS VEGAS
MOBILITY MASTER PLAN

Photo by Lucky Wenzel

Charleston LRT Rendering

Photo by Dean Aaron

LAS VEGAS MOBILITY MASTER PLAN

PREPARED BY ch2m

ACKNOWLEDGEMENTS

Managing a multimodal transportation network requires coordination among various partners: within the City, with neighboring cities, with the County, and with agencies and departments at the regional and state levels. Many players directly impact the City of Las Vegas' transportation system and many others will be involved in implementing the changes envisioned by this Plan.

Prepared for

The City of Las Vegas, Nevada

Mayor Carolyn Goodman

Councilwoman Lois Tarkanian, Ward 1

Councilman Bob Beers, Ward 2

Councilman Bob Coffin, Ward 3

Councilman Stavros S. Anthony, Ward 4

Councilman Ricki Y. Barlow, Ward 5

Mayor Pro Tem Councilman Steven D. Ross, Ward 6

City Staff

Betsy Fretwell, City Manager

Scott Adams, Deputy City Manager

Jorge Cervantes, Executive Director Community Development

David Bowers, Public Works Director

Mike Janssen, Transportation Manager

Joanna Wadsworth, Assistant City Traffic Engineer

Allen Pavelka, City Engineer

Robert Summerfield, Planning Section Manager

Tammy Christensen, City by Design Coordinator

Stakeholders

Boyd Gaming

Clark County School District

Communities in Schools – Southern Nevada

Governor's Office of Economic Development

Las Vegas Bicycle Coalition

Las Vegas Chamber of Commerce

Las Vegas Convention and Visitors Bureau

Las Vegas Downtown Alliance

Las Vegas Downtown Project

Las Vegas Global Economic Alliance

Las Vegas Indian Center

Las Vegas Medical District

Las Vegas Metro Chamber of Commerce

Las Vegas Metropolitan Police Department

Las Vegas Pauite Tribal Council

Latin Chamber of Commerce

NAACP Las Vegas

National Association of Filipino Americans

National Association of Women Business Owners

NAIOP

Nevada Department of Employment, Training, and Rehabilitation

Nevada Department of Transportation

Nevada Minority Business Enterprise Center

Nevada Partners

Nevada Women's Business Center

NV Energy

Providence HOA

Regional Transportation Commission of Southern Nevada

Southern Nevada Homebuilders Association

Southern Nevada Strong

The Center

UNLV

Union Pacific Railroad

University Medical Center

Urban Chamber of Commerce

Valley Center Opportunity Zone

Consultant Team

CH2M

Bardia Nezhati

Jackie Kuechenmeister

Dan Andersen

Jennifer John

Lisa Valdez

Jill Kramer

Lyle Wilcox

Justin Martin

Applied Analysis

Jeremy Aguero

Beth Maguire

CONTENTS

VOLUME II: TECHNICAL APPENDICES*

Appendix A: Existing Conditions Technical Memorandum

Appendix B: Planned and Programmed Improvements Technical Memorandum

Appendix C: High Level Needs Assessment Technical Memorandum

Appendix D: Bicycle Corridor Improvements Technical Memorandum

Appendix E: Transit-Oriented Development and High Capacity Transit Corridor Selection

Appendix F: Simplified Trips on Project Software Technical Memorandum

Appendix G: 20-Year Transportation Improvement Project Cost Lists

* See provided CD-ROM for Volume 2 documents.

EXECUTIVE SUMMARY

The Mobility Master Plan, under the heading of transportation, is one of four strategic imperatives as part of Las Vegas' City by Design initiative. As a 20-year look-ahead, this long-term plan will help guide transportation decisions and prioritize public investments for the years ahead.

ECONOMIC DIVERSIFICATION | PUBLIC SAFETY AND LAW ENFORCEMENT | EDUCATION | **TRANSPORTATION**

This Plan is guided by **six transportation goals** focusing on developing transportation connectivity; ensuring high quality safe roadways; engaging in the effort to develop the I-11 corridor; providing safe and convenient mobility choices; creating a "smart city"; and fully funding the operations, maintenance, renewal, and expansion of the City's transportation system.

The Mobility Master Plan is organized into the following **four categories of transportation improvements**:

- **Transit Improvements**
- **Bicycle/Multi-use Facility Improvements**
- **Vehicular Mobility Improvements**
- **Pedestrian Safety and Mobility/Complete Streets Improvements**

Each chapter identifies the need, defines the range of potential improvements, establishes the vision and describes specific projects to meet the vision, and presents the benefit and value of implementing the Plan.

An Evolving City

The Town of Las Vegas was officially established in 1905 after the completion of the railroad line connecting Los Angeles and Salt Lake City. What began as a dusty isolated railroad stop is now the most populous city in Nevada; a leading financial, commercial, and cultural center for southern Nevada, and one of the top tourist destinations in the world. By the year 2040, Las Vegas will see a population increase of almost 200,000 residents, dominated by a generation of Millennials (those born between 1983 and 2000) that prefers bikes and trains over cars, and higher density urban living. This Plan accounts for our changing City and the desire to introduce more transportation choice into the system. Las Vegas will diversify its economy toward high-tech manufacturing and will be a world leader in unmanned aerial systems and autonomous vehicles.

Developing the Plan

Participation by City residents has been critical in forming the direction of the Mobility Master Plan. City staff gathered opinions from over 1,000 residents to find out what their needs and wishes are for transportation mobility in the City. Information about the Plan was also distributed through local media, a project website, and presentations to civic and community groups and business associations. A Steering Committee comprised of major stakeholders, met periodically throughout the study to guide and provide input on Plan recommendations. The Plan was also coordinated with other City and regional plans, such as the Downtown Las Vegas Vision 2045 Master Plan and the Southern Nevada Strong Regional Plan.

The City studied the state of practice worldwide for almost every form of transit, and evaluated the roadway network for opportunities to make our streets more complete, reduce congestion, and improve connectivity and safety.

The Solution: Mobility Options

Providing mobility options that work for all people will ensure a future that allows our residents to meet their daily needs. The Mobility Master Plan includes over **180 multimodal transportation improvement projects** for the City of Las Vegas, spanning the 135 square miles of the city and addressing all modes of transportation. The projects range from buffered bike lanes to new interchanges. The common thread tying all of these projects together is the Complete Street concept and a need for higher-order mass transit to support high-volume transportation corridors such as Charleston Boulevard, Rancho Drive, and Maryland Parkway.

Throughout the Plan, a series of projects are featured in more detail, to highlight the different types of improvements proposed throughout the community. These project highlights are just a few of the transformational recommendations that will help us reach our vision of a world-class city, offering a high-quality of life with a diverse and robust economy, and connected and walkable communities.







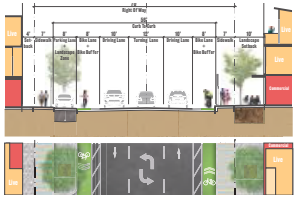












Funding the Plan

Based on the 181 multimodal projects recommended, this Plan identifies a major investment plan for Downtown in concert with the Downtown Master Plan and evaluates potential sources of funding. Through this effort, over $3.2 billion in projects were prioritized.

The street improvement projects, which include bicycle and pedestrian enhancements (estimated at approximately $1.13 billion) are identified as being fundable over the next 20 years, but will require funding from a variety of sources, some of which are dependent on federal government authorizations and others will need approval by local voters. Potential funding sources include the Motor Vehicle Tax, Question 10 Funds, the Fuel Revenue Indexing, Congestion Mitigation and Air Quality Improvement Funds, Surface Transportation Block Grant Program, Southern Nevada Public Land Management Act Funds, room tax capital allocations, and Highway Safety Improvement Program Funds.

The transit projects will require a more creative approach to funding. Unlike the roadway project funding, there are not current defined sources sufficient to support the higher-order transit strategies outlined in this Plan. The Federal Transportation Administration funding programs could potentially fund nearly 50 percent of the $2.1 billion transit program proposed, but the City would still need to find a local revenue source sufficient to offset the funding shortfall. Furthermore, the federal programs are competitive, often require some form of local funding match and are dependent of federal budgets and policy decisions. There is no defined template or single source to fund light rail, each community's funding plan is unique and includes a myriad of funding elements. For example, the RTC is projecting that the Maryland Parkway Urban Light Rail Transit Improvement Project could be operational by 2022, assuming that the federal funds are secured as anticipated. Considering that federal funds are limited and the RTC's needs are extensive, alternative funding sources would be needed to add additional transit projects, such as the Charleston and Rancho lines that are currently proposed in this Plan.

Combined, the Mobility Master Plan includes more than 180 projects with a cost of $**3.2 billion**.

Charleston Boulevard: Transit Commuter Corridor

Rancho Drive: Transit-Oriented Development Corridor

From Plan to Project

This Plan presents recommendations for each of the **six City wards** by four implementation phases. While the overall Mobility Master Plan discusses citywide transportation investments, as well as the future vision for regional transportation facilities, the implementation portion of the Plan only illustrates projects that will be led and constructed by the City of Las Vegas within the next 20 years.

This Plan is meant to be a **living document**. The recommended projects and their timelines may change as projects are completed, and may change based on fluctuating priorities of federal, state, and regional agencies, funding availability, and the necessity to evaluate evolving transportation needs.

Preparing for the Future

The final chapter of this Plan discusses the anticipated changes in transportation mobility in the years to come, with particular focus on autonomous and connected vehicles. Las Vegas takes pride in being a city of innovation. To that end, this Plan outlines specific strategies to promote and deploy new vehicle technologies, putting Las Vegas at the forefront of technological innovation.

www.mobilitymasterplan.vegas

Photo by Dean Aaron

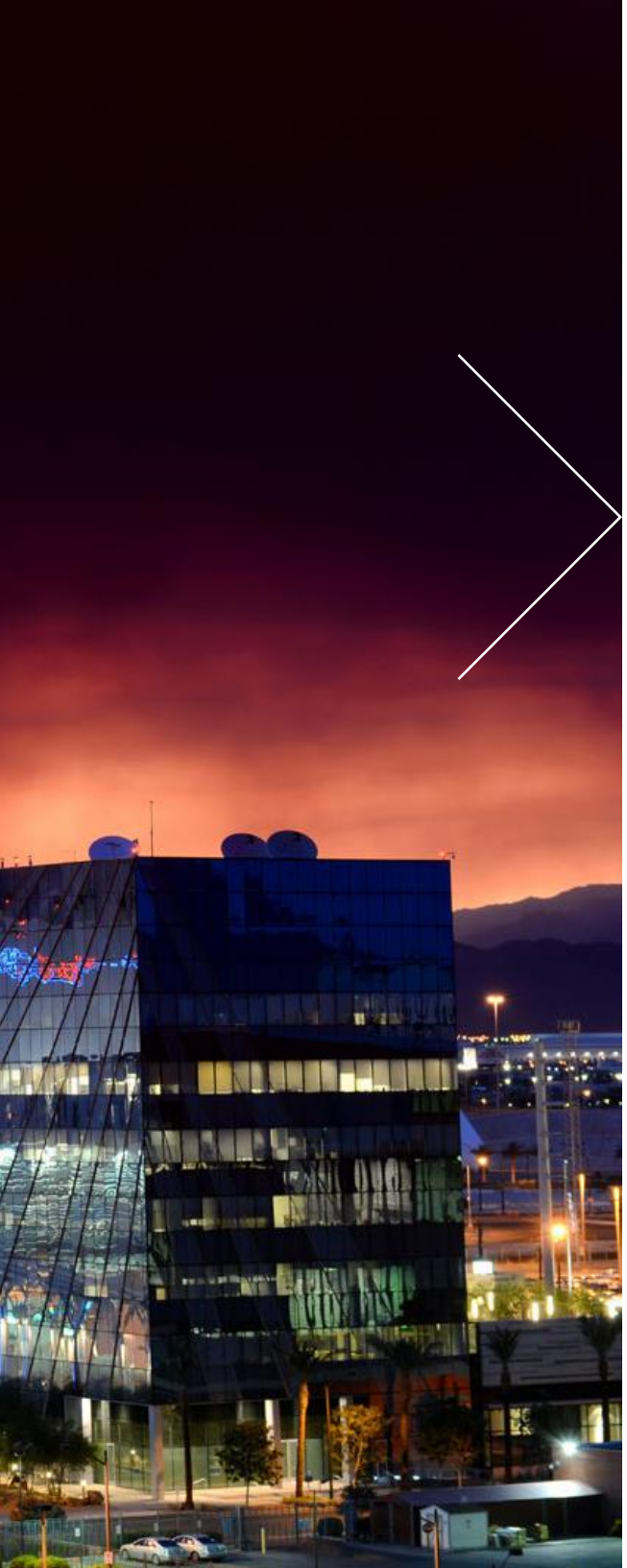


Photo credit: ***Dean Aaron***

PLANNING VISION

In responding to changing social and economic conditions, the City of Las Vegas has identified four renewed areas of focus, known as "City by Design," to form the foundation of a new Citywide Strategic Plan. These include economic diversification, public safety and law enforcement (with a focus on homelessness), education, and transportation. This Mobility Master Plan (Plan) is one of several efforts to foster the City's vision for the future.

GOALS

This Mobility Master Plan identifies projects that will improve mobility for all users; provide our residents, visitors, employers, and employees options for safely arriving at their destinations; and support continued investment in our great city. From the far corners of our City to the Downtown area, transportation investments are key to economic success.

The Las Vegas 2020 Master Plan, adopted in 2000, was developed to provide a broad and comprehensive level of policy direction for future land use decisions and related aspects of planning in the City through the year 2020. In 2000, overarching goals of the City included growth, quality of life, reurbanization, and fiscal responsibility. Since that time, however, growth trends and the preference for mobility choices have changed, as well as the demographics of the City as a whole, and the diversification and growth of different economic activity centers. To that end, our transportation network is designed for people of all ages and physical abilities whether they walk, bicycle, ride transit, or drive.

The Mobility Master Plan, under the heading of transportation, is one of four strategic imperatives as part of Las Vegas' City by Design initiative. The Plan is comprised of four categories of transportation improvements: transit, bicycles/ multi-use, vehicular mobility, and complete streets/pedestrian safety and mobility. As a 20-year look-ahead, this long-term plan will help guide transportation decisions and prioritize public investments for the years ahead.

Specific transportation goals guiding this document include:

- Develop transportation connectivity within the City and externally with Downtown as the hub of a fully connected region. "All roads should lead to Downtown" (Councilman Ricki Y. Barlow).
- Ensure the City of Las Vegas has the highest-quality and safest roads possible.
- Engage in the effort to develop a new Interstate 11 corridor that connects the City and region to global markets and opportunities.
- Provide safe and convenient mobility choices, including vehicular mobility, bicycle and pedestrian connectivity, and widespread transit services.
- Create a "smart city" with intelligent infrastructure that can sense and respond to the environment.
- Fully fund the operations, maintenance, renewal, and expansion of our transportation system to continue to advance infrastructure quality and service.

Our transportation network is designed for people of all ages and physical abilities whether they walk, bicycle, ride transit, or drive.

Looking South Along Casino Center Blvd at the Fremont Street Crossing

WHERE DID WE COME FROM?

The Town of Las Vegas was officially born in 1905 after the San Pedro, Los Angeles & Salt Lake Railroad finished its line between Los Angeles and Salt Lake City. Within weeks, the railroad auctioned off 1,200 dirt lots that became the heart of Downtown Las Vegas, the first step in a century of growth and development that transformed southern Nevada from an isolated, dusty railroad stop into a thriving, iconic metropolis recognized around the world.

While the railroad created the first interstate economic link between southern Nevada and its neighbors, it was the development of the Arrowhead Trail in the early 1910s, followed by the U.S. highway system in the 1920s and the federal interstate system in the 1960s that coincided with the region's decades of explosive expansion. The highway systems capitalized on the American love of the automobile and provided for convenient travel to and from the hotels and casinos sprouting up in southern Nevada.

Through the decades, major infrastructure investments supported and enabled both ongoing and future development throughout southern Nevada. That development began at the original town site of Downtown Las Vegas and since then has spread to all corners of the Las Vegas Valley (the Valley), mainly in the form of large master-planned communities like Summerlin, which sought to accommodate large populations without sacrificing quality of life amenities.

Key Milestones Impacting Transportation:

1905– Las Vegas is officially founded
1911– The City becomes incorporated
1940s–Growing & popular destination for gaming
1955– 8 million tourists visit Southern Nevada
1960– Construction begins on I-15

Photo credit: ***Paula Cook***

Photo credit: ***Christopher Bartel***

Fremont Street, Las Vegas – circa 1920
Photo credit: ***UNLV Special Collections***

WHERE ARE WE TODAY?

The Las Vegas of today is the 29th largest city in the United States, with a population of more than 600,000 residents (U.S. Census, 2014), compared to a ranking of 39th just 16 years earlier. The rapid growth experienced over the last two decades has created new challenges in the area of transportation.

Many areas of the Valley experience traffic congestion, which in turn bears its own transportation impacts. A large portion of Las Vegas residents experience long commutes and the amount of time spent driving continues to rise. Public transit options are at the will of traffic congestion and, therefore, do not always provide enhanced travel times.

Growing traffic is linked with a higher number of traffic incidents, which account for recurring traffic delays. Freight movement is burdened by congestion. The City is aggressively improving pedestrian and bicycle access, comfort, and safety on roadways that were originally built with car-centric features, but there are still many older roadways lacking this balance.

The 42 million tourists that visited Las Vegas in 2015 relied heavily on our transportation system, with 6 out of 10 visitors arriving by car, bus, or other form of ground transportation.

CHALLENGES & OPPORTUNITIES

Nearly **75%** of all commuter traffic in the City of Las Vegas comes from the northwest/western edges of the City into the metropolitan center of the Valley (Downtown and Resort Corridor region).

See Appendix C

Downtown Las Vegas is quickly becoming a place where people want to live, work, and play.

In the future, the street network will be largely built out and maxed out, impacting travel time, safety, visitor experience, the cost of delivering goods, and our economy.

See Appendix F

High capacity transit has the potential to remove many vehicle trips from our congested roadways—as many as **16,000** vehicle trips could be removed from Charleston Boulevard alone on an average weekday.

See Appendix F

34 percent of residents who responded to the Mobility Master Plan Survey have a commute over 30 minutes in length each way—which will increase as the City grows.

94 percent of survey respondents said they would use light rail, or another higher order form of mass transit.

Between 2009 and 2014, nearly 700 vehicle collisions involved a pedestrian incident or fatality within the City.

Source: ***NDOT Crash 2014 data***

The 2015 *U.S. Bicycling Participation Benchmarking Study* cites that **52** percent of people are worried about being hit by a motor vehicle, and **46** percent of adults would be more likely to ride if bicycles were physically separated from cars.

Photo credit: ***The D***

Photo credit: ***Daisy N. Leavitt***

WHAT'S THE OUTLOOK FOR TOMORROW?

The world is constantly changing. Las Vegas faces a number of challenges—some old, some new, some global in nature, and others unique to our region. Let's face our transportation future head on.

A Growing City

The Valley is growing. Over the next 20 years, the region will see about 600,000 new residents (Land Use Working Group, 2016). The street network is largely built out, leaving less opportunity for building new roads, but more opportunity for using existing streets more efficiently to move people better.

Aging Population

In the next 15 years, the number of Las Vegas residents aged 60 and over will more than double (U.S. Census, 2014). An aging population means changes in travel patterns and more people with physical challenges getting around the City. By investing in transportation with accessibility in mind, and providing mobility options that work for all people, we can ensure a future that allows everyone to meet their daily needs.

Millennials

Conversely, 27 percent of Las Vegas' current population are considered "millennials" – or those born between 1983 and 2000, and who now comprise the nation's largest generation (U.S. Census, 2014). This group of young Americans has consistently stated its preference to be less car-focused, as documented in various research and surveys. Fewer high school seniors are obtaining driver's licenses (a decline from 85 to 73 percent between 1996 and 2012). (PIRG, 2014). According to a Rockefeller Foundation survey, more than half (54 percent) of millennials surveyed say they would consider moving to another city if it had more and better options for getting around and 66 percent say that access to high quality transportation is one of the top three criteria they would weigh when deciding where to live.

Source: Fewer high school seniors are obtaining driver's licenses (a decline from 85 to 73 percent between 1996 and 2012) (PIRG, 2014)

Demand for Transit

In various surveys recently completed (RTC, Southern Nevada Regional Planning Coalition, City of Las Vegas General Population Survey), nearly all respondents felt that the region needs a new or expanded form of mass transit to ease mobility for visitors and commuters. Investing in public transportation will allow the region to move a greater number of people more efficiently. With technology constantly changing, it also provides the opportunity to develop an iconic, state-of-the-art rail corridor that can redefine our City.

Revitalizing Downtown

Downtown Las Vegas is quickly becoming a place where people want to live, work, and play. By offering appealing public spaces on the streets, the Downtown's role can strengthen as a gathering place for the City and region. This is already occurring in such locations as the Fremont Street Experience, The 18b The Las Vegas Arts District, Symphony Park, and Fremont East District, and can continue to evolve in new Downtown amenity areas. The Downtown Las Vegas Vision 2045 Master Plan outlines these future amenity areas, along with a range of mobility options to move people to, from, and within the Downtown area.

Derived from City of Las Vegas City by Design initiative

PLANNING FRAMEWORK

As we know, Las Vegas is a great destination to visit, and an even better place to live. Having transportation options that are easy, accessible, and flexible allows our residents to save time and money while promoting their well-being. Transportation choices also allows our visitors to have a good time and want to return, and our trucks to deliver commercial goods when we need it.

How can we move people better? That's what this plan strives to do: change the way we move people.
Provide choices. Transform our city.

Las Vegas may be at the epicenter of innovation, but Rome wasn't built in a day. And we cannot rebuild our transportation system in a night. But, this Plan is our vision. It provides a different way of approaching transportation so that we can change the way we move, and in doing so, transform the way we live.

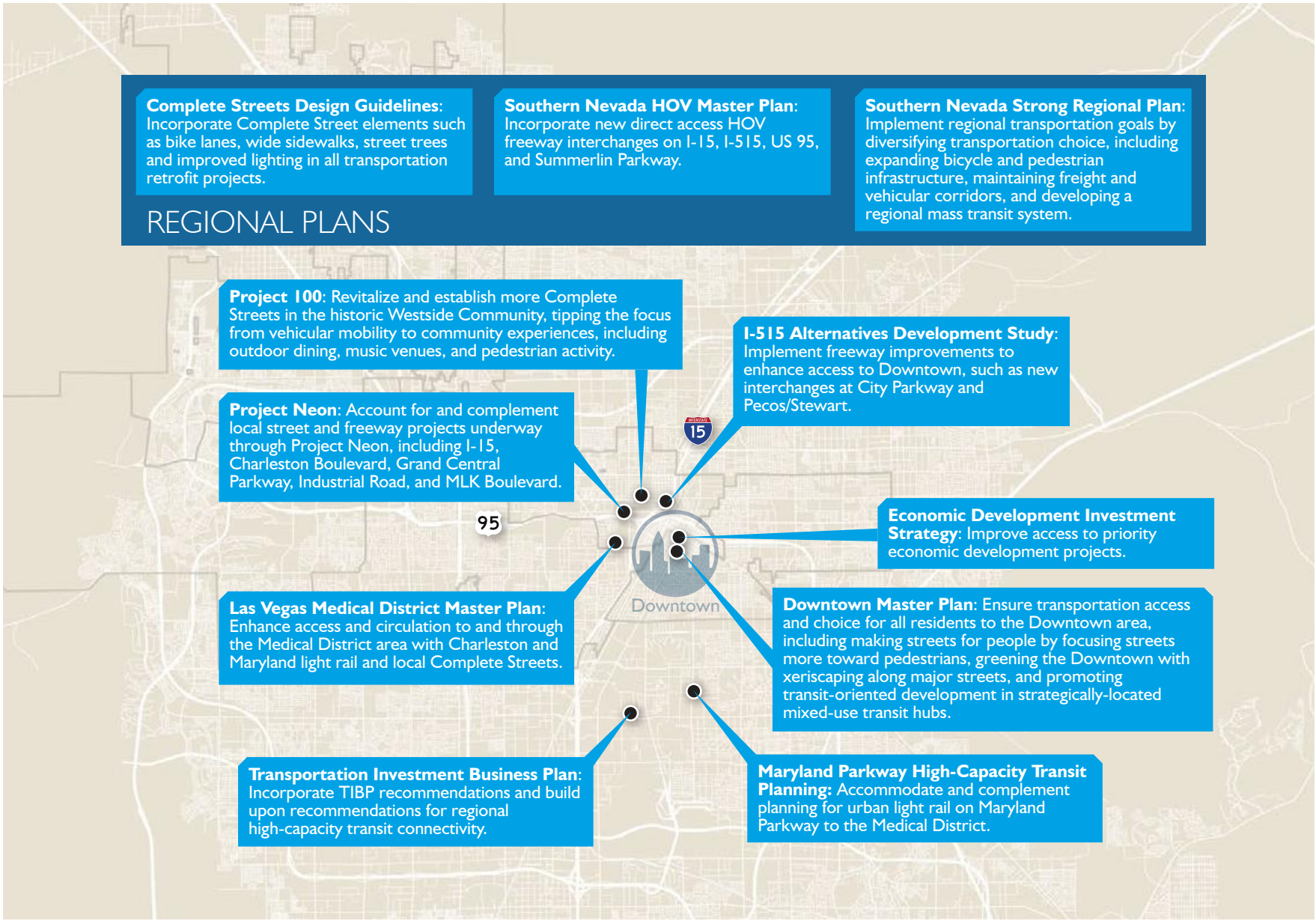
The Plan is comprised of four categories of transportation improvements: transit, bicycles/ multi-use, vehicular mobility, and complete streets/ pedestrian safety and mobility. Each chapter establishes the problem, defines the range of potential improvements, delineates specific projects, and presents the benefit and value of implementing the Plan.

The City continues to grow and become more dynamic as we attract new residents, visitors, and businesses to the Valley. Therefore, this report is intended to be a living document. It lays the foundation for an interconnected network of transportation investments, but as the City evolves over time, so should this Plan, providing a blueprint for us to move forward, build upon our past successes, and rise to meet new and emerging challenges.

Coordination with Other Plans

Several other planning efforts are recently completed or underway in the region, with direct implications to the City of Las Vegas transportation system. This Plan is consistent with these guidance documents, providing further direction in establishing priorities for future funding and policy decisions (Figure 1-1).

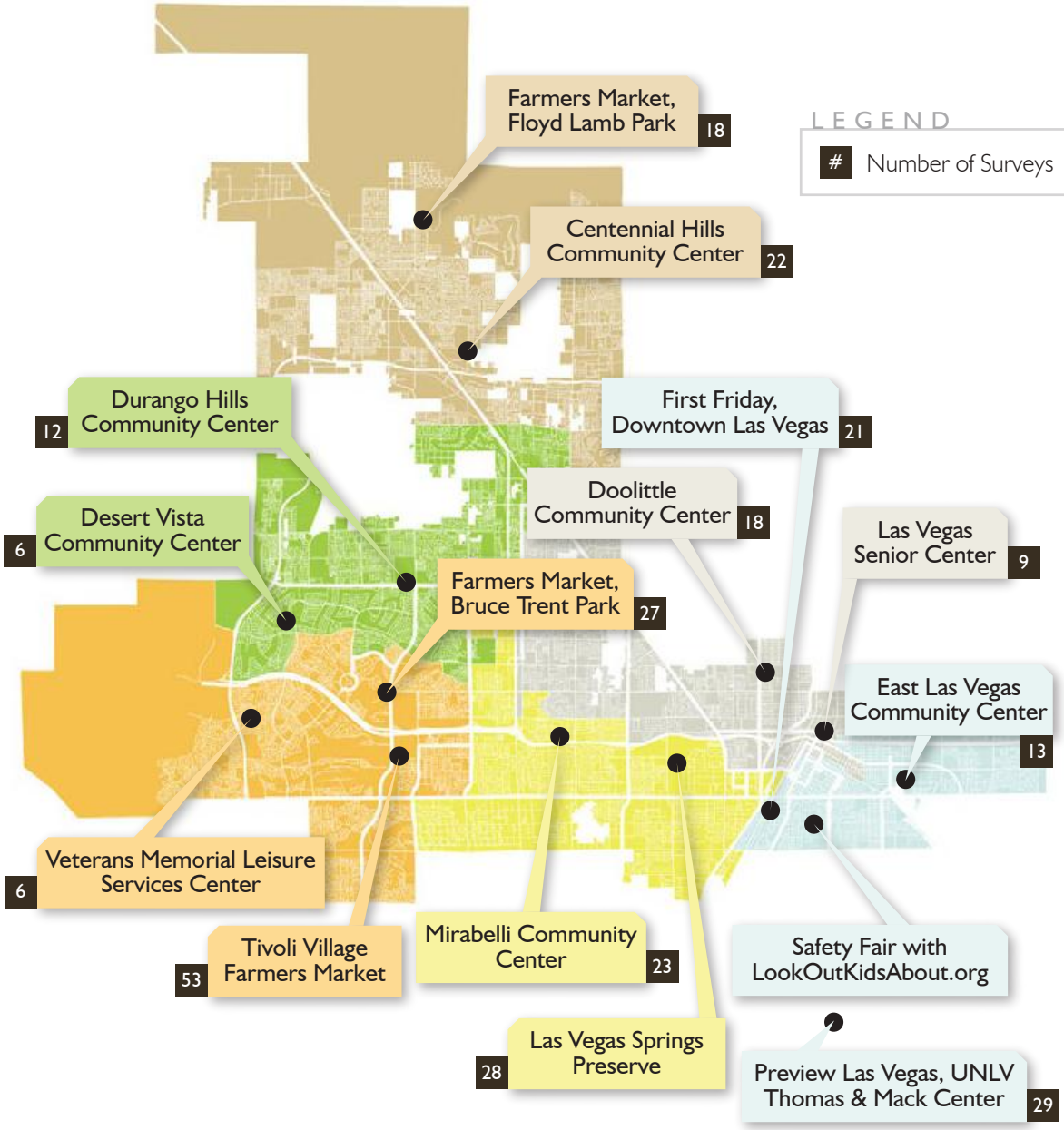
FIGURE I-1. Regional Mobility Planning Coordination



PUBLIC PARTICIPATION

Participation by City residents has been critical in forming the direction of the Mobility Master Plan. Early in the study process, City staff went out to the community to gather opinions from a large and diverse group of residents, visiting community centers, weekend farmer's markets, and local neighborhood events, shown on Figure 1-2. Interested citizens were asked a series of questions about their transportation priorities. These questions were printed on large poster boards and respondents were asked to place dots on the boards, allowing respondents to see how others felt about the same topics and receive immediate feedback. Additionally, a website was created that allowed online commenting and up to date progress: http://mobilitymasterplan.vegas/.

On February 9, 2015, *KLAS-TV Channel 8 News Now* ran a story during the evening news programs and provided the link to the on-line version of the Mobility Survey. Additionally, numerous presentations were made to civic and community groups, such as *The American Institute of Architects, Southern Nevada Tourism Infrastructure Committee, Southern Nevada Bicycle Coalition, Strategic Planning Community Outreach Event, and City of Las Vegas City Council meetings.* Furthermore, a Steering Committee comprised of major stakeholders, met periodically throughout the study to guide and provide input on Plan recommendations. **Through these combined efforts, over 1,000 responses to the Mobility Survey were received, and thousands more citizens were introduced to the study.**



This is just the beginning!

As the Public Works Department, along with staff from the Planning Department and the Department of Operations and Maintenance, begin to implement the transportation recommendations in this Mobility Master Plan, every project will have more focused outreach to each adjacent neighborhood, in accordance with the City's Public Works Outreach Policy and Procedures, as individual projects move from planning to design to construction.

Floyd Lamb State Park

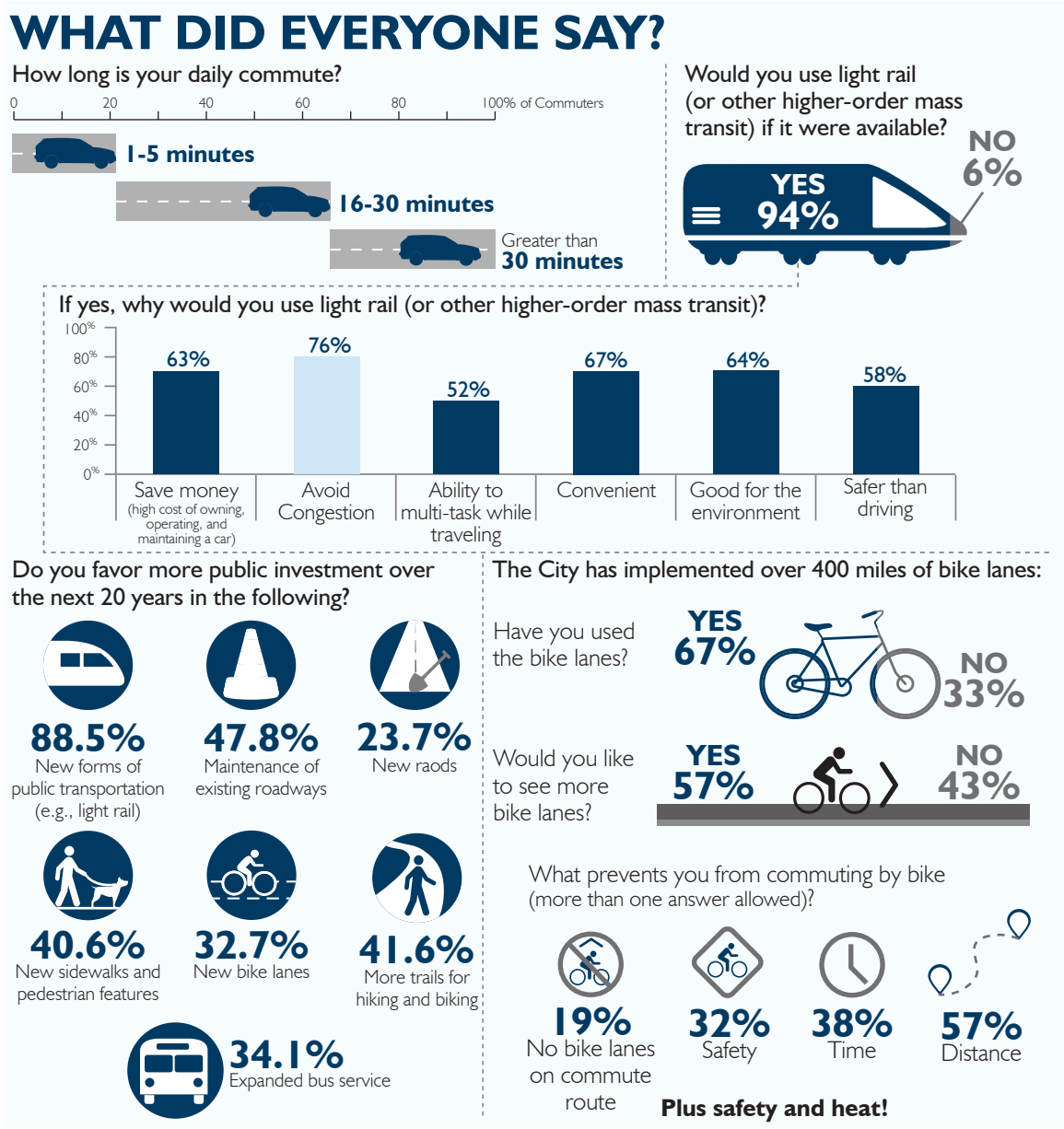
The Mobility Survey asked if respondents had any suggestions for improving transportation access, mobility and safety. Common suggestions included:

- Senior citizens would use light rail for distant travel—they do not like driving far
- More off-street trails
- More separation between bike lanes and the road on higher-speed roadways
- Put bicycle lanes on lower-traffic streets, especially to and around schools and parks
- More visible markings/striping for bike lanes
- Better connectivity between bike lanes
- Don't allow bike lanes to end at intersections

Through the Southern Nevada Strong regional planning effort, residents across the Valley stated many of the same wishes:

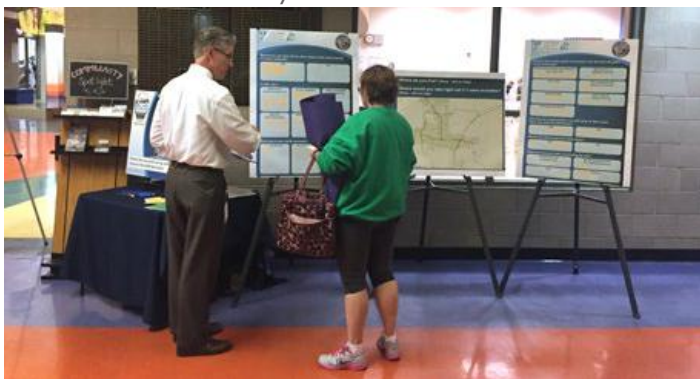
- Develop a safe, high quality comprehensive transportation system that allows travelers choices including reliable and convenient mass transit, walking, cycling, and driving
- Pursue a high speed, mass transit system, such as light rail or similar technology, that rivals other metropolitan regions in the nation, beginning along segments with greatest potential for success
- Design or retrofit communities and streets to improve safety and ease of movement for pedestrians, cyclists and vehicles
- Provide a transportation system that addresses the needs of our low income communities

Transit desirability was reiterated in the City's 2015 General Population Survey which found that roughly 6 in 10 respondents said they would use light rail or some other type of higher order transit system if it were available in the City of Las Vegas.

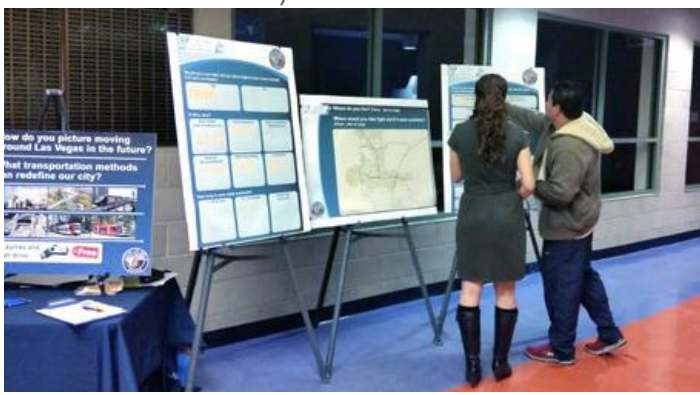


Trent Park

Centennial Hills Community Center



Centennial Hills Community Center



MAJOR PROJECT HIGHLIGHTS

The Mobility Master Plan includes over 200 multimodal transportation improvement projects for the City of Las Vegas, spanning the 135 square miles of the city and addressing all modes of transportation. Throughout the document, a series of projects are featured in more detail, providing greater understanding to the differing types of improvements proposed throughout the community to transform the way we move. Figure 1-3 presents these projects and their location in the city. The images to the right include the page number the featurette is located to learn more information.

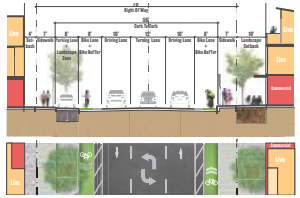


FIGURE I-3. Major Project Highlights Location Map

Summerlin Parkway Looking West of Rampart

MTS Orange Line, San Diego, CA

SDX on Dedicated Bus Lanes

Photo credit: **RTCSNV**

2

TRANSIT IMPROVEMENTS

Bonneville Transit Center

Photo credit: ***RTCSNV***

THE NEED

A strong public transit network is a key component to a great transportation system. The Las Vegas region has a robust local and express bus network, but the desire exists for more.

Why transit? The greatest number of commuters in Las Vegas travel from the northwest and west into Downtown Las Vegas, the Resort Corridor, and McCarran International Airport. Streets are already congested leading into the Valley's core, and as the edges of the City continue to build out and redevelop, more people will want to travel into the core, and congestion will only continue to worsen (Figure 2-1).

Why not build more roads?

Adding more lanes attracts more drivers, expands our ability to travel, and results in sprawling development. This is the story of suburban development that boomed post-World War II. Today, 45 percent of Las Vegas residents travel between 16 and 30 minutes to get to work each day; 34 percent have a commute more than 30 minutes. The most rapidly expanding areas of the City are on the metropolitan edge, even though many underutilized and vacant properties exist in the regional core.

As development continues in areas such as Summerlin and Skye Canyon, the road network alone will not be adequate to deliver travelers to their destinations expediently. Thus, the critical question is not whether transit options should be considered, but rather, what are the most effective transit modes and corridors to serve Las Vegas residents?

The **Southern Nevada Strong** regional planning effort revealed that **83%** of residents in the region want to "pursue a **high-speed, mass transit system,** such as **light rail** or **similar technology**, which rivals other metropolitan regions in the nation, beginning along segments with **greatest potential for success**."

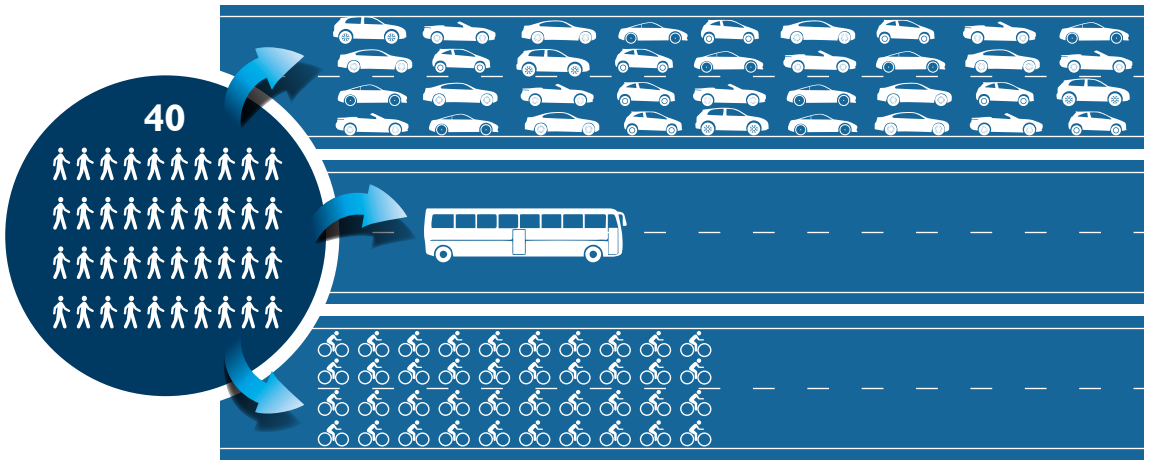
Via this Plan's Mobility Survey, **94%** of residents would "use **light rail**, or other **higher order mass transit**, if available."

When asked what form of public investment is the **top priority** over the **next 20 years**, **89%** those responding to this Plan's Mobility Survey requested "**new forms of public transportation**," over new roads, expanded bus service, roadway maintenance, sidewalks, and bike lanes.

The City of Las Vegas 2015 General Population Survey Results found that nearly **6** in **10** residents **58%** would use light rail or some other type of **higher order transit** system if it were available to get around the City.

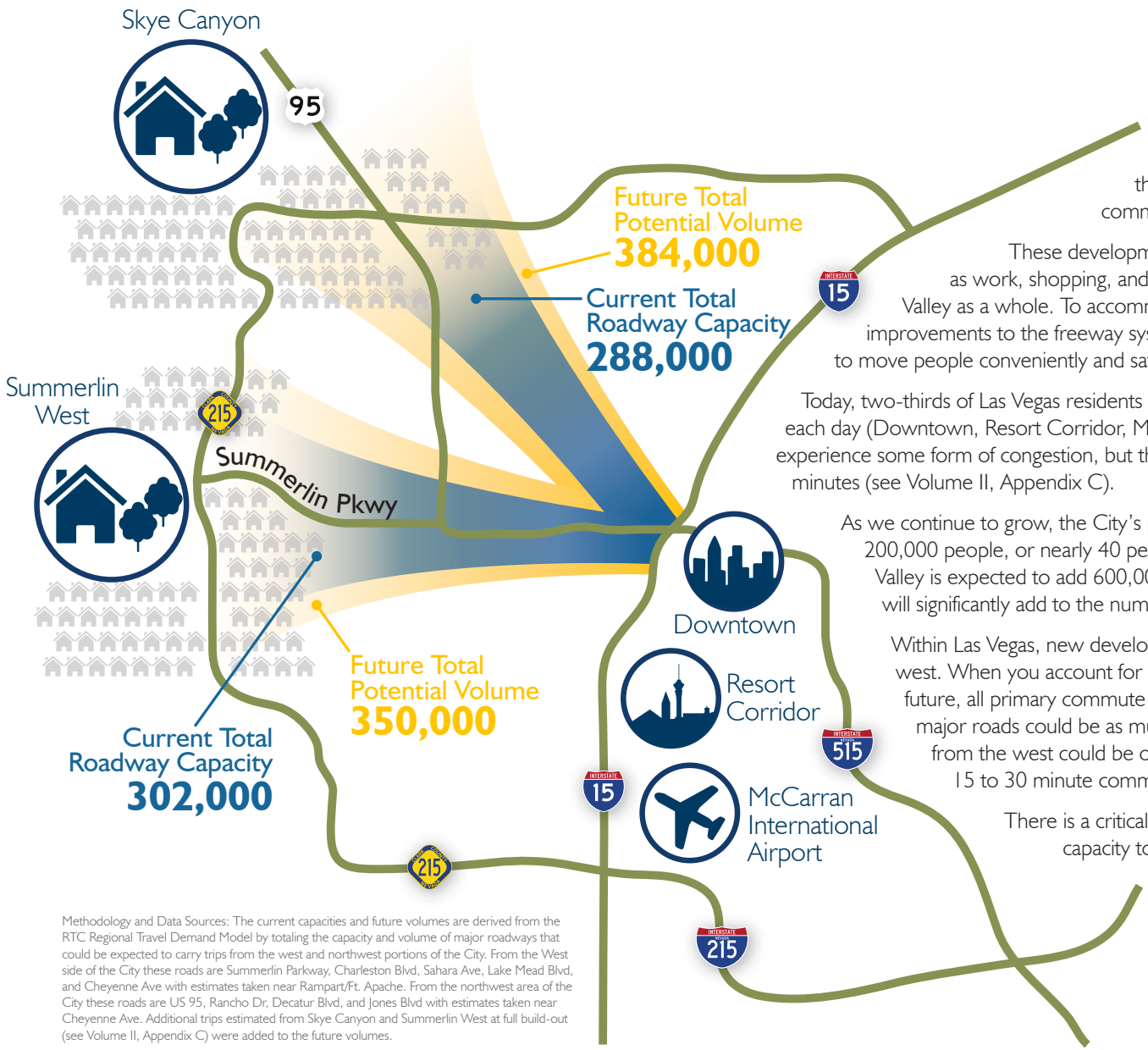
Understanding Congestion

Amount of space required to transport the same number of passengers by car, bus, or bicycle



In the Las Vegas Valley the average vehicle occupancy for home-based work trips is 1.1 persons per vehicle (RTC Travel Demand Model).

FIGURE 2-1. 2035 Travel Implications of Future Development



Methodology and Data Sources: The current capacities and future volumes are derived from the RTC Regional Travel Demand Model by totaling the capacity and volume of major roadways that could be expected to carry trips from the west and northwest portions of the City. From the West side of the City these roads are Summerlin Parkway, Charleston Blvd, Sahara Ave, Lake Mead Blvd, and Cheyenne Ave with estimates taken near Rampart/Ft. Apache. From the northwest area of the City these roads are US 95, Rancho Dr, Decatur Blvd, and Jones Blvd with estimates taken near Cheyenne Ave. Additional trips estimated from Skye Canyon and Summerlin West at full build-out (see Volume II, Appendix C) were added to the future volumes.

Planning for the Future: Accommodating Growth in Las Vegas

The majority of land within the City of Las Vegas is built-out, with development in the next 20 years focused on filling in vacant parcels on the outskirts of the City, particularly in large entitled master planned communities such as Summerlin West and Skye Canyon.

These developments will generate a substantial number of trips, such as work, shopping, and school, and will impact congestion levels within the Valley as a whole. To accommodate these extra residents, we'll not only need improvements to the freeway system and street network, but also new transit options to move people conveniently and safely.

Today, two-thirds of Las Vegas residents commute into the center of the Valley for work each day (Downtown, Resort Corridor, McCarran International Airport). Most major routes experience some form of congestion, but the average commute still ranges from 15 to 30 minutes (see Volume II, Appendix C).

As we continue to grow, the City's population is expected to increase by more than 200,000 people, or nearly 40 percent by 2040. On a regional level, the Las Vegas Valley is expected to add 600,000 residents (Land Use Working Group, 2016). This will significantly add to the number of trips on our roadways.

Within Las Vegas, new development will primarily be located in the northwest and west. When you account for how much more traffic this adds to our system in the future, all primary commute corridors will be over capacity. From the northwest, major roads could be as much as 130 percent over capacity, and major roads from the west could be operating 115 percent over capacity. Today's typical 15 to 30 minute commute will lengthen and become much less reliable.

There is a critical need to increase transportation infrastructure capacity to serve future growth, as well as provide residents with choices on how they commute to work. Among others, this includes widening US 95 and Summerlin Parkway, completing CC-215, and adding high capacity transit to Rancho Drive and Charleston Boulevard.

THE MODES

A variety of transit modes are considered to meet differing trip purposes. For example, freeway express bus excels at delivering commuters from the metropolitan edge to the core with limited stops and the ability to travel at higher speeds, potentially in high-occupancy vehicle (HOV) lanes. BRT, light rail transit (LRT), and streetcars also move large numbers of people efficiently, although they are more ingrained in the community, fostering a more active street environment. Local bus is a lower-speed option with more stops, while circulators tend to move in a looping pattern around one activity center, like a downtown area.

In 1992, the RTC assumed responsibility from a private operator to manage public transit services in the Las Vegas area. Annual local transit ridership has increased from 22 million in 1994 to more than 66 million in 2015, an increase of over 200 percent. Recent data from the RTC indicate that the agency has a farebox recovery rate over 1.0 for all routes including routes along the Resort Corridor, and over 2.0 along the Resort Corridor. With 57 million riders in 2011 the RTC was identified as the 19th busiest transit system in the nation; by 2015, ridership had increased by an additional 9 million passengers.

SDX on Casino Center

Tuscon, Arizona Streetcar

Waikiki, Hawaii Trolley Bus

TABLE 2-1. Transit Mode Facts

What are our options for transit?	What is it? Where does it go? And when do I use it?	How many people can it carry per hour during rush hour?	How fast does it go on average?	Where does it stop?	When can I get on?	
					Rush Hour	Rest of the Day
Light Rail Transit	Light rail is an electrified train that generally operates in separate right-of-way (ROW) or dedicated lane within the street; light rail generally link multiple train cars to add capacity over other forms of transit. Light rail generally connects destinations up to 20 miles. » *Typically used to make higher-speed, high-demand regional connections, with strong commuting peak periods.*	9,420	20-40 mph	0.3 to 1 mile	5-10 minutes	20 minutes
Streetcar	Streetcar is an electrified train that generally runs in mixed traffic, sharing a lane of travel with cars. Streetcars tend to make shorter connections, under 5 miles in length. » *Typically used to make moderate-demand local connections, with steady all-day demand.*	1,080	10-35 mph	A few blocks up to 0.5 mile apart	5-10 minutes	20 minutes
Bus Rapid Transit	Bus rapid transit operates similarly to light rail, usually in separate ROW or dedicated lane within the street; vehicles tend to be larger and bus stops have more amenities than local bus routes. » *Typically used to make higher-speed, high-demand regional connections, with strong commuting peak periods.*	2,700	20-40 mph	0.3 to 1 mile	5-10 minutes	20 minutes
Freeway Express Bus	Freeway express bus generally uses HOV lanes on freeways to maintain higher speeds during peak travel. » *Typically used to make connections between a metropolitan core and edge communities/suburbs.*	900	Varies; operating in HOV lanes allows to better maintain freeway speed limit	Generally limited or no stops between end points	10-30 minutes	30-60 minutes
Local Bus	Local bus operates in mixed traffic along major arterials, generally making linear connections across a metropolitan area and stopping frequently. » *Used for many purposes; typically slower travel times with many interim stops between major destinations.*	600	10-20 mph	0.2 to 0.5 mile	10-30 minutes	30-60 minutes
Circulator	Circulator operates in mixed traffic in urbanized areas, like a downtown or city center. Generally creates a looping route with frequent stops. » *Typically used to make shorter, lower-demand trips within one activity center.*	300	10-15 mph	On demand	5-10 minutes	5-20 minutes

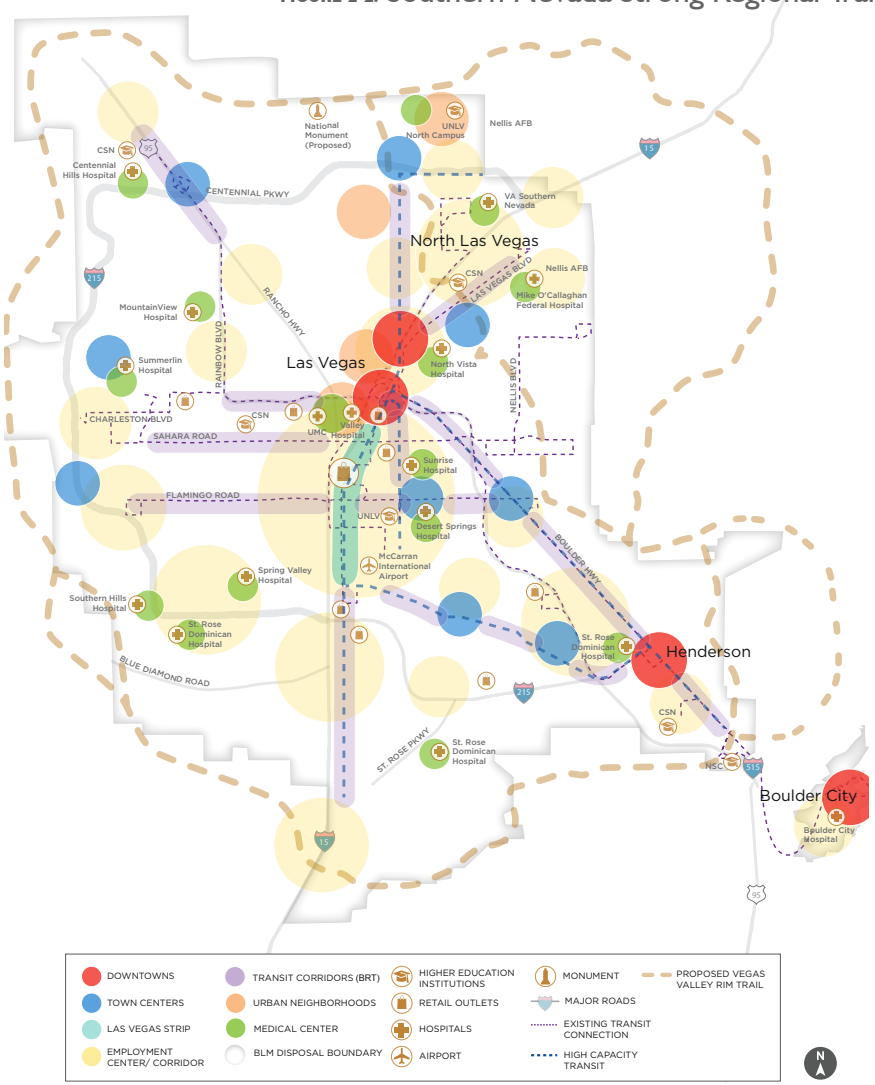
THE TRANSIT VISION

To realize success of a public transit system, it must transcend jurisdictional boundaries to form connections throughout the region – transferring people from home to work to school and other destinations.

In Southern Nevada Strong's Regional Plan, an interconnected web of high-capacity transit is proposed to connect downtown and town center areas, traversing urban neighborhoods and employment centers. Some of these corridors already have successful transit routes in operation, while other connections are identified to form the basis of more detailed study at the city level.

The RTC is moving forward with two transit spines in the core of the region, light rail transit along Maryland Parkway and Las Vegas Boulevard. Both corridors were most recently recommended in the RTC's *Transportation Investment Business Plan* (TIBP), which focused on transportation needs in the core of the region – specifically the Maryland Parkway Project will connect local destinations while the Las Vegas Boulevard Project will connect visitors to McCarran International Airport the Resort Corridor/convention district, and Downtown Las Vegas. They will form the backbone for a regional transit system that connects the workforce with the workplace. Corridors established as part of this Plan are intended to support the base transit network established by the RTC in the TIBP.

FIGURE 2-2. Southern Nevada Strong Regional Transportation Plan



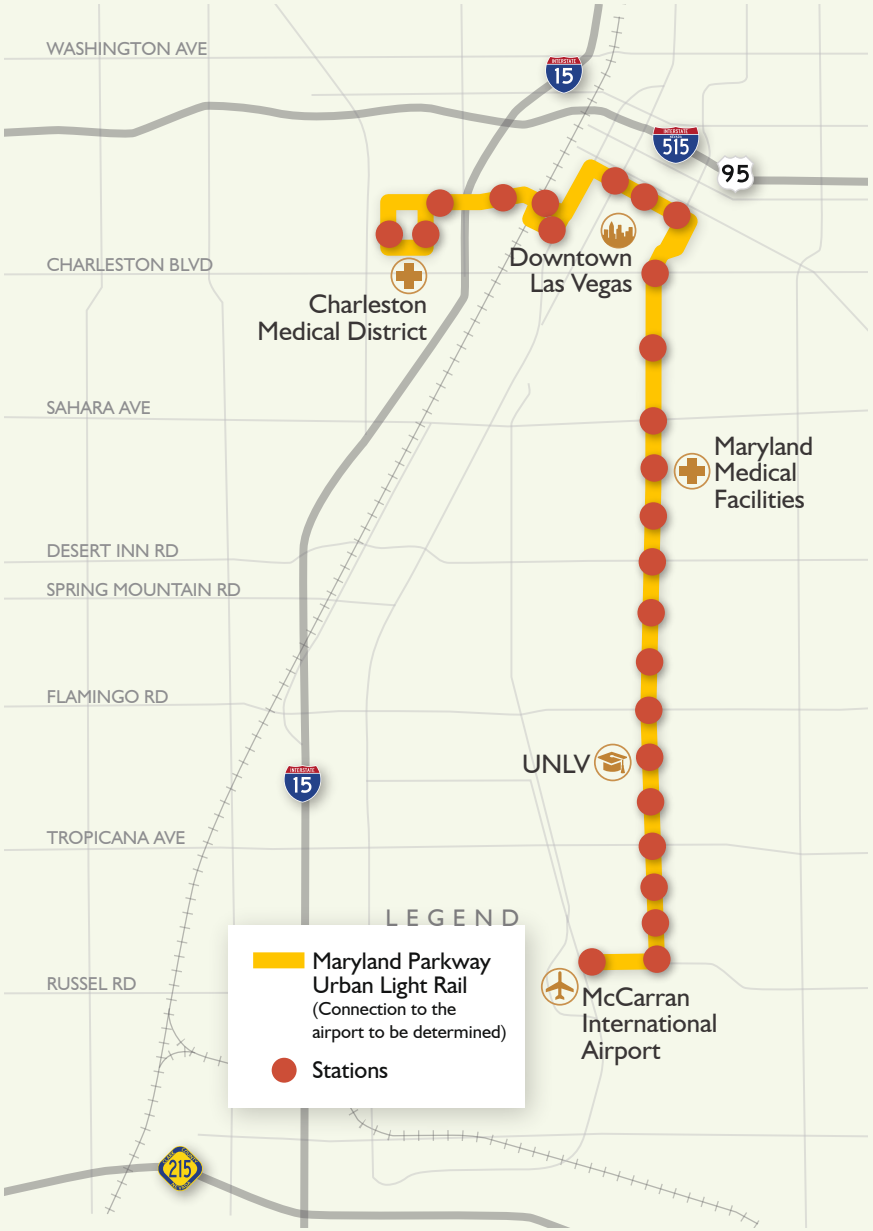
Maryland Parkway Urban Light Rail

Maryland Parkway is a vital corridor for the Las Vegas Valley that connects McCarran International Airport, downtown Las Vegas, and many high-activity centers, such as the UNLV main campus, UNLV School of Architecture Downtown Design Center, UNLV medical and science schools, Boulevard Mall, Sunrise Hospital, as well as numerous commercial and residential areas. In March 2016, the existing bus service served nearly 10,000 passengers each weekday. The RTC recognizes that the Maryland Parkway corridor could greatly benefit from a substantial investment in transportation infrastructure, as well as support urban development in the Las Vegas core. Because of the multitude of more closely spaced corridor destinations, a side-running urban light rail corridor is proposed. With this investment, ridership on Maryland Parkway is expected to increase from 9,000 daily riders to 15,000 daily riders – a change of 67 percent (per the ongoing Maryland Parkway Environmental Assessment). Planning is currently underway to determine specific operating characteristics. Figure 2-3 shows the preliminary alignment.

Maryland Parkway Urban LRT Visualization

Source: **RTC**

FIGURE 2-3. Proposed Maryland Parkway Urban Light Rail



This Plan builds upon this transit spine in the core of the region to foster an interconnected network of regional high-capacity transit corridors combined with enhanced local transit options – driven by the desire to offer transportation choice for residents, provide reliable and frequent transit service that is convenient and safe, and reduce single-occupancy vehicle trips to decrease congestion. Figure 2-4 presents the long-term vision of regional transit in the City.

Regional High-Capacity Options

Rancho Drive and Charleston Boulevard were identified as future regional high-capacity transit corridors within the City based on a data-driven analysis of factors such as transit ridership, travel demand origin-destination data, employment and population cores, transit-conducive land use, and socioeconomic factors. Each of these corridors is envisioned to host LRT running in exclusive transitways. Decatur Boulevard is planned to be upgraded to host BRT through the core of the Valley, operating similarly to the BRT service on Sahara Avenue, Boulder Highway, and Flamingo Road. Planning for rail-based transit on Maryland Parkway and Las Vegas Boulevard is being led by the RTC*. This analysis will be integrated into the RTC's *Las Vegas Valley Transit System Development Plan*, which will begin the process of being updated in the summer of 2016.

* In March of 2016, over 3,000 passengers used the Rancho Drive/Centennial Hills bus route on a typical weekday, and over 12,000 passengers used the Charleston Boulevard service.

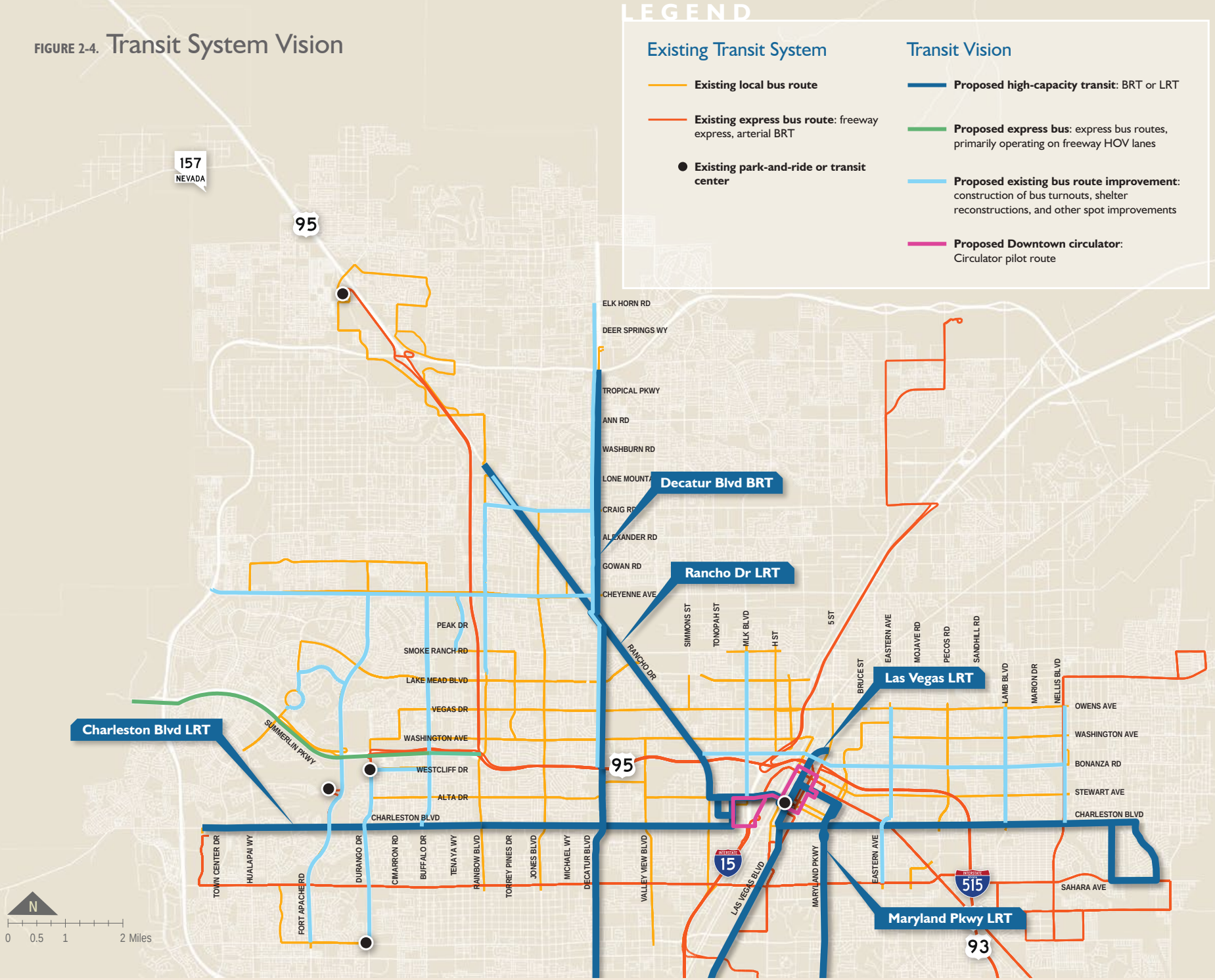
Enhanced Transit Operations

Several corridors have proposed bus route improvements. These are existing high-volume local bus routes that may receive a number of improvements to increase operational performance and/or the overall user experience for people who walk and take transit. Enhancements may include streetscape improvements to make walking safer and easier; bus pullouts; bus shelter relocations to back of sidewalk; signal prioritization; dedicated lanes; and/or other operational improvements to increase travel efficiency. All of these routes intersect with the proposed high-capacity transit routes, creating a network of north-south and east-west transit connectivity. Furthermore, the City will continue to work with the RTC to expand fixed route bus coverage to growing areas of the city where limited transit currently exists.

In the summer of 2016 the RTC will begin updating the *Las Vegas Valley Transit System Development Plan* (RTC, 2002). Many of the recommendations identified in 2002 have been implemented, including implementation of the Express Route system and improvements to routes on Sahara Avenue, Boulder Highway, and (soon-to-be-completed) Flamingo Road. This two year study will assess the existing transit network and surrounding land uses, and make recommendations for future transit investment. Analysis will include market research and testing high capacity transit scenarios with the goal of identifying high quality, productive transit systems supported by compact walkable and transit-oriented places.

Salt Lake City Light Rail (TRAX)

FIGURE 2-4. Transit System Vision



Charleston Boulevard: Transit Commuter Corridor

Charleston Boulevard, among other streets, is a back bone corridor within the City. It connects the western and eastern edges of the City, traversing Summerlin Town Centre, Boca Park, the College of Southern Nevada, the Las Vegas Medical District, Downtown, and eastern Las Vegas. The corridor transports between 30,000 and 55,000 vehicles each day depending on the segment, moving people between work, school, and home, as well as serving local goods movement. Additionally, more than 12,300 people utilized the Charleston Boulevard bus route each day in March 2016.

Route 206 - Charleston Boulevard, is one of the highest commute routes in the system, ranked third behind the Deuce and Strip to Downtown Express (SDX) routes. Based on 2015 census data, this route serves approximately 184,000 residents, and provides access to nearly 100,000 jobs within a 1/2 mile of the corridor (RTC Travel Demand Model).

Charleston Boulevard offers the greatest opportunity to support traditional vehicular commuting with enhanced transit service, with a vision to implement center-running light rail in exclusive ROW. Depending on choices related to stop spacing and stop frequencies, this route has the potential to triple the number of current riders in the future.

Passing through the Las Vegas Medical District and into Downtown, this route is expected to generate higher volumes of pedestrian and bicyclist traffic and, therefore, the street improvement plan is the most aggressive of all transformational projects – expanding the street's current width to safely accommodate all modes: vehicles, light rail trains, bicycles, and pedestrians. This will form an east-west spine of the planned fixed guideway transit system for the region, including RTC's plans for light rail transit along Las Vegas Boulevard through the Resort Corridor into Downtown and along Maryland Parkway with an extension to the Las Vegas Medical District. The Charleston route will extend eastward to Sloan Lane, serving the residential neighborhoods of east Las Vegas, where one in every third household does not own a vehicle (U.S. Census Bureau, 2014 American Community Survey).

The following sketch shows a future concept for Charleston Boulevard that creates a comfortable and safe travel environment for all residents, including:

- Center-running light rail
- Travel lanes to accommodate personal vehicles and local delivery trucks
- Bike lanes for cyclists making the connection to home, work, or school
- Wide sidewalks, buffered from moving traffic by street trees and the bike lane

Charleston Route 206 has the 3rd most monthly ridership in the entire network only behind The Strip's Deuce and the SDX.

Source: RTCSNV Monthly Fixed Route Ridership Report, March 2016

FIGURE 2-5. Charleston Boulevard

Existing

Visualization

Rancho Drive: Transit-Oriented Development Corridor

Transit-oriented development, or TOD, is a type of community development that includes a mixture of housing, office, retail, and/or other amenities integrated into a walkable neighborhood and located within a half mile of quality public transportation. TOD creates better access to jobs, housing, and opportunities for people of all ages and incomes (Reconnecting America, 2015).

While TOD opportunities are present throughout the City, Rancho Drive was identified as a priority corridor for this project improvement for its ability to truly affect desirable change and available land. Rancho Drive's bus ridership today is driven mainly by the number of destinations along the route. The corridor has the ability to foster new growth around transit because of the diverse and complementary high-activity uses along the corridor, combined with a large number of vacant parcels for redevelopment. Approximately 22 percent of the parcels along the corridor are ideal for TOD—either vacant, underutilized, or larger (greater than 10 acres).

Because the highest potential for TOD/redevelopment depends on underlying transit service and an active pedestrian realm, some form of high-capacity transit (LRT or BRT) is proposed to replace current bus service on Rancho Drive. Both LRT and BRT, when implemented in a dedicated lane, stops frequently enough to create a robust walking environment, but provides sufficient enhanced service over current operations to ensure that trips are more efficient. Operating in exclusive ROW, this route will demonstrate a commitment to investments in the corridor and assurance that the route will remain in place.

Benefits of TOD*

- Reduced household driving and, thus, lowered regional congestion, air pollution, and GHG emissions
- Walkable communities that accommodate more healthy and active lifestyles
- Increased transit ridership and fare revenue
- Potential for added value created through increased and/or sustained property values where transit investments have occurred
- Improved access to jobs and economic opportunity for low-income people and working families
- Expanded mobility choices that reduce dependence on the automobile, reduce transportation costs, and free up household income for other purposes

* **SOURCE:** *Reconnecting America, 2015*

FIGURE 2-6. Rancho Drive

Existing

Visualization

Assessing the Options: Using FTA's STOPS Modeling Platform

Beginning to think about implementing high-capacity transit in the City involved more than just gathering public opinion. The Federal Transit Administration (FTA), which oversees implementation and provides financial and technical assistance to local public transit systems, developed a tool to provide insight into the impact of proposed transit corridors, such as what introducing a new transit line will do to overall travel in a corridor and/or how many people will reasonably use transit with the introduction of new service in the future.

This tool is known as Simplified Trips on Project Software (STOPS). STOPS uses current datasets such as the Census and local transit ridership data, including on-board surveys if they are available, to forecast alternatives and understand how these would perform in the local setting. For the City of Las Vegas, four alternative transit scenarios were modeled along Charleston Boulevard and Rancho Drive; **all scenarios assumed implementation of the Maryland Parkway urban light rail**:

- **Local bus** – establishing a baseline condition if no improvements were made over existing transit service
- **High Capacity Transit** – moving from standard local bus to premium transit, which could be BRT or Streetcar, operating in mixed traffic with the flow of cars, and with a slight improvement (18 percent) in travel time due to transit signal priority
- **Light rail** – moving to full rail-based transit with higher passenger capacity than BRT or streetcar, operating in a dedicated center lane, with broader transit stop spacing, and increased travel time savings (20 percent) due to an exclusive running-way and less frequent stops
- **Enhanced light rail** – builds upon light rail scenario, with more aggressive frequencies and travel time savings (40 percent), allowing trains to arrive in shorter intervals and serve more people

Figure 2-7 shows the magnitude of ridership changes by deploying different operating scenarios. Enhanced light rail, or light rail in a dedicated transit lane with increased frequencies over today's bus route, provides the greatest opportunity to induce change to the current transportation system. In combination with the planned Maryland Parkway and future Las Vegas Boulevard routes, Charleston Boulevard and Rancho Drive can form the framework for a regional rail-based transit system that can be extended to serve transit riders throughout the County, including the cities of North Las Vegas and Henderson.

FTA STOPS MODELING SUMMARY

Existing Average Annual Ridership Made by Households in Region (Source: RTC 2014 Travel Demand Model)

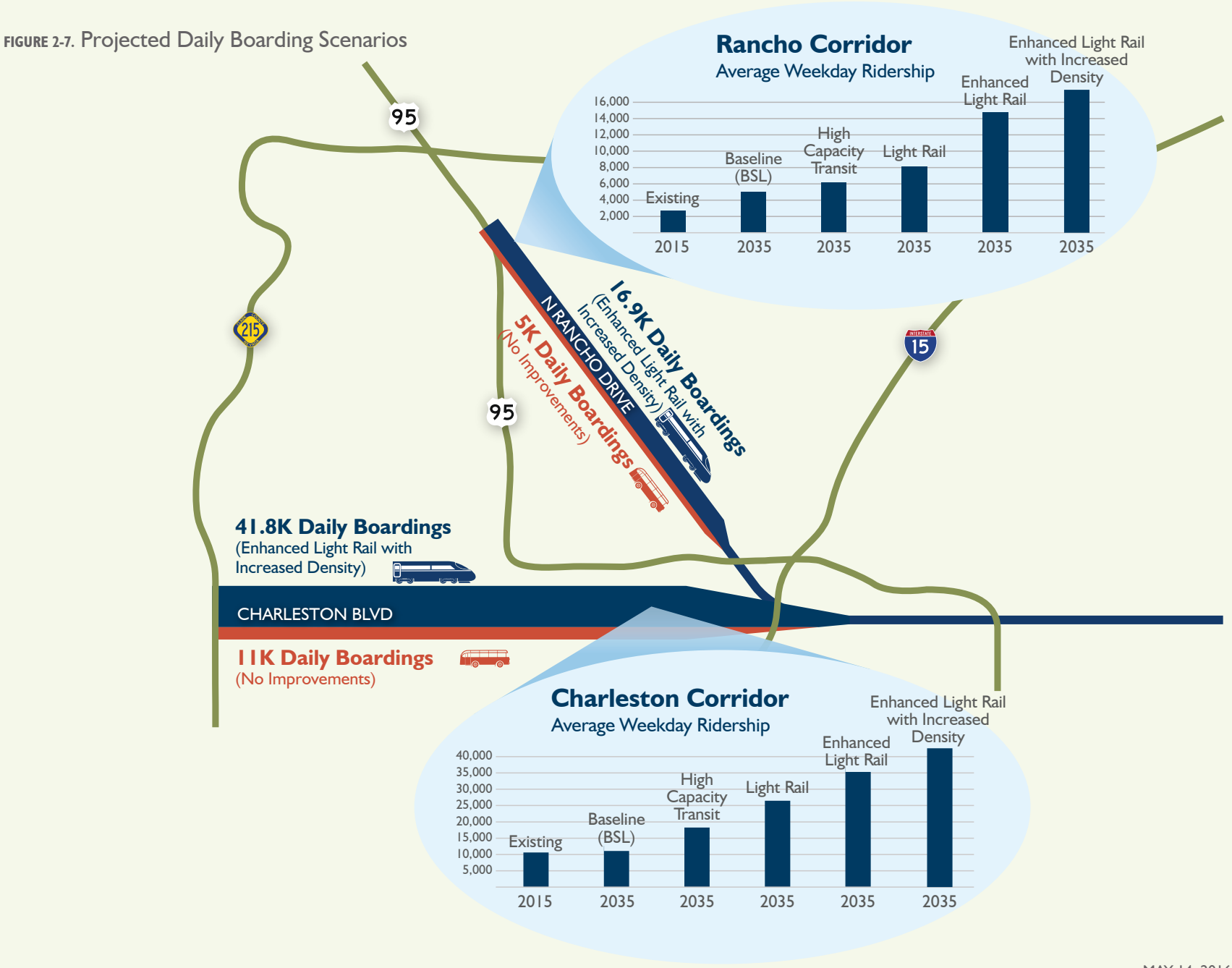
Charleston Blvd transit route	**Rancho Drive** transit route
10,400 trips per day	**2,700** trips per day

The **FTA STOPS** model predicts that by **2035...**

Doing nothing to improve travel times along the **Charleston Blvd** transit route is expected to increase ridership by 5% over existing levels, while implementing enhanced light rail transit with increased densities will increase ridership by **281%** over doing nothing.

Doing nothing to improve travel times along the **Rancho Dr** transit route is expected to increase ridership by 84% over existing levels, while implementing enhanced light rail transit with increased densities will increase ridership by **235%** over doing nothing.

FIGURE 2-7. Projected Daily Boarding Scenarios



Downtown Circulator

Downtown is growing in popularity as an attractive place to live, work, and play. Immediately surrounding Downtown are Symphony Park, the Medical District, the Strip, and various residential communities. With growing congestion and a rising generation (sometimes referred to as the Millennial Generation, or people who entered high school beginning in 2000 and later) that prefers leaving their cars behind, more and more people will elect to get around via walking, biking, and public transportation—especially if those offerings are safe, convenient, affordable, and attractive.

Currently, the primary barrier for circulation within the Downtown area is the Union Pacific Railroad (UPRR) and I-15 corridors – which bifurcate Downtown and have limited crossing options. For example, Symphony Park sits on the opposite side of the UPRR corridor from the bulk of Downtown. Bonneville Avenue and Ogden Avenue tunnel under the tracks to connect Symphony Park with the rest of Downtown, and while they have sidewalks and bike lanes, they are narrow and the roads were primarily constructed to provide vehicular access.

The Downtown Las Vegas Circulator is intended to serve both visitors and workers in the Downtown area. For visitors, it provides a casual transportation option to travel between Downtown destinations such as the Fremont Street Experience, Downtown casinos/hotels, Las Vegas Premium Outlets, and other dining/recreation destinations. Residents are more likely to use the route to circulate within the Downtown area, rather than for commuting purposes – allowing an alternate option to driving for workday trips, such as meetings or lunches. An initial deployment route is proposed for a 4.7-mile, two-way loop (Figure 2-8). Future extensions may carry the route to Cashman Center, and/or the 18b Las Vegas Arts District.

CityMobil2 demonstration

Branded circulator in Waikiki, Hawaii

Zoom Circulator in Avondale, Arizona

Downtown Circulator

Implementing a Downtown Circulator transit route provides a low-cost and easy-to-implement transportation solution to serve residents, employees, and visitors. Very little infrastructure on the street is needed. Circulator stops tend to be simple – posted signs for pick-up locations. However, the flexibility of the mode allows the circulator to stop and pick up or drop off passengers at will, as well as to evolve as new development occurs, changing routing to connect more destinations. For example, some circulator systems use a hybrid model using a fixed route, as well as available on-demand service via a GPS smart phone app. A downtown circulator allows people to park their car in one location and easily access all the destinations the Downtown has to offer.

What kind of vehicle?

Circulator vehicles provide a fun and creative way to express a theme for the area. The initial pilot route will use smaller vehicles (capacity of 10 to 25 persons), with the ability to add larger vehicles to the mix as ridership expands. The service could be branded as uniquely "Downtown."

Additionally, as autonomous vehicle technology advances, circulator buses are becoming the first automated vehicles on the streets, with many successful tests completed throughout Europe. While Las Vegas explores how technology may affect citywide circulation, the Downtown Circulator could be put Las Vegas at the forefront of the next generation of vehicle technology.

FIGURE 2-8. Downtown Circulator Initial Deployment Route

Data source: ***Clark County GIS Management Office (2015)***

Photo credits: ***Big Bus Tours, City of Las Vegas, Craig Morgan Butelo, Lucky Wenzel, LVCVA, Studio West Photography***

Transit Options Considered but Not Selected

Because this is a 20-year vision for the future, a wide variety of transit options were considered to help move Las Vegas residents around the City and larger metropolitan areas. As technology continues to evolve, so will the way we move. The two new transit options introduced as part of this Plan are the Downtown Circulator and regional light rail links. Here is what else we explored:

Las Vegas monorail

Monorail Extension to Downtown

While not located within the City limits, the Las Vegas Monorail is a private transit carrier, operating a 4-mile corridor within the Resort Corridor, running along the backside of the eastern hotel/casino facilities along the Strip, from Tropicana Avenue (MGM Casino) to Sahara Avenue, and serving the Las Vegas Convention Center.

The Las Vegas Monorail is considering a series of future extensions and improvements, including an extension to Mandalay Bay and a new station at Sands Expo and Convention Center, thereby connecting the three major convention facilities in the Resort Corridor.

Why Not for Downtown Las Vegas?

» In the past, the Las Vegas Monorail has shown an interest in connecting its system to Downtown Las Vegas, primarily to make a connection to the Fremont Street Experience. This connection was developed in conceptual planning documents in 2005, but the Las Vegas Monorail chose not to pursue the extension as ridership analysis indicated that demand was not sufficient to warrant the financial investment. Subsequently, the RTC and City of Las Vegas partnered on a project to create the Strip and Downtown Express BRT, which has high frequency transit stops at the Monorail Station on Paradise Road and at Sahara Avenue, and has helped extend the reach of the monorail system to Downtown. The proposed light rail corridor along Las Vegas Boulevard will have an overlapping travel shed with a monorail extension to Downtown, limiting future demand for an extension. A viable monorail extension to Downtown Las Vegas is not likely if the Las Vegas Boulevard light rail system is implemented.

» Extending the monorail from the northernmost stop at Sahara Avenue to Downtown Las Vegas may not be needed because of more immediate implementation of a light rail system along Las Vegas Boulevard, however it could be viable in the future with the addition of Downtown convention center facilities adjacent to US 95. As indicated in the report Downtown Las Vegas Vision 2035, this development could become a new economic anchor, and depending on its size could be a catalyst for new transportation connections.

Portland aerial tram

Suspended coach people mover

PRT concept

Urban Gondola

An urban gondola (aerial tram) has no driver and transports a small tramway cabin via cable(s). The tramways can run in a straight line over development – something ground transportation cannot do, allowing for faster travel times. The aboveground nature of the corridor doubles as a tourist attraction, providing views of the surrounding area – a frequently sought endeavor in Las Vegas. The leading nationwide gondola designer and manufacturer, Doppelmayr, provided valuable technical support on the potential deployment of a gondola transport system in Las Vegas.

Why Not for Las Vegas?

» One of the primary concerns with a gondola system in Southern Nevada is the ability to have an effective air conditioning system. Gondola systems have been successfully deployed in several cold climates, with heat systems, but there has been very limited deployment of air conditioning systems in very warm climates. As the battery technology continues to improve to power the air conditioning system this option may become viable in the future.

» Additionally with implementation of the proposed light rail transit between the Las Vegas Strip and Downtown, a third transit option making the same connection is not needed.

People Movers

Automated people movers eliminate the need for drivers and require passengers to stop at each station along a simple, well-defined route. People movers can be as small as a simple two station layout (frequently used to connect airport terminals) or can form a regional transit system. A variation on the typical rail people mover technology has been evolving through suspended coaches – operating much the same way, not taking up valuable street space, which makes it conducive to dense urban environments.

Why Not for Las Vegas?

» Like other automated transit, this offers great potential for short connections, and could be applied to the longer connections required throughout the city. As this transport system continues to be refined and deployed in other locations it may be a viable option for Las Vegas in the future.

Personal Rapid Transit

Personal rapid transit (PRT) systems are fixed-route systems that typically operate above the street. This is an attractive form of transit for short-distance trips because it provides on-demand service, delivering riders directly from their origin to their destination.

Why Not for Las Vegas?

» Existing PRT systems connect a short number of linear stops. It would be a greater challenge to develop on-demand service for an elevated system with many destination options.

THE BENEFIT OF INVESTMENT

Public transit is one component of a successful and comprehensive multimodal transportation system. It connects people to jobs, supports business development, saves households money, and generates employment with every dollar invested.

Public transit is a form of environmental stewardship, reducing carbon emissions by 37 million metric tons of carbon dioxide each year across the United States, saving the equivalent of 4.2 billion gallons of gasoline.

It provides an affordable – and for some, necessary – alternative to driving. For others, it provides choice. Choice to choose a more efficient route. Choice when driving is not an option. Choice to perform other activities while commuting.

Public transit provides additional benefits for people who do not use it. It makes the entire transportation system work more efficiently. **Every 10 people on a bus or train in your community during rush hour means there are nine fewer cars on the roads.** By providing additional capacity, public transit use can move more people around, thereby increasing the efficiency of the entire transportation network. That means less traffic congestion, fewer carbon emissions, and a safer community for all.

** Average vehicle occupancy (i.e., persons per vehicle) in the Las Vegas Valley is 1.4 for all trips and 1.1 for home-based work trips (RTC Travel Demand Model).*

In cities such as Phoenix and Cleveland, investment in LRT and BRT, respectively, have resulted in $8.2 billion and $5.8 billion in adjacent development. Both routes were starter corridors for the region and opened in 2008.

Phoenix, Arizona Light Rail

From the **American Public Transportation Association (APTA)**

Public Transportation **Enhances Personal Opportunities**

Public transportation provides **personal mobility** and **freedom** for people from all walks of life.

Access to public transportation gives people **transportation options** to get to work, go to school, visit friends, or go to a doctor's office.

Public transportation provides **access to job opportunities** for millions of Americans.

Public Transportation **Saves Fuel, Reduces Congestion**

Public transportation has a proven record of **reducing congestion**.

In 2011, U.S. public transportation use saved **865 million hours** in travel time and **450 million gallons** of fuel in 498 urban areas.

According to APTA's Transit Saving Report, a two-person household can save, on the average, more than **$10,174 per year** by downsizing to one car.

Public Transportation **Provides Economic Opportunities** and **Drives Community Growth & Revitalization**

Every $1 invested in public transportation generates approximately **$4 in economic returns.**

Every $1 billion invested in public transportation supports and creates **more than 50,000 jobs**.

Home values performed **42 percent better on average** if they were located near public transportation with high-frequency service.


SANDHILL RD

3

BICYCLE/ MULTI-USE FACILITY IMPROVEMENTS

THE NEED

Bicycling is an important element to Las Vegas' transportation system because it fulfills both long- and short-distance trips. The City's Unified Development Code (2011) enacts policy that encourages Las Vegas to create new bicycle friendly infrastructure or enhance existing facilities to increase connectivity in the bicycle network. The Las Vegas Master Plan 2020: Trails Element (2013) established the long-term vision for such infrastructure, including an interconnected network of on-street bike lanes and routes. To date, the City has implemented over 450 miles of bike lanes and bike routes, and more than 100 miles of multi-use paths. The City's efforts have been recognized by the League of American Bicyclists when it was awarded as a Bronze Level City in 2014.

This Plan builds upon those recommendations to focus safe bicycle travel on a series of separated, protected bicycle lanes and regionally connected off-street bike paths to provide bikeways for a variety of users, **creating a lower-stress environment and higher level of comfort.**

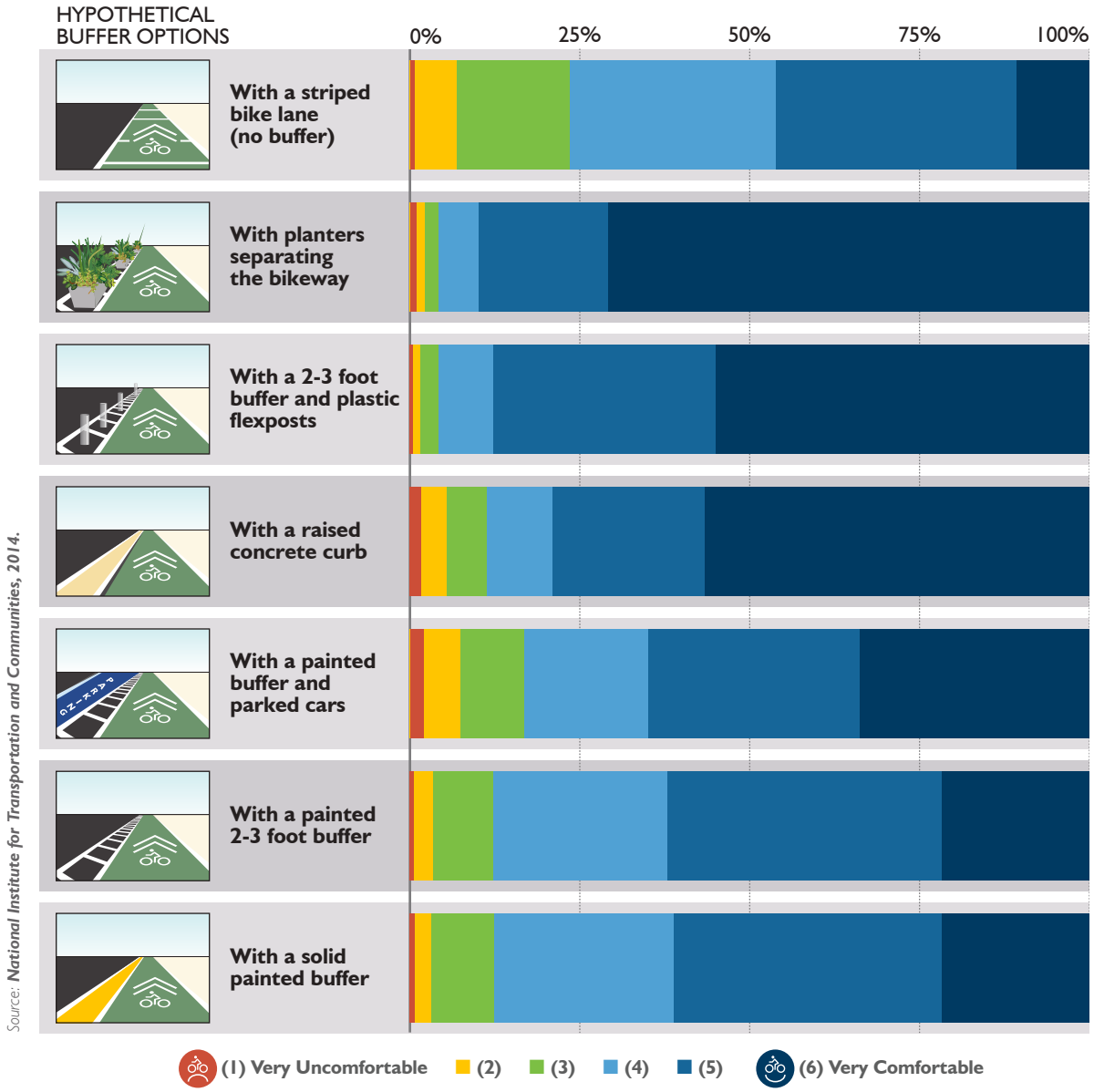
The desire for such facilities comes directly from City residents. While nearly two-thirds of residents have used the City's bike lanes and would like to see more, many citizens voiced the need for separation between bike lanes and the road, citing safety as a deterrent for commuting by bike, and preferring bike lanes on less-traveled streets rather than busy arterials. This concept is not unique to Las Vegas. Figure 3-1 presents the findings of a survey conducted as part of the National Institute for Transportation and Communities study of protected bike lanes in the U.S. The survey shows bicyclists' perceptions of different buffer designs and concludes that designs of protected lanes should seek to provide as much protection as possible to increase cyclists' comfort (Portland State University and Alta Planning, 2014).

Bicycling is also becoming a more viable mode choice, both through changes in infrastructure, as well as advances in technology. Electric or e-bikes have been popular in Asia and Europe for years, and are on the rise in North America. E-bikes provide bicycling opportunities for a diverse group of users, from commuters to casual recreational and long-distance cyclists.

A 2015 City of Las Vegas Citywide General Population Survey found that more than 1 in 4 residents ride a bicycle for recreation or transportation purposes and 5.6 percent use it for transportation (Applied Analysis, 2015). As the bike lane network is completed and electric bikes become more affordable and capable of easily going more than 20 miles on a single charge, we believe the percentage of residents who use a bike for transportation will continue to grow.

Green bike lane in Downtown Las Vegas

FIGURE 3-1. Bicycle Lane Buffer Options: National Survey Responses



Source: National Institute for Transportation and Communities, 2014.

The 2015 *Green Bike Lane in Downtown Las Vegas* cites that 52 percent of people are worried about being hit by a motor vehicle, and 46 percent of adults would be more likely to ride if bicycles were physically separated from cars.

THE IMPROVEMENT TYPES

Today's bicycle infrastructure in the City is typically made up of three conditions: on-street bicycle lanes, bicycle boulevards, or trails/multi-use pathways. In response to resident responses to better separate cyclists from moving traffic, a series of enhanced bicycle corridor treatments are recommended throughout the City. Figure 3-2 presents the range of typical bicycle infrastrucutre, varying in level of protectiveness from adjacent traffic, and provides general guidance on what types of treatments may be most suitable to different types of streets.

FIGURE 3-2. Bicycle Facilities

VEHICLE-BIKE SEPARATION		FACILITY TYPE
		**Bicycle Boulevard** Bicycle boulevards are streets with low motorized traffic volumes and speeds, designated and designed to give bicycle travel priority. This treatment uses signs, pavement markings, and speed and volume management measures to create safe, convenient bicycle environments. Many local or collector streets with low existing speeds and volumes are conducive to bicycle boulevard treatments.
		**On-Street Bike Lane** A bike lane is a defined portion of the roadway designated by striping, signing, and/or pavement markings for the exclusive use of bicycles. Sometimes, the bike lane is painted green to clearly define the bicycle realm from the vehicular travel lanes. Bike lanes typically run alongside the curb when no parking is present and contain no physical barrier between moving traffic.
		**Buffered/Semi-Protected Bike Lane** A buffered bike lane is a conventional on-street bike lane paired with a designated buffered space separating the lane from the adjacent travel lane. This is especially applicable on streets with high travel speeds, high travel volumes, and/or high amounts of truck traffic. The buffer might be as simple as a striped area of roadway, or could include some form of vertical separation, such as bollards or potted plants.
		**Protected/Separated Bike Lane** Protected bike lanes use a variety of methods for physical protection from passing traffic. A parking lane may suffice as a barrier, or a raised/landscaped median. Often, several different methods are used. Fully protected bike lanes are used most often on streets where bicyclists might feel stress because of high traffic volumes, high speeds, or high parking turnovers. A two-way protected bike lane may also be referred to as a cycle track.
		**Off-Street Trail/Multi-Use Pathway** An off-street trail is physically separated from traffic, but intended for shared use by a variety of groups, including pedestrians, bicyclists, and joggers.

Source: ***Alta Planning and Design***

Buffered/Semi-Protected Bike Lanes

A buffered bike lane is a conventional on-street bike lane paired with a designated buffered space separating the lane from the adjacent travel lane and/or parking lane. Buffered bike lanes:

- Provide greater shy distance between motor vehicles and bicyclists.
- Provide space for bicyclists to pass another bicyclist without encroaching into the adjacent motor vehicle travel lane.
- Encourage bicyclists to ride outside of the door zone when buffer is between parked cars and bike lane.
- Provide a greater space for bicycling without making the bike lane appear so wide that it might be mistaken for a travel lane or a parking lane.
- Appeal to a wider cross-section of bicycle users.
- Encourage bicycling by contributing to the perception of safety among users of the bicycle network.

Many streets in Las Vegas have the extra width to provide a buffer between the travel lane and bike lane and will be implemented in conjunction with street rehab and maintenance projects, which usually require repaving and restriping the roadways. Depending on the corridor, semi-protected bike lanes can be achieved in numerous ways:

Painting/striping a wide buffer

Including bollards in the buffer area

Photo credit: ***FHWA***

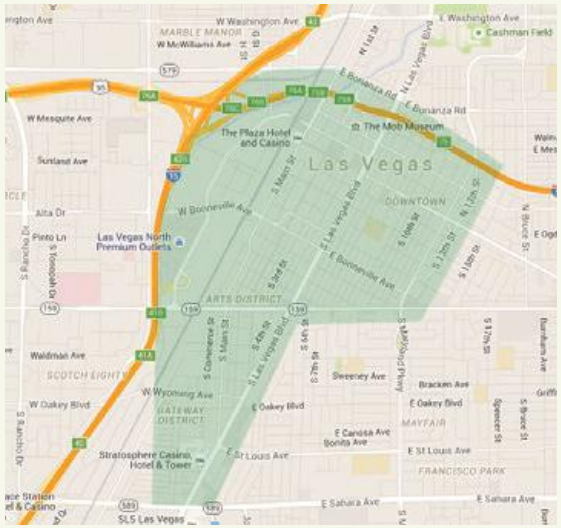
Placing plants in the buffer area

RTC BIKE SHARE

The RTC is preparing to launch a public bike share system in late summer 2016, with the first phase in Downtown Las Vegas. Providing an affordable and convenient transportation choice for locals and tourists alike, the RTC's Bike Share system will include a network of approximately 18 stations and 180 bicycles available for self-service rental 24 hours a day. The bike stations will be spread across an approximately 1.5-square-mile service area, with stations currently planned at the **Bonneville Transit Center to link RTC bus riders with bikes, the Center, and Las Vegas City Hall**. The RTC is in the process of selecting additional station locations based on input from a community survey and also are exploring the feasibility of a bike-sharing system on the UNLV campus.

How It Works:

- The system will be designed to allow one-time use by either walking up to a docking station or registering online.
- Docking stations will allow bike share renters to register, slide their credit card and sign the user agreement.
- Bike Share members will be sent an electronic key to quickly release a bicycle in the system.
- An app will be available to help users locate bikes and vacant docks.



SOUTHERNNEVADASTRONG
OUR VALLEY. OUR VISION. OUR FUTURE.

Source: ***RTC, 2016***

Completing the Beltway Trail

As part of the Mobility Master Plan Survey, residents were asked to rank their top priority bicycle corridor. The survey results showed completion of the Beltway Trail as the number one priority for the bicycling community. The Beltway Trail is a key component of the Southern Nevada Regional Trail System. Completion of the trail is an importation step toward completing a network of multiuse trails in the Valley, ultimately providing a continuous trail loop around the Beltway. The trail is both a great recreational facility and upon completion will also become a key transportation route that will ultimately connect all of the north/south and east/west access locations, allowing users to travel almost anywhere around the Valley.

THE BICYCLE PLAN

While the trend has been to provide as many on-street bicycle lanes as possible throughout a metropolitan region, the approach to implementing enhanced facilities focuses these treatments on a more limited, yet interconnected network. Variations on the enhanced bicycle treatments may be applicable for each corridor depending on the bicycle environment desired, including the need for on-street parking, travel characteristics (speed, volume, access), and the character of the pedestrian zone. Typical variances might occur in the width of the bike lane, width and number of travel lanes, and the width and type of buffer treatment(s).

Traditional bike lanes will continue to be installed on streets within the City, with enhanced treatments constructed on streets with higher bicycle volumes, or those that provide better regional connectivity. As the City's transportation network continues to evolve, it is likely that this enhanced bicycle network will expand.

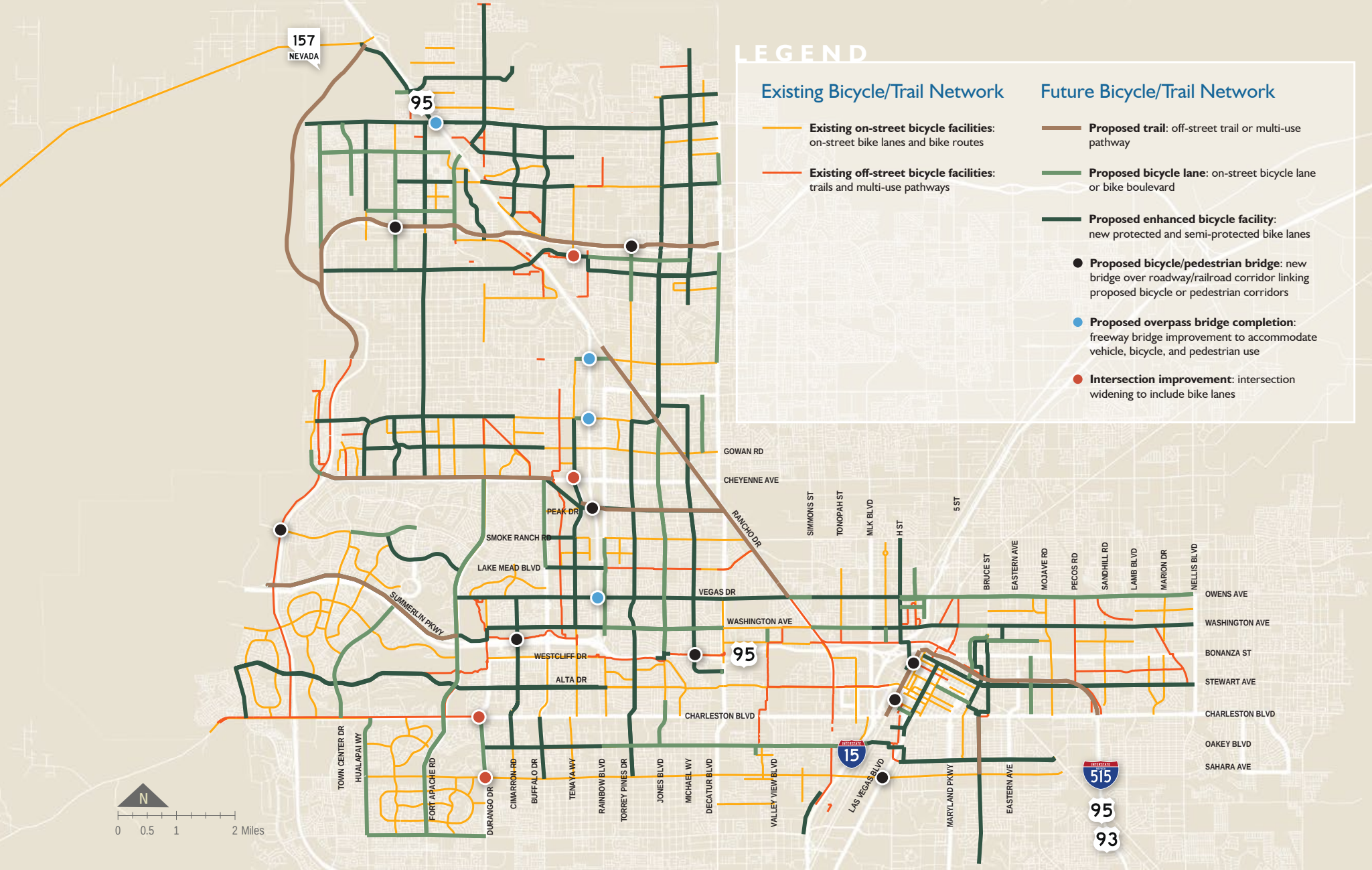
Figure 3-3 illustrates the vision for a regional enhanced bicycle network, along with the underlying existing system.

Criteria for Selecting Enhanced Bicycle Corridors

- 80 to 100 feet of available right-of-way
- High transit ridership
- Highly populated corridor
- High employment density
- Greater number of households with no access to autos

BICYCLE/MULTI-USE FACILITY IMPROVEMENTS

FIGURE 3-3. Bicycle System Vision



Stewart Avenue: Enhanced Bike Corridor

A major theme heard consistently from residents is that people do not feel safe cycling on busy streets. On-street bike lanes are supported, but respondents would like to see better separation with moving traffic. This not only relates to those commuting to work, but also for schoolchildren walking or biking to school. Therefore, this project seeks to implement a new treatment on Las Vegas streets: a fully protected bicycle lane.

Key components of protected bicycle lanes include:

- Some form of physical separation between moving traffic and the bike lane (e.g., plastic post, planter, on-street parking).
- Allocation of space exclusively for people on bikes, not shared with pedestrians or motorized traffic, except for intersections.
- Part of the street grid; as opposed to a parallel off-street facility that follows flood control channels or rail corridors.

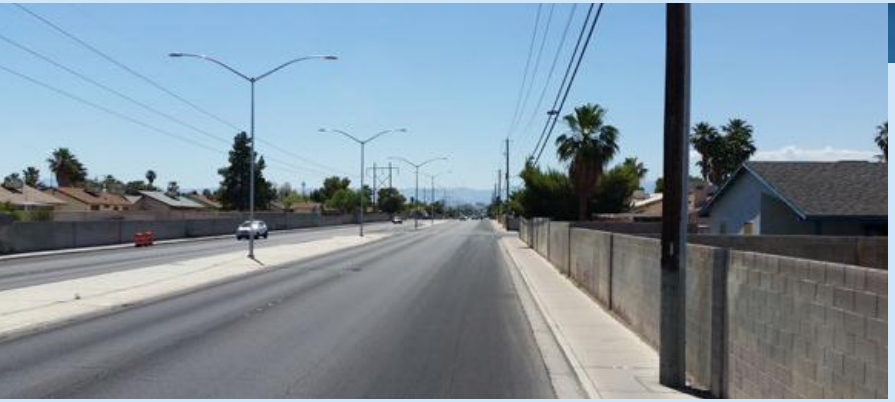
The Stewart Avenue corridor spans almost five miles, connecting Downtown Las Vegas with residential and employment areas in eastern Las Vegas. Throughout the span of the corridor, there are clusters of high transit boardings and high pedestrian and bicycle crashes (see Appendix D). This indicates an active pedestrian environment, safety concerns, and opportunities for linking bicycle and transit facilities. Additionally, for much of the corridor, up to two-thirds of area households do not own a car, thus having a more limited choice in transportation options. The visionary image to the right represents a potential application of a fully protected bike lane on Stewart Avenue to address these needs and opportunities.

The City recently conducted traffic counts at the intersection of Stewart Avenue and 28th Street and found that during a two-hour period in the afternoon, more than 1,200 pedestrians pass through this area. In the same period, 2,200 cars traversed the intersection – resulting in pedestrians comprising 35 percent of all traffic on a roadway that today, is primarily oriented to vehicular traffic. In the immediate vicinity of this intersection are three schools, two community centers, a sports complex, and clusters of multi-family residential homes. Between 30 and 60 percent of all residents in this area do not own personal vehicles and/or maintain an annual income below poverty level.

Neighborhood features near Stewart Avenue/28th Street. Source: **Google Earth**

FIGURE 3-3. Stewart Avenue

Existing



Visualization

US 95/Alexander Road Overpass

One of the key attributes to a successful bicycle network is interconnectivity. If cyclists cannot follow a bike path to their intended destination, they will be less likely to make the choice to ride. Today, the regional freeway system provides an obstacle to cycling. Frequently, a bike lane will end short of a major street, and resume on the other side – requiring cyclists to merge with vehicular traffic to pass through the intersection, which can be daunting to many riders. Alternatively, a street may truncate near the freeway, with no overpass to connect to the other side. In this occurrence, cyclists may be required to ride a half-mile or more out of the way to find a bridge connection. Four new freeway overpasses are proposed on US 95 to incorporate bicycle and pedestrian travel, at Alexander Road, Lone Mountain Road, Grand Teton Drive, and Vegas Drive. Today, the bike networks on these corridors have been significantly developed, but have gaps across the freeway, causing cyclists to merge with traffic or find another route. These are critical gaps in the east/west bike network that are needed to help bicyclists cross the freeway corridors safely, comfortably and efficiently. Figure 3-4 illustrates bridge improvements proposed to aid pedestrians and bicyclists in crossing the freeway corridors in a safe and comfortable manner.

FIGURE 3-4. US 95/Alexander Road

Existing

Visualization

THE BENEFIT OF INVESTMENT

There are multiple benefits to improving the bicycling network and providing fully separated bicycle lanes. Many other cities have demonstrated an increase in bicycle ridership and a decrease in traffic delay when street-calming features such as protected bicycle lanes are installed. In addition, bicycling has positive benefits for public and environmental health as well as local business.

The most notable value is increasing safety for all users of the street by dedicating and protecting space specifically for bicyclists, reducing the risk of collisions with vehicles "over-taking" the bike lane or "dooring" from parked vehicles – increasing safety for both bicyclists and drivers. Protected bike lanes also provide additional room for intersecting street and driveway traffic to "creep up" if needed, to have a better line of sight for oncoming traffic.

In addition to making bicyclists feel safer and more comfortable, protected bike lanes add potential for pedestrian friendly streetscapes and more greenspace. Protected bike lanes provide a buffer space for pedestrians where sidewalks are not offset from the curb. They shorten intersection crossing distances, prevent turning conflicts with people walking, and reduce traffic weaving, and by narrowing the travel lanes, protected bike lanes help with traffic calming on a corridor. Protected bike lanes are also a great option for busier commercial corridors as a way of attracting more bicycle traffic to local businesses, thereby increasing economic development opportunities. Lastly, in comparison to other infrastructure improvements to increase safety and capacity, constructing a protected bike lane is significantly less costly per mile than building a new roadway.

Safety

- Because they shorten crossing distances, control turning conflicts, and reduce traffic weaving, New York City's protected bike lanes reduced injury rates for people walking on their streets by 12 to 52 percent (NYCDOT, 2013).
- Streets with protected bike lanes saw 90 percent fewer injuries per mile than those with no bike infrastructure (Teschke, et al., 2012).

Economic

- The value of properties within one block of the Indianapolis Cultural Trail increased 148 percent after construction — more than doubling in value from 2008 to 2015 (IUPPI, 2015).
- Protected bike lanes can be part of street redesigns that greatly boost retail performance. After the construction of a protected bike lane on 9th Avenue in New York City, local businesses saw a 49 percent increase in retail sales. On other streets in the borough, the average was only 3 percent (NYCDOT, 2012).

Rider and Driver Comfort

- Whether they ride bikes themselves, 79 to 97 percent of drivers say they feel moderately or very comfortable driving near bikes with a protected bike lane. Only half of drivers are comfortable on roads without bike infrastructure (People for Bikes, 2013).
- Forty-nine percent of survey respondents in Chicago felt people's driving behavior improved after installation of a protected bike lane on Kinzie Street in downtown Chicago (Chicago Department of Transportation, 2011).

In a 2015 survey of 89 mayors from 31 different states, 70 percent indicated that they would prefer bike lanes over more parking or car lanes. **The survey found that even across a diverse range of cities, there is strong support for increasing a city's bike infrastructure**, even at the expense of other transportation modes (Boston University Initiative on Cities, 2016).


FedEx

4 VEHICULAR MOBILITY IMPROVEMENTS

US-95 Traffic Looking West
Photo credit: ***John Easton***

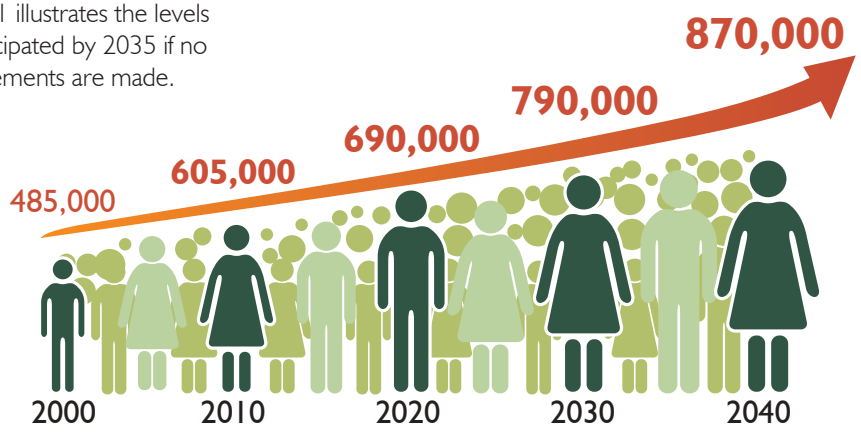
THE NEED

Infrastructure is the physical backbone of the City's transportation system and in Las Vegas, streets are our largest public asset. The role of vehicular movement has been significant in development of the region and will continue to play a critical role in our City's circulation. While the railroad initially put Las Vegas on the map, development of the streets and freeways provided an accessible means for people to visit and settle in Las Vegas.

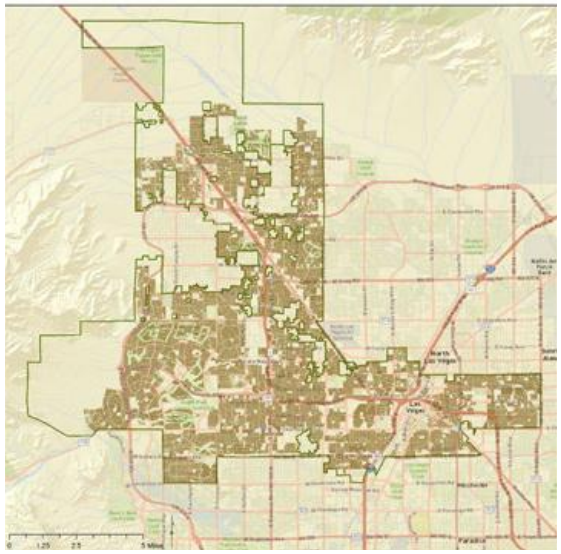
Today, more than 50 percent of Las Vegas residents work in the metropolitan center: Downtown Las Vegas, the Resort Corridor, or McCarran International Airport and surrounding environs. Streets are already congested leading into the core of the Valley, and the demand for reliable transportation connections will only increase. Figure 4-1 illustrates the levels of roadway congestion anticipated by 2035 if no additional roadway improvements are made.

City of Las Vegas Population Projection

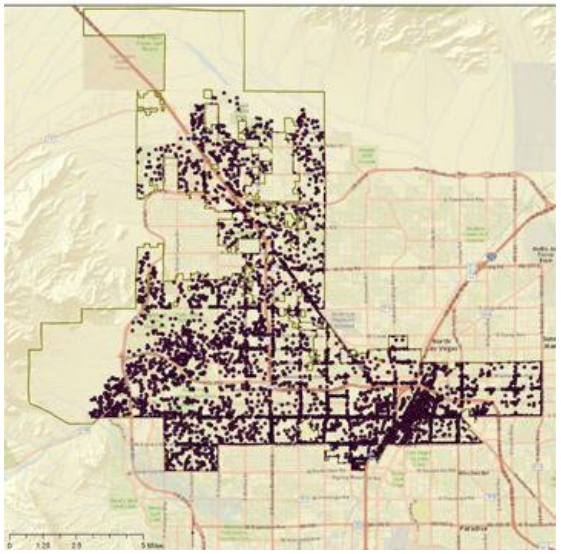
Source: ***Land Use Working Group, 2016***



Residential Development



City of Las Vegas | All Employers



Vacant Land

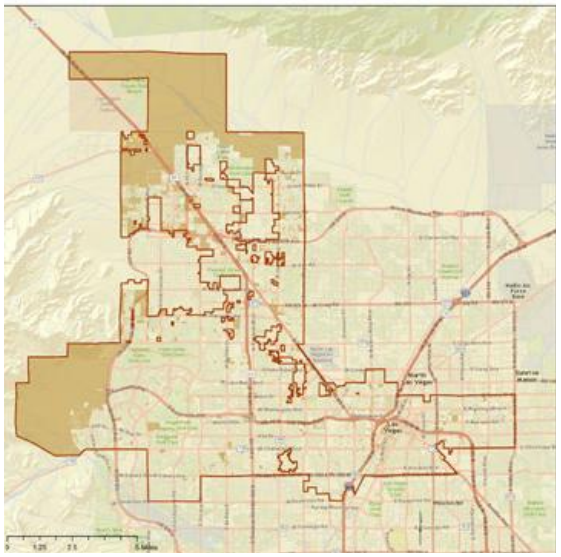
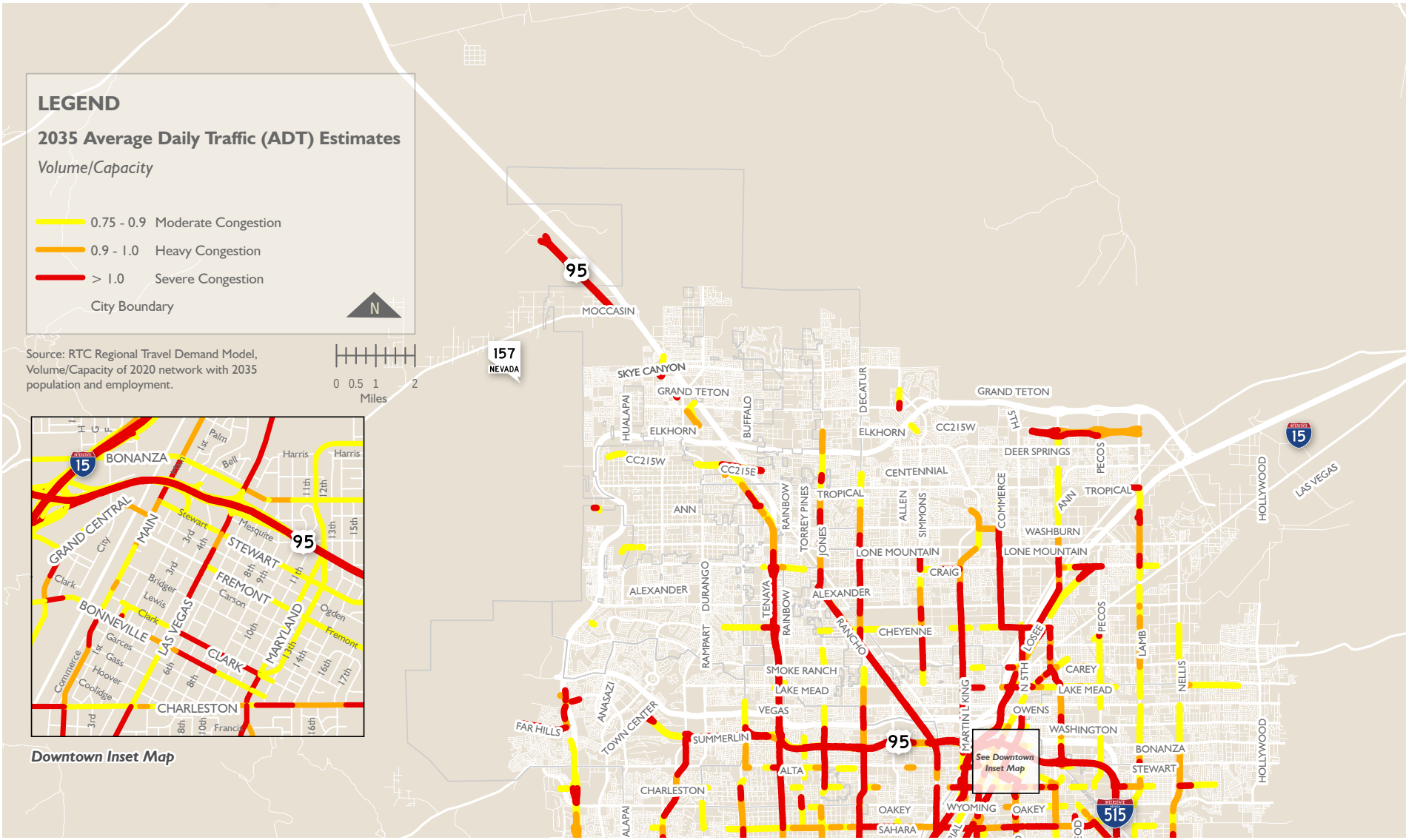


FIGURE 4-1. 2035 Congested Roadways If No Additional Improvements Are Made Beyond 2020



Streets, however, are not only key to personal circulation. Freight movement allows Clark County to aid significantly in the state's import and export activities, and is an integral step in future economic development goals for Nevada. Therefore, ensuring adequate movement of goods is a regional issue that requires collaboration among all jurisdictional entities.

It has been demonstrated that business is attracted to and retained in areas where business-related delivery of goods, including small package delivery, are convenient and reliable. Improvements in goods movement can alleviate congestion, improve mobility, remove traffic safety hazards, and promote economic health.

In May 2015, the RTC completed a *Southern Nevada Regional Goods Movement Master Plan*. The study found that **today, approximately 87 percent of the total freight that is moved into, out of, or within the Las Vegas metropolitan area occurs by trucking on area roadways**. One of the study's core strategies is to improve the arterial network at start and end points, removing current obstacles to freight vehicles, including geometric or operational constraints, inadequate roadway maintenance, and/or congestion reduction. This Plan's focus on arterial maintenance and rehabilitation and minimizing bottlenecks at numerous intersections will help improve freight operations.

Stratosphere and Smith Center

Source: ***Craig Morgan Butelo***

Southern Nevada is world renowned for its leisure and hospitality industry – from the Las Vegas Strip and Fremont Street, to the sunny golf courses and resort environments. A major element of the industry's success is access to reliable goods movement. Each of these hotels, casinos, restaurants, and recreational venues requires daily delivery of food, linens, and other goods. While the regional freeway system provides access to the overall vicinity, it is the local street network that links the trucks with their intended destinations. Urban freight movement is organized around making efficient trips with smaller vehicles to dense mixed-use areas. Getting goods to their final destination often requires negotiating limited delivery bays or lack of curbside space, narrow streets, tight turning radii, and low clearances.

Fostering Economic Development

Locally, roadway improvements can be key to the level of economic investment that can be made on a property. If a property does not have good access and adequate transportation connections, it will never develop into its highest and best use. An example of a property with strong development/investment potential as identified by the City's Downtown Economic and Urban Development Department is the Fisher Brothers Mixed-Use site, a 67-acre property located along I-15 immediately south of Sahara Avenue. The projects proposed in the Mobility Master Plan, such as a future HOV lane interchange at Meade Avenue and an extension of Martin Luther King to Desert Inn Road could be vital to helping this site realize its full economic potential.

Source: ***City of Las Vegas Downtown Las Vegas Economic and Urban Development Projects Portfolio***

THE IMPROVEMENT TYPES

In response to the need to accommodate regional traffic, various improvements are proposed for corridors that will remain critical to vehicular circulation and balance regional and local circulation needs, including:

- Roadway extension or connectivity improvements
- Enhanced bridge connections to facilitate vehicular, bicycle, and pedestrian connectivity
- Street rehabilitation or maintenance projects
- Intersection improvements to increase capacity and operations
- New/improved freeway corridors and/or freeway interchanges

Because this Plan provides enhanced transportation choices (transit, biking, walking), many streets will have overlapping transportation purposes, accommodating multiple users. Therefore, recommended improvements to the overall network may include various options to better separate users, such as exclusive transit lanes or protected bike lanes – improving safety for other users, while maintaining the necessary vehicular capacity and efficiency. All freeway corridors are assumed to remain prioritized for personal vehicles and goods movement.

With about 600,000 new residents anticipated to live in the Las Vegas Valley over the next 20 years, this will add more than 1 million trips to our transportation system.

Source: ***The Land Use Working Group, 2016 and the RTC Regional Travel Demand Model***

I-15 North Frontage Roads, including Owens Avenue Complete Street

The I-15 Frontage Roads project is proposed to improve connectivity and access to the historic Westside Community from I-15, to create opportunities for economic redevelopment in the area, and to further implement complete streets concepts such as those proposed along Owens Avenue, into the community.

Elements of Proposed I-15 North Frontage Roads Project

Owens Avenue Concept Visualization 1

Owens Avenue Concept Visualization 2

Summerlin Parkway Traffic Safety and Capacity Improvements

The city of Las Vegas is proposing to construct traffic safety and capacity improvements on Summerlin Parkway. The project is one of several projects proposed to increase the transportation infrastructure capacity needed to serve both existing and future demand in the Valley. Summerlin Parkway is a heavily used divided highway and the proposed modifications will make the daily commute safer for many residents. Likewise, the project will provide additional capacity needed to accommodate future development in the west and northwest. This includes the large entitled master planned communities such as Summerlin West, Skye Canyon, and community development near the Paiute Reservation. The project is expected to be constructed in three phases at a total estimated investment of $11.3 million.

Phase 1

The first phase includes construction of a cable barrier rail system in the median of Summerlin Parkway from approximately Buffalo Drive to the Summerlin Parkway/CC-215 interchange (Work Item A).

Phase 2

Phase 2 includes improvements to the westbound Rampart Boulevard off-ramp, including a new westbound auxiliary lane for a two-lane off-ramp at Rampart Boulevard, ramp widening to provide "triple" west to south left-turn lanes, modifications to improve sight distance and roadway lighting, and modifications to the existing traffic signal system at the Rampart Boulevard intersection. This phase also includes extending the existing northbound US 95 to westbound Summerlin Parkway high-occupancy vehicle (HOV) lane, and constructing the Angel Park Trail connector that will extend the trail further west from Durango Drive to Rampart Boulevard (Work Items B-C).

Phase 3

The final phase includes constructing an auxiliary lane between the northbound CC-215 to eastbound Summerlin Parkway ramp and the Anasazi Drive off-ramp, auxiliary lanes between Town Center Drive and Rampart Boulevard in the east and westbound directions, and an eastbound auxiliary lane between Rampart Boulevard and Buffalo Drive (Work Items D-F).

Overview of Summerlin Pkwy Traffic Capacity and Safety Improvements

Source: ***City of Las Vegas Public Works Department Transportation Division***

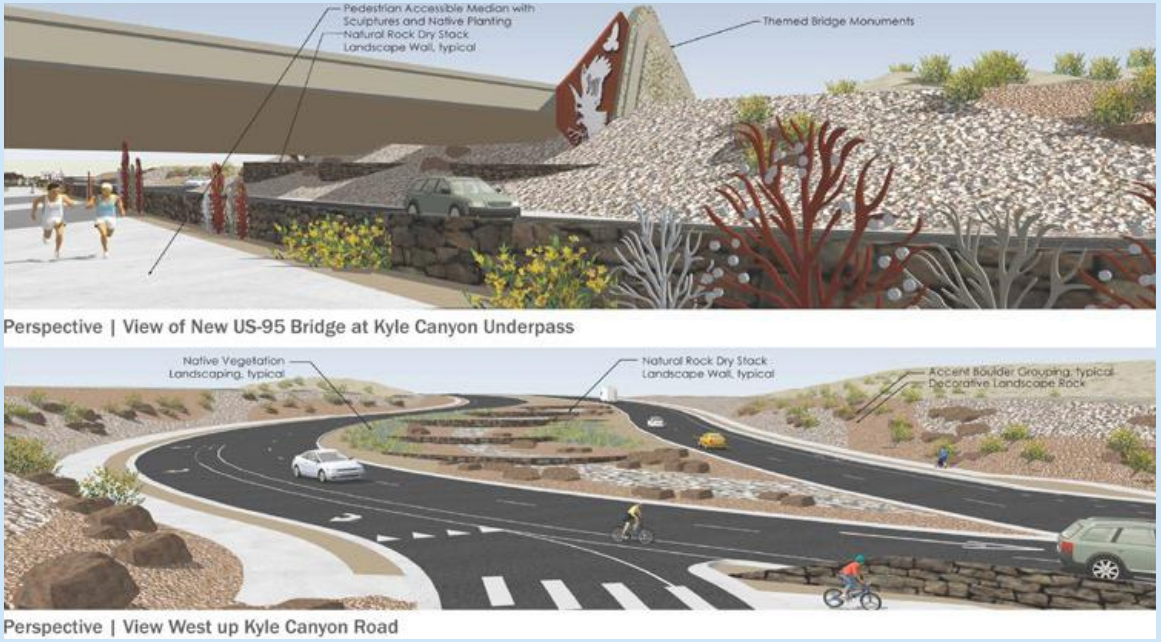
US 95/Kyle Canyon Interchange

The US 95 interchange at Kyle Canyon provides access to recreational amenities on the north side of the city, including Mount Charleston, Red Rock Canyon, and Floyd Lamb State Park. With development of the Skye Canyon community, traffic in this area will change dramatically.

Constructing a service interchange at this location is one component of the larger five-phase US 95 Northwest Corridor Program, which extends from Washington Avenue to Kyle Canyon Road, and includes improvements necessary to alleviate congestion within the corridor by increasing capacity and improving regional connectivity. The project is being implemented by NDOT, in partnership with the City of Las Vegas and Clark County.

Because of the rural nature of this area and proximity to the various recreational amenities stated above, a context-sensitive approach has been taken to marry the interchange into the surrounding environment, including themed bridge monuments, decorative and native landscaping, and use of natural rocks. Large landscaped medians separate traffic on Kyle Canyon Road entering and existing US 95, but will be made pedestrian-accessible for hikers or bicyclists.

US 95/Kyle Canyon Road Interchange Visualization 1



US 95/Kyle Canyon Road Interchange Visualization 2

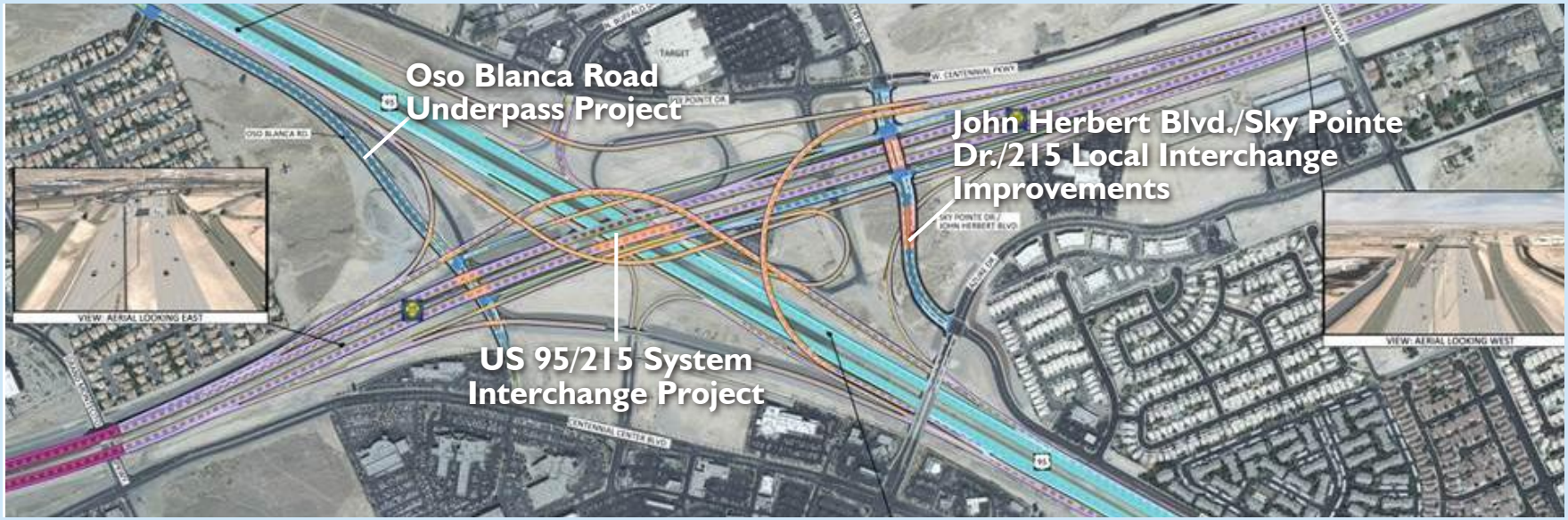
Source: ***Nevada DOT***

US 95/CC-215 System Interchange Project, including local interchange improvements

The interchange at US 95/CC-215 is a key junction for regional travel and provides local access to multiple communities. Currently, the US 95/CC-215 Interchange has only one direct system-to-system connection, causing traffic to re-route onto local roads to make the connection between freeways.

This project includes completion of the full system interchange, along with several local access improvements, including the John Herbert Boulevard/Sky Pointe Drive interchange with CC-215 and the Oso Blanca Road underpass. Like the Kyle Canyon project, this is one part of the larger, five-phase US 95 Northwest Corridor Program and is being implemented by NDOT, in partnership with the City of Las Vegas and Clark County.

The expected project outcomes would not only benefit residents in regards to their travel and air quality needs, but would facilitate the movement of much-needed goods within and through the area as development occurs and the population grows. Moreover, both automobiles and trucks would move through the corridor more efficiently and safely, and the new freeway connectivity through the US 95/CC-215 Interchange would eliminate the potential conflict between freeway through-traffic and local traffic.



Source: ***Nevada DOT***

Elkhorn/HOV Direct Connect Interchange

The Elkhorn/HOV Direct Connect Interchange project includes construction of a local access interchange with high occupancy vehicle (HOV) ramps. Currently, Elkhorn Road bridges US 95, with a full-access interchange at Durango Drive to the north. This new interchange would allow a direct connection for any HOV travelers, helping to reduce vehicle miles travelled and benefit the community and the environment. This is one component of the larger five-phase US 95 Northwest Corridor Program and is being implemented by NDOT, in partnership with the City of Las Vegas. This interchange also allows an efficient connection for buses and carpoolers to access the RTC park-and-ride located near Elkhorn and Grand Montecito Parkway.

Source: ***Nevada DOT***

THE VEHICULAR MOBILITY VISION

With more than 1,340 miles of paved streets in the City, this encompasses the largest component of the Mobility Master Plan: preserving efficient vehicular travel developing a robust road network, continuing street improvement projects, and maintaining our system with necessary repair and reconstruction to sustain our investments. While the street system was built for vehicles, it forms the foundation for bicycle, pedestrian, and transit travel – enabling transportation choices. Therefore, we must continue to invest in and improve this base network (Figure 4-2).

City of Las Vegas Transportation Mode Share to Work	
Car, truck, or van	88.8%
Public transportation	4.4%
Walk	1.8%
Bicycle	0.5%
Taxicab, motorcycle, or other means	1.6%
Work at home	3.0%

Alta Street Improvements

FIGURE 4-2. Vehicular Mobility Vision

Summerlin Parkway
Photo credit: ***June Johns***

Freeway Improvements

Each city in the Las Vegas metropolitan area contributes to the success of the regional freeway system. Major freeway improvements planned over this 20-year period include:

- Upgrade of Summerlin Parkway: Summerlin Parkway is programmed over two phases to convert the corridor to a full freeway, including the addition of new traffic interchanges, auxiliary lanes, and HOV lanes. Related, express bus service is expected to serve the Summerlin community via Summerlin Parkway, and a parallel Summerlin Parkway multi-use trail will connect to the CC-215 Beltway Trail. These improvements are necessary to support the continued buildout of the City, and in particular, the Summerlin Master Plan, which has entitlements remaining in Summerlin West that are projected to generate in excess of 150,000 trips per day with many of them using Summerlin Parkway (see Appendix C).
- Construction of Sheep Mountain Parkway, CC-215 to US 95: Sheep Mountain Parkway serves as the next generation of high-capacity roadways beyond the Beltway to serve expected growth in Las Vegas. The initial phase connects CC-215 with US 95 in the vicinity of the Kyle Canyon area. Like Summerlin Parkway, this will be a phased improvement, beginning with an arterial roadway and transitioning to a full freeway as needed. Traffic interchanges are anticipated at Centennial Parkway, Grand Teton, and Kyle Canyon.

95 Widening of US 95 in Northwest Las Vegas: US 95 is an important freight corridor, forms the primary connection to northwest Nevada, and is slated to become the future I-11 connection. Beyond Summerlin West, northwest Las Vegas is the principal area within the City remaining for new development. With US 95 as the main connection to the rest of the City, improvements are planned to widen and add interchanges to the corridor. Most importantly, the conversion of the US 95/CC-215 intersection to a freeway system interchange is programmed for construction. This will aid in circulation and access by cars, trucks, and transit. Similar to the mobility issue on Summerlin Parkway, without this widening and freeway completion effort, US 95 will be unable to serve the added population expected at Skye Canyon and near the Paiute area. Even with these improvements, capacity will be constrained. Supplementing travel demand with light rail on Rancho Drive provides an opportunity to maintain the functionality of this critical statewide corridor.

INTERSTATE 15 Completion of Project Neon (underway and, therefore, not illustrated on the map): Project Neon will improve traffic on I-15 and local streets near the Spaghetti Bowl by better separating traffic and improving the proposed access ramps near Downtown. The corridor extends 3.7 miles along I-15 from Sahara to the US 95/I-15 Interchange. The project itself will consist of an HOV connector between US 95 and I-15, direct HOV access ramps at Wall Street, reconstruction of the Charleston Boulevard interchange, and Grand Central Parkway connector over Charleston Boulevard.

I-15 Spot Improvements: I-15 is the artery of the Las Vegas Valley. It serves as the main north-south connection through the metropolitan area, runs parallel to the Las Vegas Strip – which attracts more than 40 million visitors a year, and is a major transcontinental corridor serving trade and commerce between Southern California and Canada. NDOT continues to maintain and pursue capacity enhancements to this corridor, such as Project Neon. Additional near-term improvements include adding HOV exit ramps between the airport and Downtown, as well as improving the frontage road system north of Downtown, near the UPRR corridor, and related industrial/freight development. A potential HOV interchange at Meade Avenue/I-15 is also proposed to provide traffic relief to Sahara Avenue and Desert Inn.

I-515 Spot Improvements: Managing traffic and access in and out of Downtown Las Vegas on I-515 is currently under study by NDOT. Preliminary recommendations include widening and/or reconstructing I-515, extending HOV lanes, and constructing new direct access HOV ramps and additional traffic interchanges. Two potential new access ramps are proposed at City Parkway (providing access to Symphony Park and Downtown) and Maryland Parkway. In addition, because of the congestion at I-515 and Charleston Boulevard, the addition of interchanges north and south of this location, at Pescos Road and Stewart Avenue and at Sahara Avenue, are under study to better distribute traffic during the morning and evening rush hours. This improvement has the added benefit of better balancing the provision of high-capacity transit and enhanced bicycle lanes on nearby corridors.

Spaghetti Bowl Freeway Interchange

Photo credit: ***Nevada DOT***

Targeted Street Improvements

The Regional Transportation Plan, or the 20-year program of multimodal transportation improvements for entire Las Vegas Valley, identifies numerous roadway and freeway improvements to improve safety and access on the transportation system. This includes various new freeway interchanges, corridor enhancements, signal improvements, as well as overpasses or bridges to facilitate more interconnected travel on the street system.

Street Rehabilitation and Maintenance

This Plan also includes the 10-year Arterial Reconstruction Plan, which programs required rehabilitation and maintenance projects through 2027. It is through these projects that several related improvements will be conducted (e.g., addition of bike lanes, widened sidewalks), allowing minimal disruption to traffic by conducting multiple improvement projects concurrently. Street rehabilitation projects not currently combined with other multimodal improvements are illustrated on Figure 4-2.

Looking north on Main Street from Las Vegas City Hall

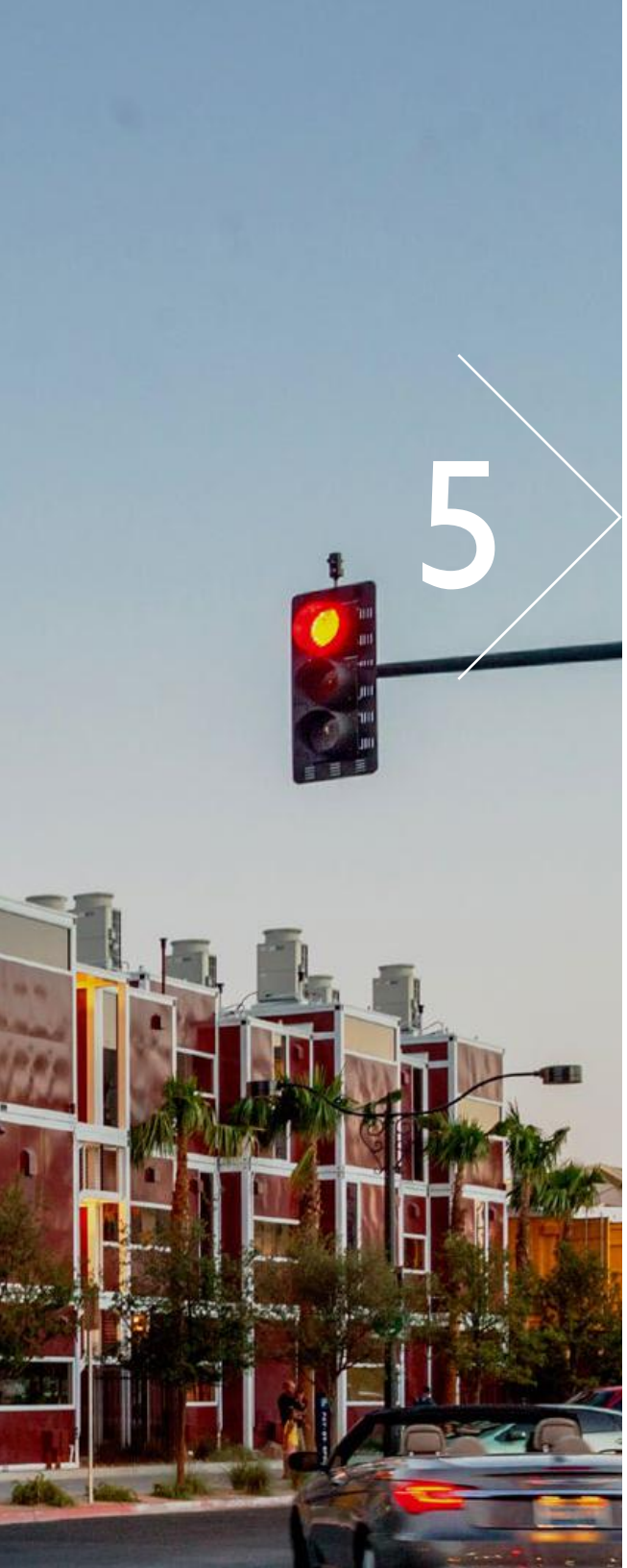
THE BENEFIT OF INVESTMENT

Evaluating how transportation and other infrastructure benefit the overall economy has been the subject of extensive economic literature. However, the costs of inadequate transportation investment are exhibited around us every day. Americans spend 5.5 billion hours in traffic each year, costing families more than $120 billion in extra fuel and lost time. American businesses pay $27 billion a year in additional freight transportation costs, increasing shipping delays and raising prices on everyday products (White House, 2014). Underinvestment impacts safety as well. There were more than 33,000 traffic fatalities last year alone and roadway conditions are a significant factor in approximately one-third of traffic fatalities.

The Las Vegas Valley is not immune from worsening congestion and is a prime example of how fast-growing population and rapid economic expansion create additional travel demand that outpaces additional roadway capacity. Between 1984 and 2014, annual congestion costs in the region increased six-fold from $211 million to $1.38 billion, an annual increase of 6.5 percent. That period includes the economic downturn, when congestion costs shrank for a 5-year period. In the past 2 years, rising congestion has returned, and costs rebounded from post-recession lows up to $1.38 billion. On a per-commuter basis, congestion costs in the region exceed national averages, with traffic delays costing the typical Las Vegas commuter $984 and 46 hours in lost time a year (Texas Transportation Institute [TTI], 2015). A good example is Project Neon, which will improve access to the Las Vegas Premium Outlets Mall which is already a tremendously successful business.

Beyond contributions to transportation efficiency and reliability, it has been demonstrated that business is attracted to and retained in areas where deliveries of business-related goods, including small package delivery, are convenient and reliable. Improvements in the movement of goods can alleviate congestion, improve mobility, remove traffic safety hazards, and promote economic health.


S 7th Street
CONTAINER PARK
707



5

PEDESTRIAN SAFETY AND MOBILITY/ COMPLETE STREETS IMPROVEMENTS

Photo credit: ***Lucky Wenzel***

THE NEED

Streets do not only facilitate moving people and goods through and within the City, but they are also settings for commercial activity and spaces for interaction. Pedestrian and retail activity along street corridors is vital to the economic health of neighborhoods. Streets as gathering spaces enhance social interaction. By incorporating ecological infrastructure like street trees, they can enhance sustainability initiatives.

Streets traversing Downtown Las Vegas, town center areas in master planned communities, and major commercial corridors can be oriented towards large volumes of street activity, encouraging walking as the primary means of exploring these areas. Restaurants and retail establishments extend out onto the street with outdoor dining and sales racks – attracting passersby to stop. However, the traditional organization of the street network puts more emphasis on vehicular traffic than pedestrians, bicyclists, or transit riders, awarding them a substantial width of the street. This becomes particularly problematic along high-volume transit routes, where larger numbers of pedestrians may be queuing up at bus stops or walking to their final destination. Conversely, this may also be the case on local streets that transport large numbers of schoolchildren to and from school each day. If students do not have a safe walking environment – sidewalks, safe intersection crossing infrastructure – parents will not feel comfortable allowing them to walk, putting an additional volume of cars on the road that might not otherwise make this trip.

Adopted Guidance

In an effort to promote the use of all transportation modes and make Southern Nevada a more sustainable place to live, the RTC adopted a policy for **Complete Streets**, along with design guidelines to guide design of comfortable and safe streets.

While this encompasses vehicular transportation improvements, it also supports projects that enhance walking and bicycling infrastructure, as well as improved access to public transportation facilities and services. The Complete Streets initiative promotes urban development patterns and Americans with Disabilities Act (ADA) infrastructure that allow for greater accessibility to transit stops and stations. In addition, because safety for all travelers is paramount, Complete Streets is of particular importance for those who rely on transportation infrastructure to be physically active and for students who walk or bike to school.

The City of Las Vegas integrated Complete Streets design standards into the Unified Development Code to establish requirements for achieving a connected transportation system that provides a safe and accessible environment for a variety of transportation modes and users. Opportunities to integrate Complete Streets principles into roadway improvement projects remain a concerted effort.

The concept of "Complete Streets" is streets that can be used by everyone. They are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists, and transit riders of all ages and abilities. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work.

Complete Streets improvements may encompass a broad range of project types, and in many cases, corridors or intersections may benefit from the application of more than one improvement type. For example, shade, art, and benches can add to the comfort and community feel of the street. Refuge islands and curb extensions can improve pedestrian safety by shortening street crossing distances. Wide sidewalks or pedestrian bridges can achieve both purposes – inviting more people to walk along the street, while increasing the sense of safety. The act of constructing a protected bike lane or adding on-street parking increases safety by imposing a degree of separation between the sidewalk and moving vehicles. All of these improvements benefit transit riders, the majority of which have commutes that include an element of walking to or from their final destination.

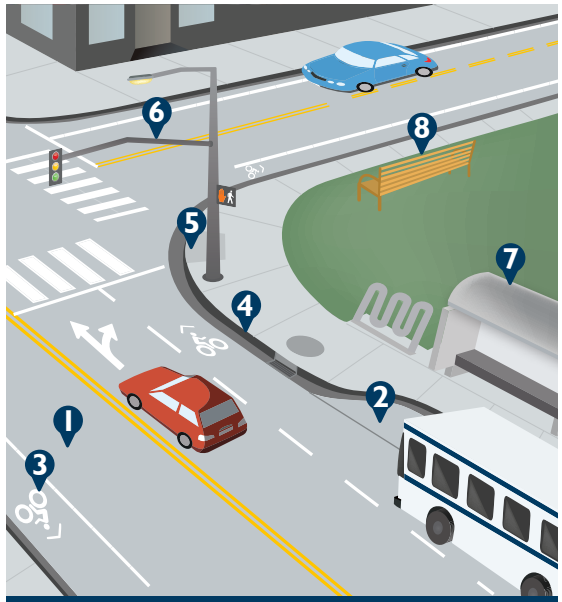
In short, a wide variety of small infrastructure enhancements can go a long way in improving the street environment for many types of users.

While not every street can be designed to serve all users equally, there are opportunities to enhance service for all users while maintaining its principal transportation function. Complete Streets incorporate community values and support adjacent land uses while ensuring safety and mobility.

Proper application of Complete Streets concepts supports sustainable growth and preservation of scenic, aesthetic, and historic resources.

» *From the RTC Policy for Complete Streets*

What does a "Complete Street" look like?



Toolbox of Some Complete Street Elements:

1. Vehicle Travel Lanes
2. Bus Turnouts
3. Bicycle Lanes
4. Curb and Gutter
5. Sidewalks and ADA Ramps
6. Traffic Signals
7. Transit Stop and Amenities
8. Street Furniture and Landscaping

IMPROVING THE STREET ENVIRONMENT

Looking East Along Garces Avenue Towards 6th St.

Comfortable Walking Environment

Photo Credit: ***Sherrie More***

Complete Street Elements

Photo Credit: ***Tucson, AZ***

Shade, Art, Benches, and Lighting

Street furnishing are amenities that improve the travel experience, placed in what is known as the "amenity zone." Street furnishings add vitality to the pedestrian experience and encourage use of the street by pedestrians by providing a more comfortable environment. They provide a functional service to the user as well, with benches allowing people to sit, trees providing shade, and lighting providing a safer environment in the evenings. While installing street furnishings reduces the effective walking width in some areas, they also provide a buffer from traffic and enhance the overall environment. These features may be used to brand an area, or just provide much needed opportunities for a respite in heat or walking.

Wide Sidewalks

Sidewalks along city streets are one of the most important components of Complete Streets. They provide access to destinations and critical connections between modes of travel, including autos, transit, and bicycles. Clear walking widths and safe visual sightlines at driveways should be maintained to ensure a comfortable walking environment. In areas of high pedestrian volumes, such as in Downtown/ town centers, or other areas connecting transit stops or parking areas to destinations, wider sidewalks can increase the usability and attractiveness of walking as a viable transport option. As a component of Complete Streets projects, sidewalks should always be constructed in an ADA-accessible manner.

Bikes, Transit, and On-Street Parking

While a complete system of bicycle and transit facilities are discussed in Sections 2 and 3, the addition of these modes, in combination with the various other improvement types discussed here, can contribute to a Complete Street. On-street parking or dedicated transit corridors serves a similar purpose. Moreover, where one or more of these options are paired with an enjoyable walking environment, vehicular traffic tends to move more slowly and drivers are more aware of street activity.

IMPROVING THE STREET ENVIRONMENT

Curb Extension
Photo Credit: ***NACTO***

Hawk System

Bicycle Signal
Photo Credit: ***CityLab, Gunnar Bothner***

Traffic Calming Elements

Traffic calming includes a combination of mostly physical measures that calms automobile speeds and alters driver behavior to improve the street environment for non-motorized users. Such measures could include speed humps, colored bike lanes, street trees, narrowed vehicle lanes, center islands, Danish offsets (split crosswalk) and others. Regarding Complete Streets, refuge islands and curb extensions are two popular measures to narrow the crossing width for pedestrians at intersections, while still maintaining vehicular and bicycle mobility.

Pedestrian Actuated Flashers

Intersections in high pedestrian areas should be evaluated to include pedestrian crossing signals where the "WALK" signal automatically comes on. However, in special circumstances, or at mid-block crossings with no traffic signal, a specific pedestrian signal or flasher can be used to provide a safe crossing environment. Common technologies include the Pedestrian Light Control Activation (PELICAN) system, which provides a safe, two-stage crossing for pedestrians, incorporating a median island refuge between the two stages; and the High-Intensity Activated Crosswalk Beacon (HAWK), which operates in a similar fashion. Additional techniques include a leading pedestrian interval, which grants pedestrians a 3- to 7-second head start entering the intersection over vehicle traffic, allowing the pedestrian to "take over" the crosswalk first.

Bicycle Traffic Light Priority

Cities across the world are using Intelligent Transportation System (ITS) technologies to balance traffic needs. One such concept is the bicycle traffic light priority, with intelligent lights that will prioritize the flow of buses and bicycles over cars at intersections. Under review in Copenhagen, the sophisticated signals are expected to cut travel times for transit riders between 5 and 20 percent, and for cyclists by 10 percent. Other cities, like San Francisco and Chicago, are timing lights to stay green for those riding a steady 12 to 15 mph pace.

THE PEDESTRIAN SAFETY AND MOBILITY/ COMPLETE STREETS VISION

By identifying high-volume pedestrian areas and/ or major gaps in the transportation network with a predominance of pedestrians, bicyclists, and transit riders, multimodal improvements contributing to more complete streets were assessed and recommended. Complete street features and improvements are planned throughout the city in almost every project in this Plan. Specific improvement types will vary for each corridor depending on the need, but Figure 5-1 provides a snapshot of the predominant type of need identified, based on such factors as transit boardings, bicycle/ pedestrian crashes, proximity to schools, and local population with no vehicle access.

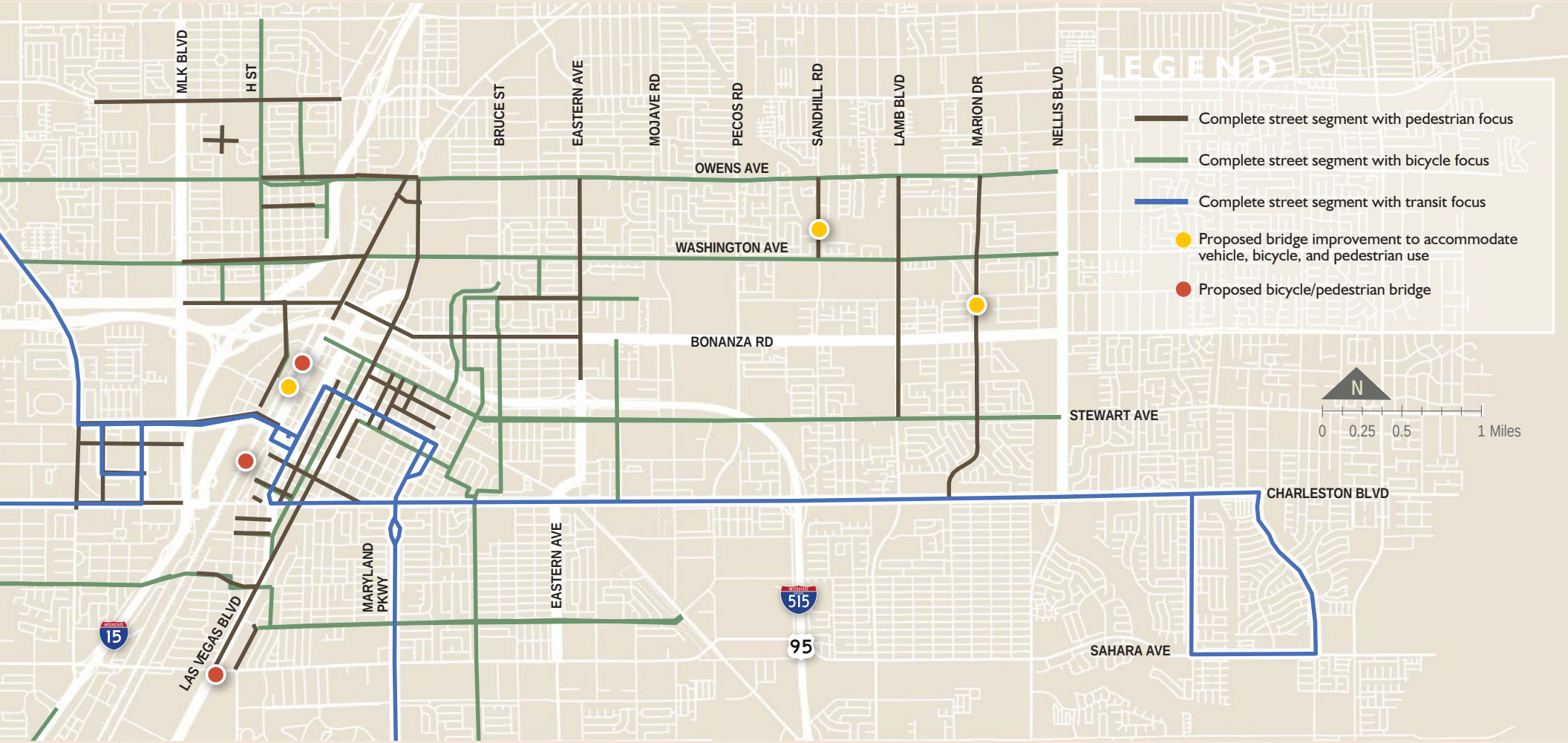
A major focus area of Complete Street improvements is Downtown Las Vegas, which was explored in detail in the Downtown Master Plan, with mobility improvements closely coordinated with those in this Plan. The following page provides more detail on Downtown transportation goals and improvements, with specific project features following on subsequent pages.

There is no singular design prescription for Complete Streets; each one is unique and responds to its community context.

» *From Smart Growth America*

Source: ***NACTO Urban Street Design Guide***

FIGURE 5-1. Pedestrian Safety and Mobility/Complete Streets Vision



Downtown Las Vegas Vision 2045 Master Plan: Planning for Downtown's Revival

2012 is often referred to as "The Year of Downtown" as a number of important projects began the transformation of Downtown as we know it, including The Smith Center, the Mob Museum, and a new City Hall complex. To build on this momentum, as well as the need to reconsider and update the current Downtown Centennial Plan (published 2000), the City embarked on a new plan for Downtown, envisioning a compelling future to guide growth and redevelopment of our urban core over the next 20 years, covering topics from land use and transportation to economic development and sustainability, with the ultimate goal of leveraging investments to transform Downtown in an environment of scarce financial resources.

This Mobility Master Plan goes hand in hand with the Downtown Master Plan. The Mobility Plan sets the context for transportation choice throughout our entire community, with the Downtown Plan providing a more detailed framework for implementation, tying mobility choice with Downtown infrastructure. Figure 5-2 illustrates the map of proposed downtown transportation investments.

Creating Streets for People

Many streets in Downtown are heavily preferential to auto movement, resulting in low intensity development along the street corridor and limited pedestrian activity. The Mobility Master Plan introduces new fixed guideway transit, protected bicycle lanes, and other Complete Street components, balancing all users of the street environment. The Downtown Master Plan envisions how the street interacts with the surrounding environment.

Promoting Transit Usage and Facilitating TOD

The Downtown Master Plan proposes 10 transit hubs in the Downtown, focusing residential, employment, and cultural/tourism activities around high-capacity transit corridors identified in the Mobility Master Plan.

Improving Linkages to Resources and Neighborhoods

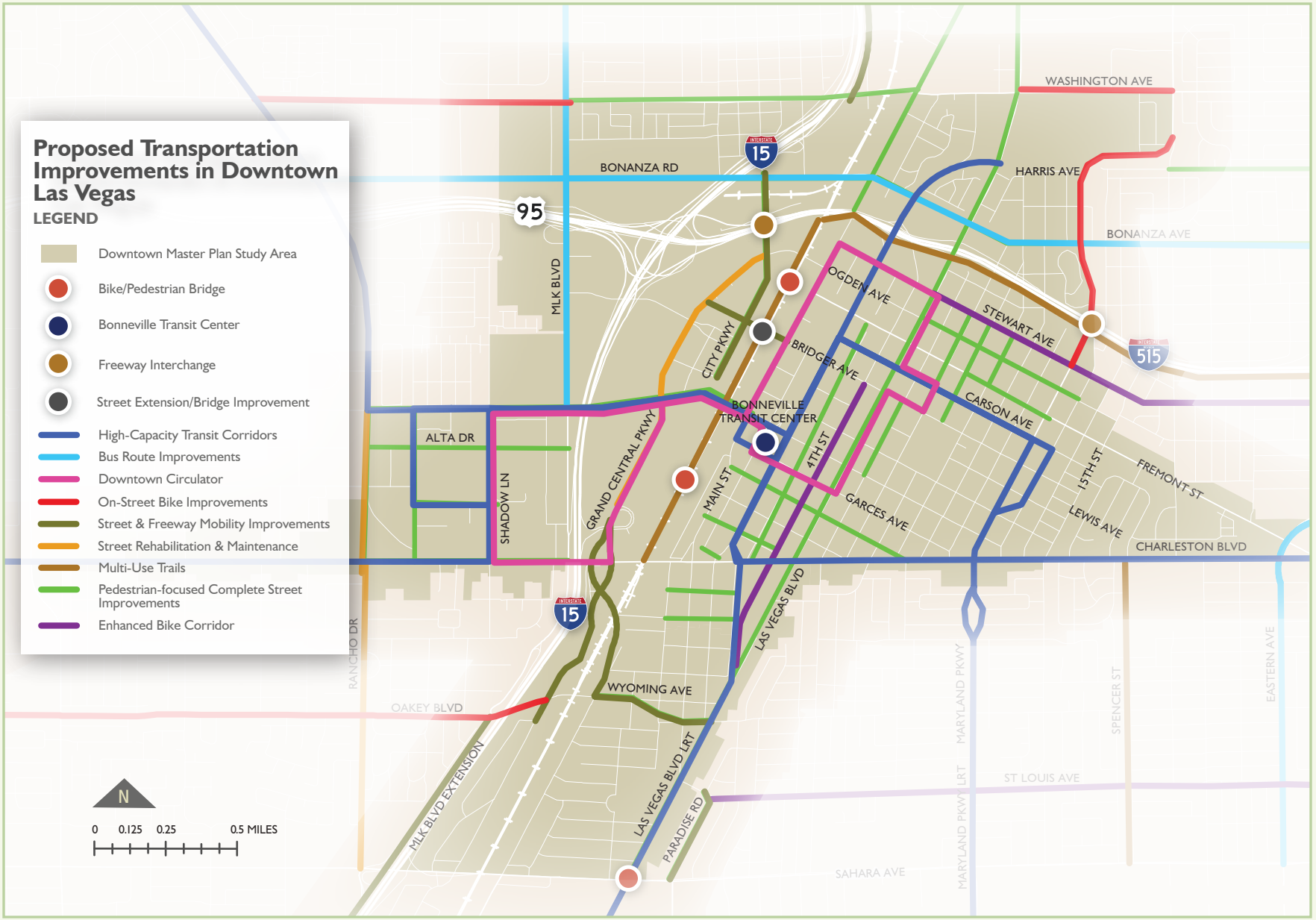
Connections between homes, jobs, education, and recreational destinations is a key component in both plans, achieved through expansion of the bicycle and pedestrian networks, multiple crossings across the UPRR corridor, a more interconnected transit system, and enhanced Downtown freeway access points.

This Mobility Master Plan identifies $**2.5** billion in planned transportation improvements that will impact the Downtown area.

Achieving an Innovation District via Smart Technology

The City has established an innovation district within the Downtown to promote and adopt new transportation infrastructure and mobility technology. Innovative technologies are a component of both plans to lay the foundation for automated and connected vehicles, and in the interim, address parking and traffic demands and improve safety.

FIGURE 5-2. Proposed Transportation Investments in Downtown Las Vegas



Linking Symphony Park with Downtown

Symphony Park has created an important cultural amenity within the City, including both the Smith Center and Children's Museum, and is adjacent to other successful destinations, including the Keep Memory Alive Lou Ruvo Cleveland Clinic, Las Vegas North Premium Outlet Shops and World Market Center. However, the UPRR corridor forms a barrier for connectivity to other Downtown destinations.

Completing the Street: Symphony Park Avenue Extension to Main/Lewis

As part of the Downtown Master Plan, a detailed concept was envisioned for the Symphony Park Avenue extension over the UPRR corridor. The corridor will include wide sidewalks, bike lanes, and a landscaped median, creating a safe and comfortable environment for all users of the street. This will serve as the primary linkage between the expanding Symphony Park area and Downtown core.

A key component to the Downtown Master Plan is improving connectivity between Symphony Park and Downtown, more closely integrating them with new trails, expanded transit, and additional bridge connections over the railroad.

Visualization

FIGURE 5-3. Symphony Park Area Mobility Improvements

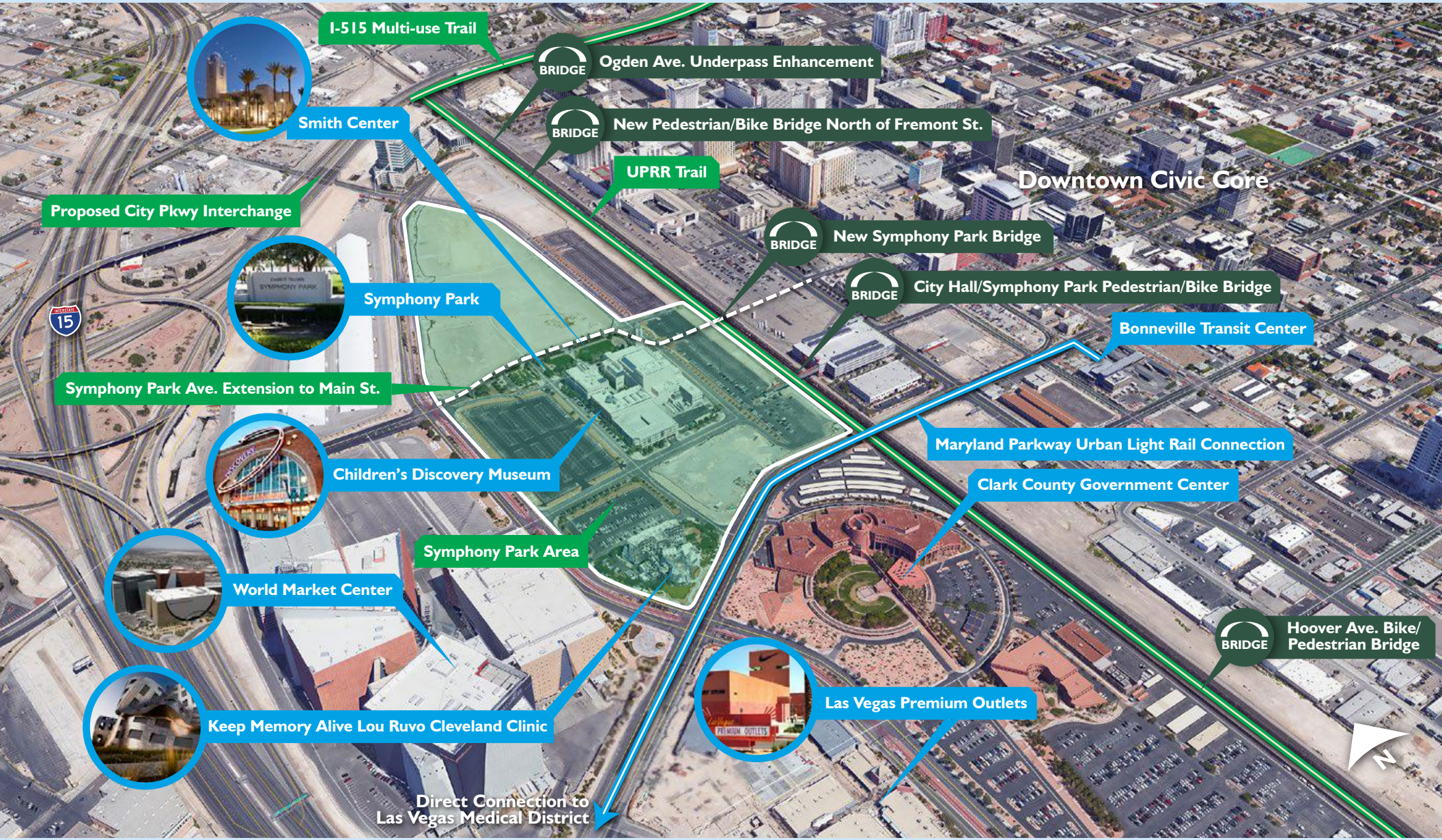


Photo credits: ***City of Las Vegas, Geri Kodey, LVCVA, Robert Longsdorf, Ryan Reason***

Main/Commerce One-Way Couplet

The City of Las Vegas is working on a number of projects to improve bicycle and pedestrian facilities in the Downtown area. After reviewing several options, it was decided that the conversion of Main/Commerce Street to a one-way couplet would be a way of achieving both goals, as well as making the street more "complete." This had the added advantage of upgrading Commerce Street, which now only provides local access through an economically marginal light industrial area. Under this concept, both corridors would be narrowed to two one-way travel lanes, with bike lanes, on-street parking, and wide sidewalks. The resulting streetscape will upgrade the overall amenity of the area and meet the needs of pedestrians and bicyclists, while also achieving a modest increase in the carrying capacity of the roadway.

Main Street - Existing

Visualization

Filling in the Gaps: Las Vegas Wash Bridge at Sandhill with Traffic Calming Improvements

Several improvements recommended as part of this Plan fill in "gaps" in the existing transportation network – extending roadways, completing bridges, or creating a continuous bike or pedestrian network. One important element is the creation of bridges across the Las Vegas Wash corridor. This is an important recreational amenity to the region, but many city streets are truncated at the wash – leaving a lot of dead ends and no connectivity. Bridging the wash at select locations provides continuity to the roadway network – serving cars, cyclists, pedestrians, and transit riders – while also providing better access to this amenity for our residents.

Sandhill - Existing

Visualization

Lake Mead Boulevard

Losee to Tonopah: Complete Streets Improvements

While Complete Streets and pedestrian improvement projects may occur independent of other transportation improvements, walking is often linked with transit or bicycling as the "last mile" connection – or the means of making the final connection to a traveler's destination. Lake Mead Boulevard is selected as a pilot Complete Streets demonstration project. In 2015, it was the 11th highest volume transit corridor in the region, preceded by four BRT routes.

This segment of Lake Mead Boulevard has a unique mix of high pedestrian generators that includes high demand transit stops, numerous schools, community centers, neighborhood shopping attractions, a library, and many senior citizen apartments. Improvements are expected to enhance the walkability and comfort of the corridor for pedestrians making the final connection from transit to their destination.

Major improvement components include:

- Road diet (narrow from three to two travel lanes per direction) to allow curb bulb-outs at intersections
- Widened sidewalks with amenity zone
- Buffered bike lane to separate vehicular and bicycle traffic
- Wide, raised center median
- Bus turnouts at major intersections and mid-block locations with high pedestrian volumes

Similar Complete Street improvements are also proposed on Lamb Boulevard between Owens and Stewart. As Lamb Boulevard sees a higher than average crash rate involving pedestrians, proposed improvements are more oriented to pedestrian safety enhancements.

Lake Mead - Existing

Visualization

Completing the Street: Las Vegas Boulevard, Sahara to Owens

$57 million of improvements are planned over three phases for the 3.5 mile stretch of Las Vegas Boulevard between Sahara and Owens Avenue. This segment connects the iconic Las Vegas Strip with Downtown, passing near the Arts District, Downtown core, Fremont Street Experience, and Cashman Field. Improvements include widening sidewalks with shade trees and improved lighting, enhanced transit shelters, full pavement replacement, vehicle capacity improvements at intersections, and north of Stewart Avenue, on-street bike lanes. Las Vegas Boulevard is by far, the most important roadway in Downtown, carrying around 30,000 vehicles per day. Reconstructing the corridor will keep it functioning at a high level for decades to come.

Las Vegas Boulevard at Carson Avenue - Existing

Las Vegas Boulevard anchors Southern Nevada's tourism industry, with 41 million people a year visiting the Valley. According to the 2015 Las Vegas Visitor Profile, over 30 million of those visitors are staying on or just off the Strip, and at least one-third of those visit Downtown at least once during their stay. While most people use cars or taxis to get Downtown, about 30 percent walk or take transit. That's about 10 million per year walking along Las Vegas Boulevard – proving a need to make a more safe and inviting visitor experience for motor vehicles and pedestrians alike.

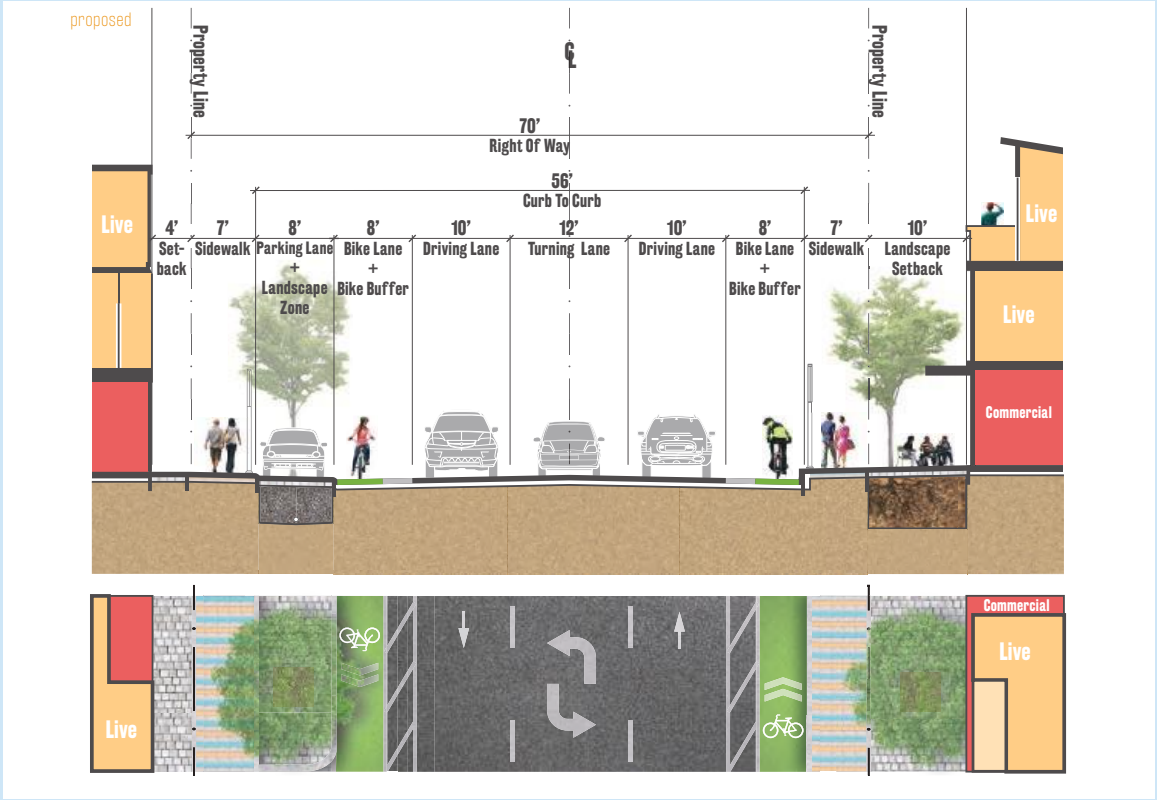
Visualization

Historic Westside Community, Washington Avenue Complete Street

The University of Nevada, Las Vegas (UNLV) recently published *The Hundred Plan for the Historic Westside Community*, establishing a vision to revitalize this community that has played a pivotal and unique role in the history of Las Vegas. One component of this plan is bringing community experiences back to the street environment, such as outdoor dining and music venues, making the streets more "complete".

Washington Avenue, specifically between D Street and H Street, is one planned Complete Street conversion. The redesign of this corridor will contribute to the success of the Music Entertainment District, with unique streetscaping, wide sidewalks, an active retail area, on-street parking, bicycle lanes, and landscaping/street trees to provide shade and character.

Proposed Redesign of Washington Avenue



Source: ***The Hundred Plan For the Historic Westside Community, 2015***

GENERAL MOBILITY IMPROVEMENTS

An effective transportation system allows choices for people to move around in the manner that best suits them. A transportation system that accommodates the needs of residents and is considerate of safety for all users provides the groundwork for a well-designed and functional city. In addition to the specific roadway projects proposed, a series of general mobility improvements are important to the functionality of the City's roadway network, and should be implemented as possible.

Getting to School Safely

The distance a student lives from school affects their ability to walk or bike to school. Schools located in low-density housing areas may have a larger proportion of students who live further away from school. This will heighten dependence on motorized transportation and force the school to provide more parking and loading/unloading areas. Alternatively, schools located in close proximity to higher-density housing are more likely to have students who live nearby and will walk or bike to school. It is not only a function of density though, but also urban development patterns. Subdivisions surrounded by large block walls with limited routes in and out may cause a short trip to school (as the crow flies) to become a lengthier commute that requires students to be driven, rather than walking or riding bikes.

As the Las Vegas Valley continues to grow, access to schools remains an important consideration. Two recent plans by the RTC offer guidance on this topic: the Regional Schools Multimodal Transportation Access Study and the Regional Bicycle Network Gap Analysis, which both provide policy direction to be adopted by local jurisdictions. The overarching goal of both is to "Create safe and inviting environments for students, families, and staff to walk, bicycle, and use public transportation on the way to school." Some underlying principles for ideal school access include:

- Separation of sidewalks and multi-use pathways from traffic
- Safe and pleasant pedestrian and bicycle routes that allow for natural surveillance
- Direct connections
- Integrated local, regional, and state-wide pedestrian and bicycle facilities, sidewalks, and multi-use pathways
- Open access to school sites on all four sides

The Clark County School District (CCSD) is the fifth largest school district in the nation, operating 357 schools. It has adopted a Safe Routes to School (SRTS) program that enables children to walk and bicycle to school. As part of this program, CCSD facilitates walk audits, which identify transportation shortcomings that should be addressed to increase safe connectivity between homes and school sites. The City of Las Vegas conducts walk audits at 12 schools per year (two per ward) under their Suggested Routes to School program. To date, improvements include installation of 14 U-turn prevention medians, 36 pedestrian flashers, kiss-n-go lanes for drop-off/pick-up, and curb extensions at 12 schools. These types of improvements will continue to be implemented citywide.

Students, parents, and employees can safely and conveniently walk and bicycle to school; thus, reducing the need for children to be bused or driven. Schools are strategically designed and are integrated with the surrounding transportation network, resulting in safe and smooth traffic operations when children are bused or driven. Long-term results are beneficial to communities because students, parents, and employees are able to access schools safely and conveniently through a variety of modes.

» *Vision Statement, from the RTC Regional Schools Multimodal Transportation Access Study*

Kiss-n-go lane for student pick-up/drop-off

Photo credit: ***City of Las Vegas***

U-turn prevention median

Photo credit: ***City of Las Vegas***

Americans with Disabilities Act

The Americans with Disabilities Act (ADA) encompasses a wide range of compliance activities, including the stipulation that the public ROW may be considered a public service in that streets, sidewalks, and curb ramps may be essential to the usage of a city's built environment. For example, streets, sidewalks, and curb ramps may be part of a continuous path of travel between various public and private facilities located on adjacent properties, such as public offices, schools, parks and recreational facilities, public service agencies, hospitals and health clinics, police facilities, and public housing. Per federal regulation, the City of Las Vegas has completed an ADA Transition Plan, which conducts a self-evaluation on all public infrastructure that meets the ADA requirements, noting compliance issues, and sets forth a plan for improving deficient infrastructure through the City's repair and upgrade program. Because the City of Las Vegas has a large number of facilities, it is impossible to immediately remove all barriers to access, but the plan establishes an implementation program based on priority – or degree of barrier. As part of this effort, a review of city roadway design standards was conducted to ensure all future street improvements comply with current ADA legislation.

ADA curb ramp

Photo credit: ***City of Las Vegas***

ADA-compliant pedestrian refuge

Photo credit: ***City of Las Vegas***

The ADA was signed into law in 1990. The ADA builds upon the requirements of Section 504 of the Rehabilitation Act and is an important civil rights legislation that prohibits discrimination against people on the basis of disability. It ensures that people with disabilities have equal rights and opportunities as able-bodied people.

Sidewalk Infill Program

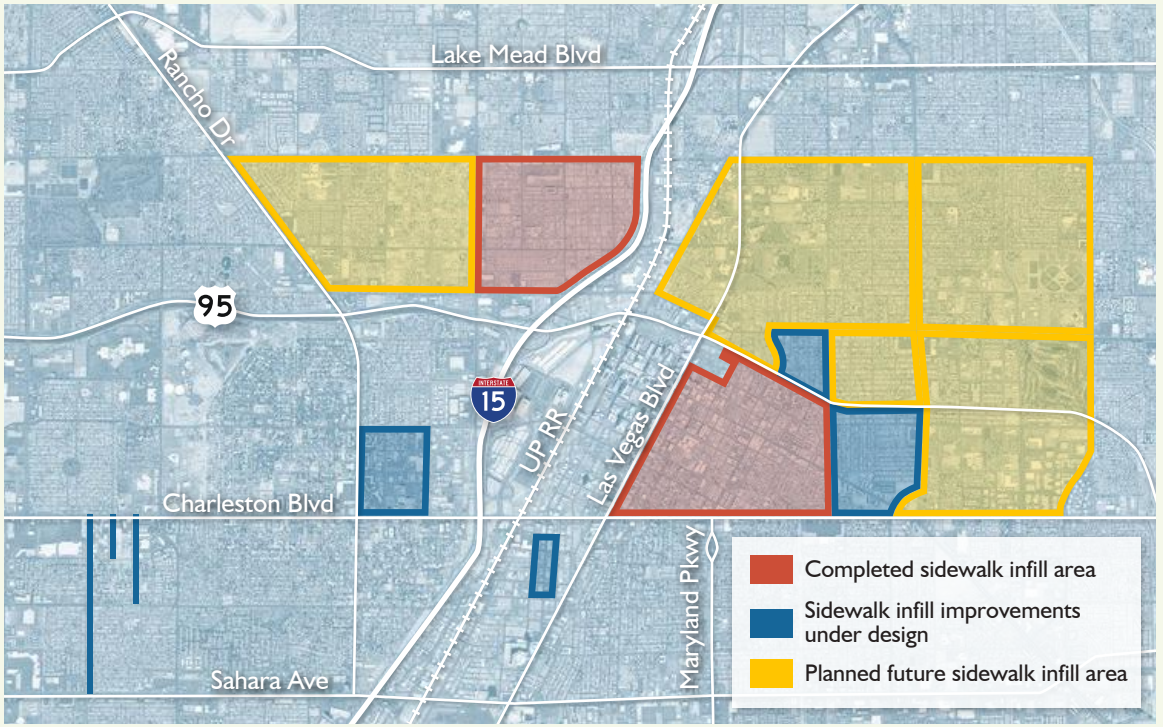
As the most basic element of a Complete Street, the City of Las Vegas continues to complete the sidewalk network through an infill program which installs or conducts needed upgrades to sidewalk facilities. Many older neighborhoods surrounding Downtown have never had sidewalks to begin with, so this program is crucial in transforming those streets, making them safer for all users, as well as more accessible for those with traveling disabilities. This program is primarily funded through Community Development Block Grant and implemented by the City's Public Works Department. Figure 5-4 illustrates the two neighborhoods that have recently had improvements completed, while outlining priority areas for near-term improvements.

To date, $8.3 million in sidewalk improvements have been completed; $9.8 million in improvements are under design; and $22 million are left to be completed – equating to $40.1 million dedicated to sidewalk development in and around the Downtown area.

Before

After

FIGURE 5-4. Sidewalk Infill Program: Priority Improvement Areas



THE BENEFIT OF INVESTMENT

Each element of the pedestrian realm provides its own benefit, and when implemented together – can provide substantial value to transforming the street. A few examples of the value added include:

- Street furniture makes walking, bicycling, and public transit more inviting. They improve the street economy by creating a more inviting and uniform streetscape, attracting people to the street and, thereby, increasing the "eyes on the street" or public safety element. An inviting pedestrian environment also creates a space for social interaction, which provides retail establishments with a valuable opportunity to attract customers and to be more visible to passersby.
- A large desert tree will yield $21 to $43 in average annual net benefits over 40 years with costs factored in (USFS, 2004). Street trees provide innumerable benefits: they create shade to lower temperatures and reduce energy use, make a more pleasant environment in which to walk, improve air quality, increase property values, enhance safety by slowing traffic and fostering a more consistent human presence, and enhance local neighborhood and cultural identity – to name a few.
- Street lighting improves nighttime safety and security by illuminating the roadway and sidewalk area to benefit all users of the public ROW, including motorists, bicyclists, transit users, and pedestrians. It also contributes to the identity of a district or neighborhood.
- Curb extensions reduce the crossing distance for pedestrians and make pedestrians more visible for motorists, encouraging drivers to slow down. They also provide additional sidewalk space for street furniture and landscaping.
- Providing raised medians or pedestrian refuge areas at marked crosswalks has demonstrated a 46 percent reduction in pedestrian crashes (FHWA, 2013).
- Pedestrian flashers can enhance safety by reducing crashes between vehicles and pedestrians at unsignalized intersections and mid-block crossings by increasing driver awareness of potential pedestrian conflicts.


725
8th ST
usbank
STOP

6

BUSINESS AND FINANCIAL PLAN

A BUSINESS PLAN FOR TRANSPORTATION

Developing a business plan for the City's transportation infrastructure is different than developing a business plan for a restaurant, movie theater or hotel. These businesses seek a profit, the common measure of success or failure for any private sector enterprise. A local government, however, measures success in different ways. Paramount among these measures is the quality of life afforded to its residents.

Quality of life can be difficult to measure, but it is far from ethereal. In the context of transportation, issues of mobility, choice and access are critical considerations. The alternative is congestion and isolation, costing residents and businesses time and money, separating consumers from businesses and workers from employers, ultimately reducing the region's economic potential.

While the measure of success may differ between the private sector and the public sector, the basic concepts of what is physically possible (what can be done), what is maximally productive (how do serve the most people most efficiently) and what is financially viable (how will the plan be funded) are remarkably similar.

Prior sections of this document have outlined the alignment of the City's transportation plan with the needs of the community, detailing infrastructure improvements and the value underlying mobility options from bicycles to enhanced light rail. Here, we consider how these improvement might be funded as well as the potential returns on those investments. These efforts notwithstanding, we respectfully submit that the most important measure of success may be the most difficult to measure: **quality of life.**

At core of this business plan is the City of Las Vegas' **mission**:

"To provide residents, visitors and the business community with the highest quality municipal services in an efficient, courteous manner and to enhance the quality of life through planning and visionary leadership."

Photo credit: ***Mike Korn***


Fremont East
DISTRICT
GAMBLIN
GRIFFIN
TATTOO
CHECKS
PIZZA Deli
REGISTER

PROJECT COST AND TIMING

Like the City of Las Vegas, the Mobility Master Plan is not one thing. In fact, it includes more than 180 distinct transportation projects ranging from buffered bike lanes to new freeway interchanges. The common thread tying all of these projects together is the Complete Streets concept and a need for higher-order mass transit to support high-ridership corridors such as Charleston Boulevard, Maryland Parkway and Rancho Drive.

In total, these projects have a combined cost of $3.2 billion*. This includes the cost of planning and environmental analysis requirements, design and right-of-way acquisition, and the construction phase, as well as preliminary operations and maintenance costs, respecting that those may differ based on the types of facilities ultimately deployed. Furthermore, the operations and maintenance costs may need to account for maintenance cost savings associated with improvements to existing transportation assets (e.g., new roads cost less to maintain than old ones).

The development timeline for the Mobility Master Plan is the 20-year period from fiscal 2018 through fiscal 2037. It is important to note that an additional 22 projects costing roughly $130 million* are part of the broader plan, but are not reflected here because they are actively underway and/or are covered by existing City transportation funds. It is also important to keep in mind that the RTC of Southern Nevada is ultimately responsible for the development and operations of the region's transit system. While the City is supportive of the identified projects, the timing and funding of the Charleston and Rancho lines are dependent on the priorities of the RTC and the availability of scarce transportation funding resources.

Combined, the Mobility Master Plan includes more than 180 projects with a cost of $**3.2 billion**.

** Project costs expressed in constant 2016 dollars.*

The Mobility Master Plan includes **181 roadway projects** developed over 20 years at a cost of **$1.13 billion.**

TABLE 6-1. Estimated Project Costs and Implementation Timings

ROADWAY PROJECTS (2018 - 2037)*

** Project costs expressed in constant 2016 dollars.*

	FY 2018-22	FY 2023-27	FY 2028-32	FY 2033-37	Total
Number of Projects	109	54	7	11	181
Length (in miles)	150.3	89.5	69.1	72.5	381.4
Estimated Cost (in millions)	$451.00	$294.00	$118.00	$263.00	$1,126.00
Average Cost Per Mile (in millions)	$3.00	$3.28	$1.71	$3.63	$2.95

TRANSIT PROJECTS (TBD)

	Timing	Length (in miles)	Cost (in millions)	Cost (per mile)
Charleston Center Running Light Rail	TBD	15.2	$1,106.8	$72.8
Rancho Center Running Light Rail	TBD	7.1	$485.0	$68.3
Maryland Side Running Light Rail	Est 2022	8.7	$465.0	$53.4
Total		31.0	$2,056.8	$66.4

The Mobility Master Plan includes **3 major transit undertakings** with a combined cost of **$2.1 billion.**

PRIMARY FUNDING STRATEGY

Funding the Mobility Master Plan's transportation projects will require a variety of funding sources. While these funding sources appear sufficient to fund the recommended transportation projects, it is important to keep in mind that some sources are dependent on federal government authorizations and others require approval by local voters. The Mobility Master Plan was designed to reflect the "need" and is prioritized based on anticipated, available funding resources. The ultimate timing of these revenues could accelerate or extend various projects. To this end, the Mobility Master Plan provides a spectrum of potential funding and programming strategies that will adapt to transportation revenue streams.

In reviewing the alternative scenario matrix, there are two important considerations to keep in mind:

1. All scenarios presented reflect the assumption that extended fuel revenue indexing is approved by voters in November 2016. This revenue source accounts for approximately 27 percent of the Mobility Master Plan's funding. In the event this measure does not pass, material adjustments to this plan will be required.

2. The RTC and others are actively refining their own estimates of transportation funding needs and anticipated revenue streams. The estimates provided here will need to be revised to reflect changes in available sources, allocation shares and use of funds as information is further refined.

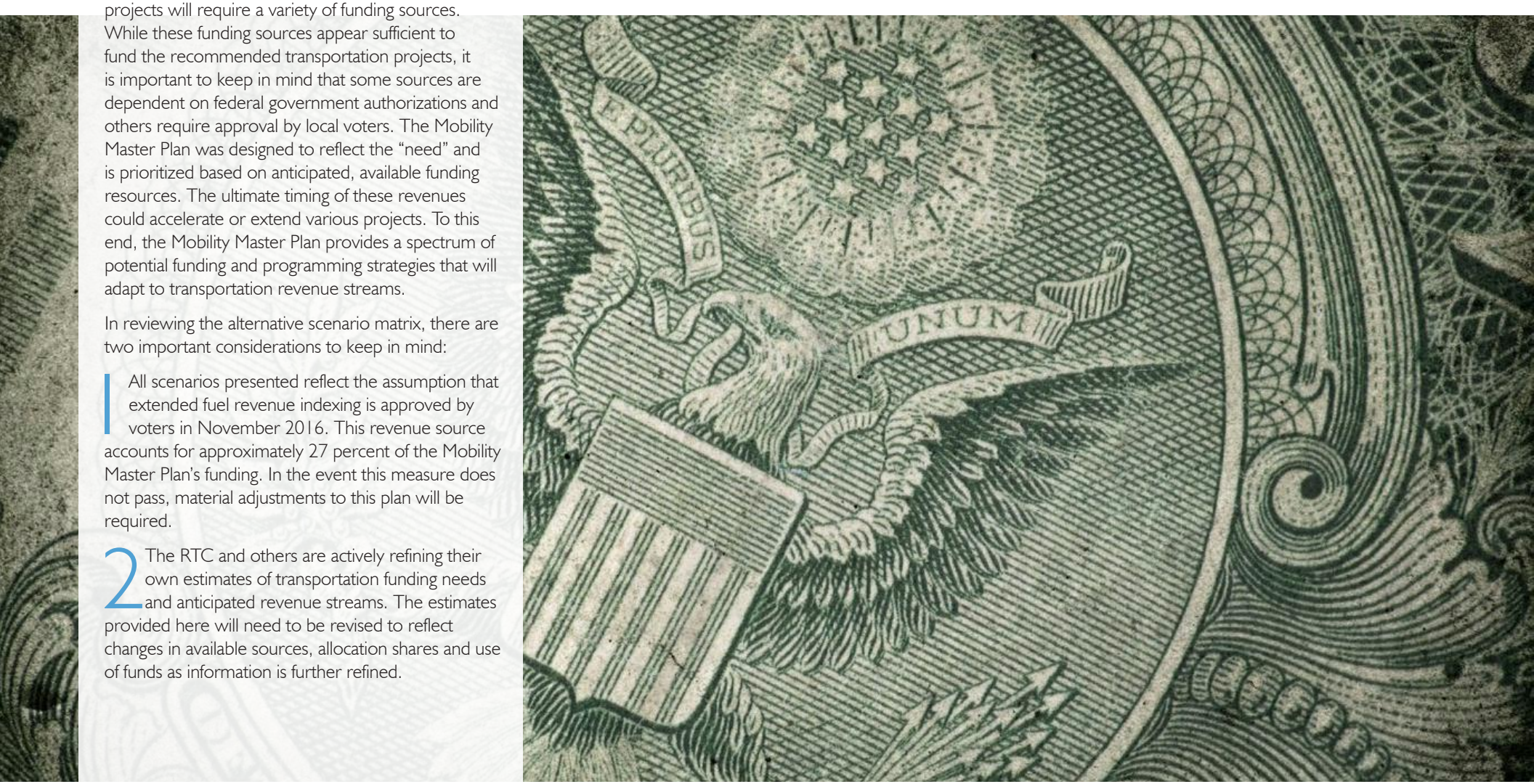


TABLE 6-2. Potential Funding Scenario Analysis for Roadway Projects

Scenario	Key Assumptions	Anticipated Revenues	Transportation Programming	Notes
Conservative	Growth and transportation revenues are slower than anticipated, resulting in a funding gap; transportation funding availability to the City is more limited; federal funding opportunities are reduced	$1.1 billion; Q10 funding, fuel revenue indexing, and other key revenue sources are reduced by approximately 25 percent (to $300M) due to slower growth and/or lower allocations of available funds	Project timing is extended; siting projects along NDOT right-of-way that can be funded by NDOT; supplemental revenues may be required earlier than anticipated	Under the conservative scenario, projects' priority is maintained, but the timing of projects may be delayed due to funding capacity
Mid-Case	Reflects highest probability growth patterns, revenue growth and funding allocation assumptions	$1.5 billion; reflects approximately $400 million from extended fuel revenue indexing; 8 additional revenue sources contribute to the balance	Projects are completed within a 20-year project horizon	Mid-case scenario does result in a funding gap in some periods; however, the carryforward fund balance is expected to offset funding shortfalls throughout the study period
Aggressive	Growth and transportation revenues are higher than anticipated, significantly reducing the out-year funding gap and potentially accelerating transportation projects	$1.8 billion; 20 percent higher than the mid-case scenario; extended fuel revenue indexing increases to $480 million; other revenues reflect increased yield consistent with higher rates of demand and consumption	Project timing is accelerated; NDOT projects remain important but are unlikely to affect near-term programming; potential revenue surplus may need to be allocated to additional projects due to greater-than-expected demand	Importantly, the aggressive scenario not only anticipates faster rates of revenue, but also, faster rates of demand due to a higher-than-expected pace of population growth

PRIMARY FUNDING STRATEGY (MID-CASE PRO FORMA)

Table 6-3 summarizes the current mid-case scenario. Notably, funding shortfalls exist in some periods; however, overall sources outpace uses by roughly 6 percent. As conditions evolve, so too must this Mobility Master Plan. There are circumstances that could reduce costs and additional revenues may be identified or required in the out years. This could accelerate or delay the timing of some projects.

The summary that follows provides one reasonable scenario should growth projections materialize as expected and revenue allocation reflect historical norms.

TABLE 6-3. Roadway Projects' Sources and Uses Summary (2018-2037)*

	FY 2018-22	FY 2023-27	FY 2028-32	FY 2032-37	Total
Program Uses					
Roadway Projects	$436.6	$366.7	$167.3	$421.1	$1,391.6
Program Sources					
A. Motor Vehicle Fuel Tax	$35.3	$64.9	$99.7	$137.9	$337.8
B. Question 10 Funds	$27.9	$30.0	$32.4	$34.9	$125.2
C. Fuel Revenue Indexing (Current)	$61.1	$0.0	$0.0	$0.0	$61.1
D. Fuel Revenue Indexing (Extended)	$273.4	$126.6	$0.0	$0.0	$400.0
E. Congestion Mitigation and Air Quality Improvement Funds	$29.0	$32.8	$37.1	$42.0	$141.0
F. Surface Transportation Block Grant Program	$66.8	$73.8	$81.5	$89.9	$312.0
G. Southern Nevada Public Land Management Act Funds	$7.9	$8.9	$10.1	$11.4	$38.3
H. Highway Safety Improvement Program Funds	$10.5	$11.9	$13.5	$15.2	$51.1
I. Room Tax Capital Allocations	$2.5	$2.5	$2.5	$2.5	$10.0
Total Program Sources	**$514.4**	**$351.5**	**$276.7**	**$333.8**	**$1,476.4**
Preliminary Funding Surplus/(Gap)	**$77.8**	**($15.2)**	**$109.4**	**($87.2)**	**$84.8**

** Project costs and revenues expressed in inflation-adjusted year of expenditure dollars.*

Motor Vehicle Fuel Tax

The City of Las Vegas receives an annual allocation of the tax imposed at the pump when consumers purchase fuel.

Fuel Revenue Indexing (Current)

In 2013, the state of Nevada began indexing fuel taxes to reflect inflation. The program provides incremental funds for transportation projects but cannot continue past 2016 without a vote of the people (values reflect the balance of anticipated allocations).

Congestion Mitigation and Air Quality Improvement Program Funds

Pursuant to the recent passage of the FAST Act, southern Nevada is estimated to receive increased allocations of $25 million per year. Approximately $5 million will be allocated directly to the RTC; the balance will be distributed among the local jurisdictions based on population and valuation with consideration of competitive projects. Estimate reflects anticipated allocation to the City.

Southern Nevada Public Lands Management Act

Beginning in fiscal 2018 the City will be eligible to participate in this federal program and can allocate funds to certain transportation projects (e.g., trails).

Room Tax Capital Allocations

The City of Las Vegas has historically allocated approximately $500,000 in room tax capital allocations to transportation funding projects. These funds are typically used to cover costs not covered by certain federal funding sources or to provide a local match for federally funded transportation projects. This analysis assumes the same level of funding throughout the project period.

Question 10 (1991 & 2002) Funds

Q10 provides additional funds for transportation through a number of sources. The current capital improvement plan for southern Nevada reflects $294.2 million during the next 15 years. Estimated allocations include the City's pro rata distribution over the 20-year plan horizon.

Fuel Revenue Indexing (Extended)

Incremental fuel tax allocation assumes passage of fuel revenue indexing by voters in November 2016. The City's total allocation is estimated at $400 million during the next 10 years, including allocations for maintenance as well as new project construction.

Surface Transportation Block Grant Program

Pursuant to the FAST Act, southern Nevada is estimated to receive increased allocations of $46.5 million per year. The anticipated allocation of $12.8 million annually reflects the City's estimated share assuming a distribution relatively consistent with its population and valuation. Notably, these projects are based on a competitive ranking.

Highway Safety Improvement Program Funds

This federal program allows program funds to be used for transportation projects that improve safety and address high-crash corridors and intersections. Under the FAST Act, Nevada is projected to get approximately $21 million per year to fund these undertakings. There are unique eligibility requirements for this program; however, program staff believe that the Mobility Master Plan can anticipate approximately $2 million annually.

TRANSIT FUNDING OPTIONS

There are no specific sources of funding defined to sufficiently support the higher-order transit strategies outlined in this plan. Notably, the Federal Transportation Administration has a number of funding programs that could potentially fund as much as 50 percent of the $2.1 billion transit program proposed. That said, these programs are competitive, often require some form of local funding match and are dependent of federal budgets and policy leanings. Additionally, a review of how comparable programs have been funded points to one unambiguous finding: there is no defined template or single source to fund light rail, each community's funding plan is unique and includes a myriad of funding elements and funding partnerships. The RTC of Southern Nevada is projecting that the Maryland Parkway Urban Light Rail Transit Improvement Project could be operational by 2022 if everything unfolds as currently anticipated and federal funds are secured. Additionally, the RTC is now entering the alternatives analysis phase for transit options within the Resort Corridor. Respecting that federal funds are limited, and the RTC's needs are extensive, alternative funding sources would be needed to add additional projects – like the Charleston and Rancho lines – to the development pipeline in the near term.

"So, we know our revenues and our certainty are about as low as they've ever been. We know for sure that our country is growing and that we're going to have more people accessing our roads, rails, and airports and more freight to move than ever before. Rather than having a single strategy, we need to have an all-of-the-above strategy. We need to use every financing tool available. When it makes sense, we need to turn to the private sector."

» *United States Secretary of Transportation* ***Anthony Foxx***

Fixed Guideway Capital Investment Grants
49 USC 5903 Grant Program

Capital Investment Grants (CIG's) is the discretionary program that provides funding for fixed-guideway investments such as new and expanded heavy rail, commuter rail, light rail, streetcars, bus rapid transit, and ferries, as well as corridor-based bus rapid transit investments that emulate the features of rail. There are four categories of eligible projects under the CIG program: New Starts, Small Starts, Core Capacity, and Programs of Interrelated Projects. The light rail project would be expected to seek funding under the "New Starts" program, which is specific to new fixed guideway projects with a total estimated cost of $300 million or more that are seeking $100 million or more for the program. Systems currently participating in the program are in Table 6-4.

TABLE 6-4. Federal New Start Program Allocations (Budgeted, FY 2016) (in millions)

Transportation Project	Mode	Project Cost	Section 5309 Request	Section 5309 Share	FY 2016 Budget Recommendation
Existing New Starts Full Funding Grant Agreements					
CA Los Angeles, Regional Connector Transit Corridor	LRT	$1,403	$670	47.7%	$115
CA Los Angeles, Westside Subway Extension (Section 1)	HR	$2,822	$1,250	44.3%	$115
CA San Francisco - Third Street Light Rail-Central Subway	LRT	$1,578	$942	59.7%	$165
CA San Jose - Silicon Valley Berryessa Extension	HR	$2,230	$900	40.4%	$165
CO Denver - RTD Eagle, Denver	CR	$2,043	$1,030	50.4%	$165
HI Honolulu - High Capacity Transit Corridor	HR	$5,122	$1,550	30.3%	$265
MA Cambridge to Medford, Green Line Extension	LRT	$2,298	$996	43.4%	$165
NC Charlotte, Blue Line Extension-Northeast Corridor	LRT	$1,160	$580	50.0%	$115
OR Portland - Milwaukie	LRT	$1,490	$745	50.0%	$115
New Starts Projects Recommended for Full Funding Grant Agreements					
CA Los Angeles Westside (Section 2)	HR	$2,374	$1,187	50.0%	$100
CA San Diego, Mid-Coast Corridor	LRT	$2,112	$1,043	49.4%	$150
CO Denver, Southeast Extension	LRT	$224	$92	41.0%	$92
MD Baltimore, Red Line	LRT	$2,998	$900	30.0%	$100
MD Maryland National Capital Purple Line	LRT	$2,448	$900	36.8%	$100
MN Minneapolis, Southwest	LRT	$1,653	$827	50.0%	$150
TX Fort Worth, TEX Rail	CR	$892	$446	50.0%	$100
Total		**$32,848**	**$14,059**	**44.6%**	**$2,177**

POTENTIAL FUNDING GAP, UNCERTAIN FUTURE

The City of Las Vegas may require additional funding sources to support roadway projects, and southern Nevada, more broadly, will almost certainly require incremental transportation funding (e.g., sales tax) to support proposed transit development. That said, other factors and potential strategies have the potential to materially affect the amount of funding that may be required in the future. Included among them are the following:

- **The ultimate timing of projects and transportation revenues.** Conservative assumptions have been applied to transportation revenues. To the extent revenues exceed expectations, roadway projects will be accelerated. Conversely, if revenues fall short of expectations the timing of some projects may need to be extended.
- **Roadway management strategies may shift project timing and cost burdens.** If NDOT's extended fuel tax indexing allocation becomes available, some of the projects in the Mobility Master Plan that are on or across an NDOT right of way may be eligible for incremental state support. In addition, Sheep Mountain Parkway has been identified as one of three possible alignments for the future I-11 project. Depending on which alignment is ultimately selected, this project could be fully funded by NDOT.
- **Policy implications and funding allocations.** Recent federal changes, including the passage of the FAST Act, have significant implications on local transportation project funding. There is significant uncertainties relative to how these programs will evolve over the next 20 years. Flexibility in project timing and being ready to take advantage of potentially competitive federal, state and local funding opportunities is a necessity.

While presented here as defined sources and uses over a **20-year planning horizon**, the City's Mobility Master Plan should be viewed as a spectrum of possibilities that will be adjusted based on a number of factors, including the pace of growth and the availability of federal, state and local funding sources.

POTENTIAL FUNDING GAP, TRANSPORTATION FUNDING OPTIONS

Assuming that 40 percent of the City's proposed fixed-guideway transit infrastructure can be funded through federal program allocations, the community would still need to find a local revenue source sufficient to offset $1.25 billion in capital cost and annual operating shortfalls. At an assumed interest rate of 4 percent, without debt service coverage requirements, a 30-year bond would require annual funding of roughly $72 million per year. Including expected operating shortfalls, this figure is likely closer to about $75 million annually.

This will be a challenge for a number of reasons. First, Nevada is a Dillon's Rule state, which means local governments' powers are limited to those specifically defined by the legislature. Thus, the City's revenue-generating capacity is highly constrained. Making matters worse is the second issue. The majority of City revenues are sourced to two revenue streams: (1) property tax and (2) consolidated tax. Property tax caps enacted by the Nevada State Legislature in 2005 effectively render any increases in property tax meaningless. The consolidated tax is primarily made up of sales and use taxes, which are already comparably high and significantly funded by tourism, the majority of which falls outside the City's boundaries.

While these challenges are formidable, they are not insurmountable. Other communities have dealt with similar challenges and cobbled together revenues from sources ranging from advertising revenues to special districts. Farebox recovery can be expected to offset somewhere between 25 and 50 percent of annual operating costs. Beyond this, there is no single source or even a common structure for funding transit projects. What is a common thread, however, is the general recognition that fixed-guideway systems benefit more than just those who will ride the system itself. The benefits span the community from motorists to businesses in terms of avoided congestion and added convenience and accessibility. The potential funding gap equates to roughly $3.00 per capita per month in 2025, when the systems could theoretically come on-line.

As currently planned, the transit element funding gap is estimated at $**75 million** annually or $**3.00 per person per month** when the projects could theoretically come online (2025).

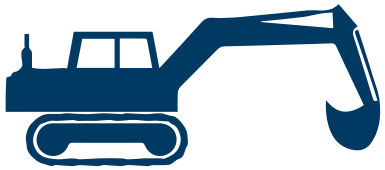
TABLE 6-5. Public Transportation Funding Strategies

Tax- and Fee-Based Transit Funding Sources	Business, Activity, and Related Funding Sources	Revenue Streams from Projects (Transportation and Others)	New "User" or "Market-Based" Funding Sources
• General retail sales and use taxes • Excise taxes • Real and personal property taxes • Contract or purchase-of-service revenues • Lease revenues • Vehicle registration fees • Tire taxes • Advertising revenues • Concessions revenues	• Employer/payroll taxes • Short-term car rental fees • Parking fees • Real property transfer taxes and mortgage recording fees • Corporate franchise taxes • Room/occupancy taxes • Business license fees • Utility fees/taxes • Income taxes • Donations • Various other business fees and charges	• Transit-oriented development/ joint development • Value capture/beneficiary charges • Special improvement/assessment districts • Community improvement districts/community facilities districts • Impact fees • Tax-increment financing districts • Right-of-way leasing	• Tolling including fixed, variable, and dynamic tolls or bridges and highways • Congestion pricing • Emissions fees • Vehicle miles traveled fees

NOTE: Adapted from Local and Regional Funding Mechanisms for Public Transportation report by the Transit Cooperative Research Program. Modified based on discussions with representatives from transit organizations in San Diego, Phoenix, Denver and Salt Lake City and based on known sources in Nevada.

RETURN ON INVESTMENT

The next logical question is what the community gets back for its $3.2-billion investment in transportation infrastructure. While many communities have attempted to measure the potential implications of such investment, their approach and conclusions are far from consistent. What is well settled is a lack of mobility negatively affects both quality of life and economic development potential. As noted earlier in this report, the City is expected to be effectively built out during the next 20 years, meaning the capacity and quality of its core areas will become increasingly important.



Project Construction/ Development Impacts

- 29,100 person-years of employment
- $1.7 billion in wages and salaries to local workers
- $5.6 billion in aggregate economic output

Congestion Reduction

Congestion currently costs local commuters $984 per person per year. Every 1 percent reduction in congestion cost saves the community nearly $14 million. Absent additional investment, this cost will increase significantly.

Incremental Economic Growth

Most research into the impacts of transportation investment suggest that the benefit-cost ratio ranges from about 1.5:1 to 4.0:1. This would translate into a community return of between $5.1 billion and $16.9 billion based on the $3.4 billion project cost. A mid-range estimate would be approximately $8.5 billion of incremental economic output at stabilization.

Increased Development Density and Improved Property Values

Quality transportation is correlated with sustained and improved property values. Transit-oriented investment in particular have been transformational in other communities. Today, properties along Charleston Boulevard, Rancho Drive and Maryland Parkway are clearly underutilized and diminished in terms of value.

Quality of Life

It is difficult to imagine a factor that affects quality of life more than mobility. While not readily quantifiable, reducing time stuck in traffic, increasing productivity and allowing better access to community, health care and entertainment services provides greater social equity and improves the overall quality of life for all residents.


ONLY
ONLY
RESTRICTED LANE
ONLY
RTC
SDX
043

7

USING THIS PLAN

IMPLEMENTATION

Implementation of the Mobility Master Plan's recommendations will support development of a balanced transportation network for the City. Generally, projects have been identified and prioritized based on the following factors:

PROJECT PRIORITIES

- Greatest connectivity to the greatest number of people or neighborhoods
- Connect residential areas to local retail, business, and community services so residents can access daily goods and services by walking or biking

- Easily implemented and improve connectivity, expand coverage, and maximize motor vehicle separation

- Suggested routes to school

- Connections to transit
- Complete the trail system and access key recreational and transportation destinations, including adjacent communities
- Connect major employers or employment areas to residential areas in order to increase commute trips by bike or walking

Based on current funding projections, network improvements are phased over a 20-year period, with projects organized for completion in four five-year increments: (1) 2018-2022, (2) 2023-2027, (3) 2028-2032, and (4) 2033-2037. These support the ongoing growth projected within the City, and will be supplemented by other regional projects led by NDOT and RTC. Major transit investments, such as light rail on Charleston Boulevard or Rancho Drive, are not included in this implementation plan, as these major transit investments will require a dedicated local source of funding.

The following pages present the Plan's recommendations for each of the six City wards by implementation phase. These only illustrate projects that will be led by the City of Las Vegas within the next 20 years and, therefore, may not mirror the investments displayed in the citywide maps located in previous chapters that provide the context of the existing transportation system, as well as the future vision for regional transportation facilities.

The corresponding tables provide additional project context, such as the types of improvements planned for each project. In many cases, a transportation project will serve multiple purposes. For example, the primary investment may be an enhanced bike lane, but as part of the improvement, a new median may be installed, or sidewalks widened – supporting cyclists, drivers, and pedestrians.

I**mportant to note: many of the improvements listed build upon an existing and already funded program for street rehabilitation.** This allows several projects to be constructed with minimal to no additional funding required, like re-striping streets to accommodate bike lanes. This also reduces corridor construction obstacles for the traveling public.

Project implementation is contingent upon the availability of adequate funding. Some of the projects listed are already incorporated into the RTP, while the City will continue to seek alternative funding for other projects. Funding availability will inevitability change over time due to economic conditions and the fluctuating priorities of federal, state, and regional agencies; therefore, projects and their timelines may change.

This Plan is meant to be a living document and, as such, is intended to be updated, accounting both for completed improvements and for the need to evaluate evolving transportation needs. The Mobility Master Plan will become a vital resource to the City's Planning Department when they update the Transportation Element of the Las Vegas 2020 Master Plan, per NRS 278.150 and NRS 278.160.

WARD 1

FIGURE 7-1. Ward 1 Projects

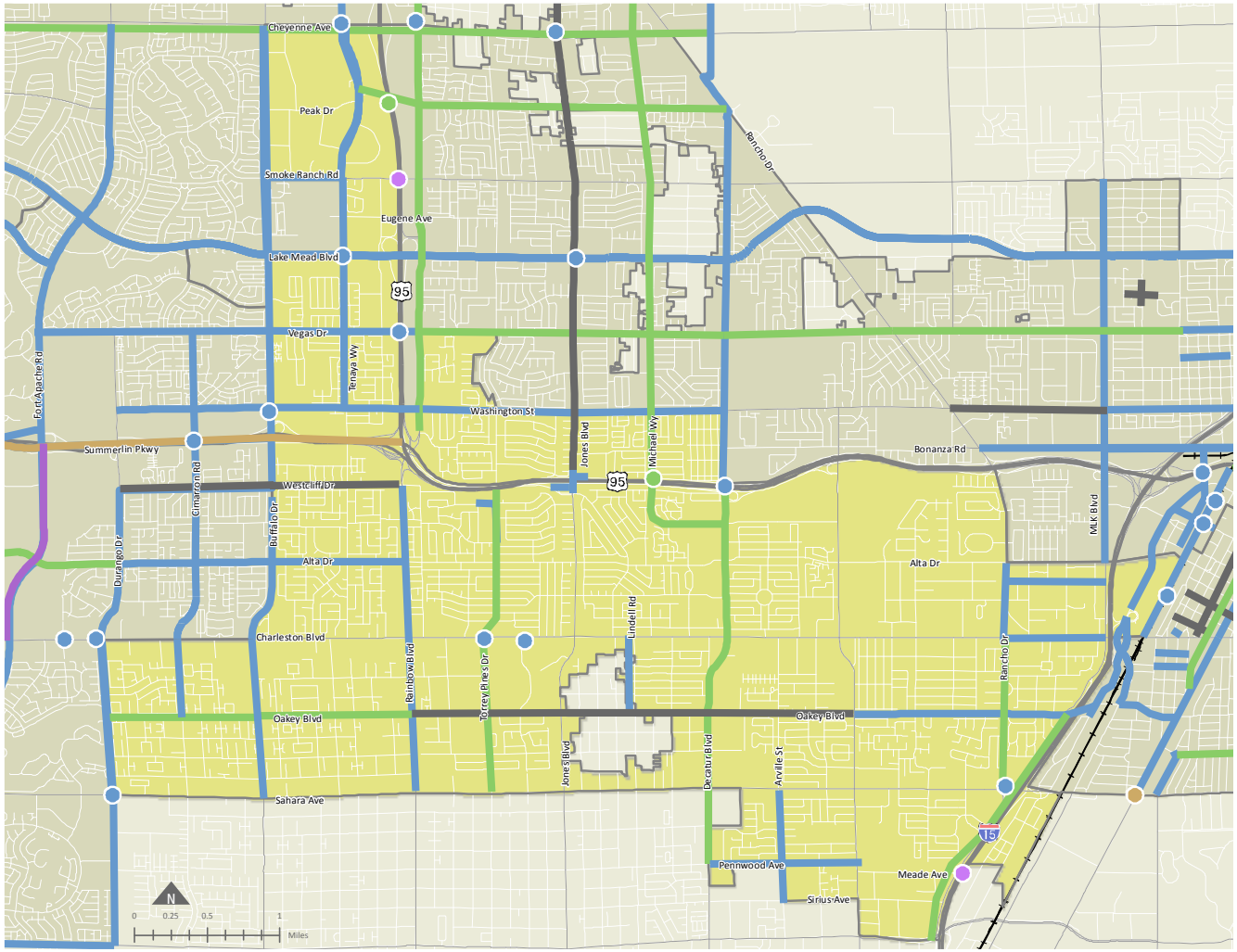


TABLE 7-1. Ward 1 Projects

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
Adcock and Garside Safe Routes to School Improvements			●			FY 2018-2022
Alta Dr - Durango to Rainbow Street Rehab and Buffered Bike Lanes	●	●				FY 2018-2022
Bonanza Trail - Pedestrian/Bike Enhancement at US 95/Jones		●	●			FY 2018-2022
Bottleneck Improvement - US 95 / Decatur southbound off ramp					●	FY 2018-2022
Buffalo Rd - Cheyenne to Charleston Bus Turnouts and Shelter Relocations			●	●	●	FY 2018-2022
Buffalo Rd - Lake Mead to Cheyenne Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Buffalo Rd - Sahara to Charleston Street Rehab, Buffered Bike Lanes, and Enhanced Median	●	●	●			FY 2018-2022
Charleston Blvd - Rancho to MLK Sidewalk / Streetscape Improvement			●			FY 2018-2022
Cimarron Road - Oakey to Vegas Buffered Bike Lanes, Traffic Calming, and Street Rehab	●	●	●			FY 2018-2022
Clark High School Safe Routes to School Improvement - Arville between Sirius and Sahara	●	●	●			FY 2018-2022
Clark High School Safe Routes to School Improvement - Pennwood between Decatur and Valley View	●	●	●			FY 2018-2022
Durango Dr - Sahara to Charleston Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Durango/Westcliff/Buffalo - Route 121 Bus Turnouts and Shelter Relocations			●	●	●	FY 2018-2022
Grand Central / Industrial Connector over UPRR	●	●	●	●	●	FY 2018-2022
Grand Central Street Rehab - Iron Horse to City Parkway	●					FY 2018-2022
Hancock Elementary School Safe Routes to School Improvement - Lindelle Between Charleston and Oakey			●			FY 2018-2022
Hoover Ave / UPRR Bike / Ped Bridge		●	●			FY 2018-2022
Oakey Blvd - Valley View to Western Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
Pinto Lane - "Neon" MLK to Rancho Complete Street	●		●			FY 2018-2022
Rainbow Blvd - Westcliff to Sahara Complete Street	●	●	●	●	●	FY 2018-2022
Rancho Dr - Alta to Charleston Street Rehab and Sidewalk Widening/Street Trees - Alta to Charleston	●		●			FY 2018-2022
Smoke Ranch Rd - Rainbow to Buffalo Street Rehab and Buffered Bike Lanes	●	●				FY 2018-2022
Summerlin Pkwy Overlay - CC-215 to Buffalo	●				●	FY 2018-2022
Tenaya Wy - Cheyenne to Smoke Ranch Bus Turnouts, Shelter Relocations, Median Retrofit	●	●	●	●	●	FY 2018-2022
Tenaya Wy - Lake Mead to Washington Street Rehab and Enhanced Bike Lanes	●	●				FY 2018-2022
Tenaya Wy - Smoke Ranch to Lake Mead Street Rehab and Enhanced Bike Lanes	●	●				FY 2018-2022
UPRR Trail - Charleston to I-515		●	●			FY 2018-2022
US 95 / Vegas Drive Overpass Completion		●	●		●	FY 2018-2022
Various Intersection Improvements Citywide For Bike Lane Pinch Points (Sahara/Durango, Charleston/Durango, Tenaya/Cheyenne, Tenaya/Lake Mead, Tenaya/Azure, and Washington/Buffalo)		●			●	FY 2018-2022
Various Intersection Improvements Citywide For Capacity and Safety (Lake Mead/Jones, Charleston/Torrey Pines, Cheyenne/Rainbow, Sahara/Rancho, Charleston/Merialdo, Cheyenne/Jones, Charleston/Community College, Sahara/Las Vegas Boulevard)				●	●	FY 2018-2022
Vegas Dr - Buffalo to Rainbow Street Rehab and Enhanced Bike Lanes	●	●				FY 2018-2022
Washington Ave - Jones to Decatur Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Washington Ave - Jones to Rainbow Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Washington Ave - Rainbow to Durango Street Rehab and Enhanced Bike Lanes	●	●				FY 2018-2022

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
Cheyenne Trail - CC-215 to Ronemus						FY 2023-2027
Decatur Blvd BRT Retrofit - Pennwood to US 95						FY 2023-2027
Maryland Pkwy LRT Local Match Funds (misc upgrades along Carson, Bonneville, Tonopah)						FY 2023-2027
Michael Wy / US 95 Bike / Ped Bridge						FY 2023-2027
Michael Wy - Meadows to Rancho Enhanced Bike Lanes						FY 2023-2027
MLK Blvd - Oakey to Teddy Extension, Widening of Rancho Drive, and Direct Connect to D.I. Overpass						FY 2023-2027
Oakey Blvd - Buffalo to Rainbow Street Rehab and Enhanced Bike Lanes						FY 2023-2027
Oakey Blvd - Durango to Buffalo Street Rehab and Enhanced Bike Lanes						FY 2023-2027
Rancho Dr - Charleston to Sahara Street Rehab						FY 2023-2027
Torrey Pines Dr - Sahara to US 95 Street Rehab and Enhanced Bike Lanes						FY 2023-2027
Summerlin Pkwy Ultimate Improvements - CC-215 to US 95						FY 2028-2032
I-15 / Meade Ave Direct Connect HOV Ramps						FY 2032-2037
Peak Trail - Tenaya to Rancho with Ped / Bike Bridge over US 95						FY 2032-2037
US 95 / Smoke Ranch Direct Connect HOV Ramps						FY 2032-2037

Notes:

1. *Projects including street rehab will be constructed through the course of already scheduled rehabilitation/maintenance activities, reducing the need for subsequent construction efforts.*
2. *All projects that alter the street environment will include relevant PROWAG/ADAAG pathway improvements, as directed by the Americans with Disabilities Act.*
3. *Projects labeled as Complete Streets will generally comprise full streetscaping improvements, including 10-15 foot sidewalks, shade trees and other landscaping, upgraded lighting, and lane narrowing/reduction in roadway width. In some cases, provisions for bike lanes and/or transit will also be included.*

WARD 2

FIGURE 7-2. Ward 2 Projects

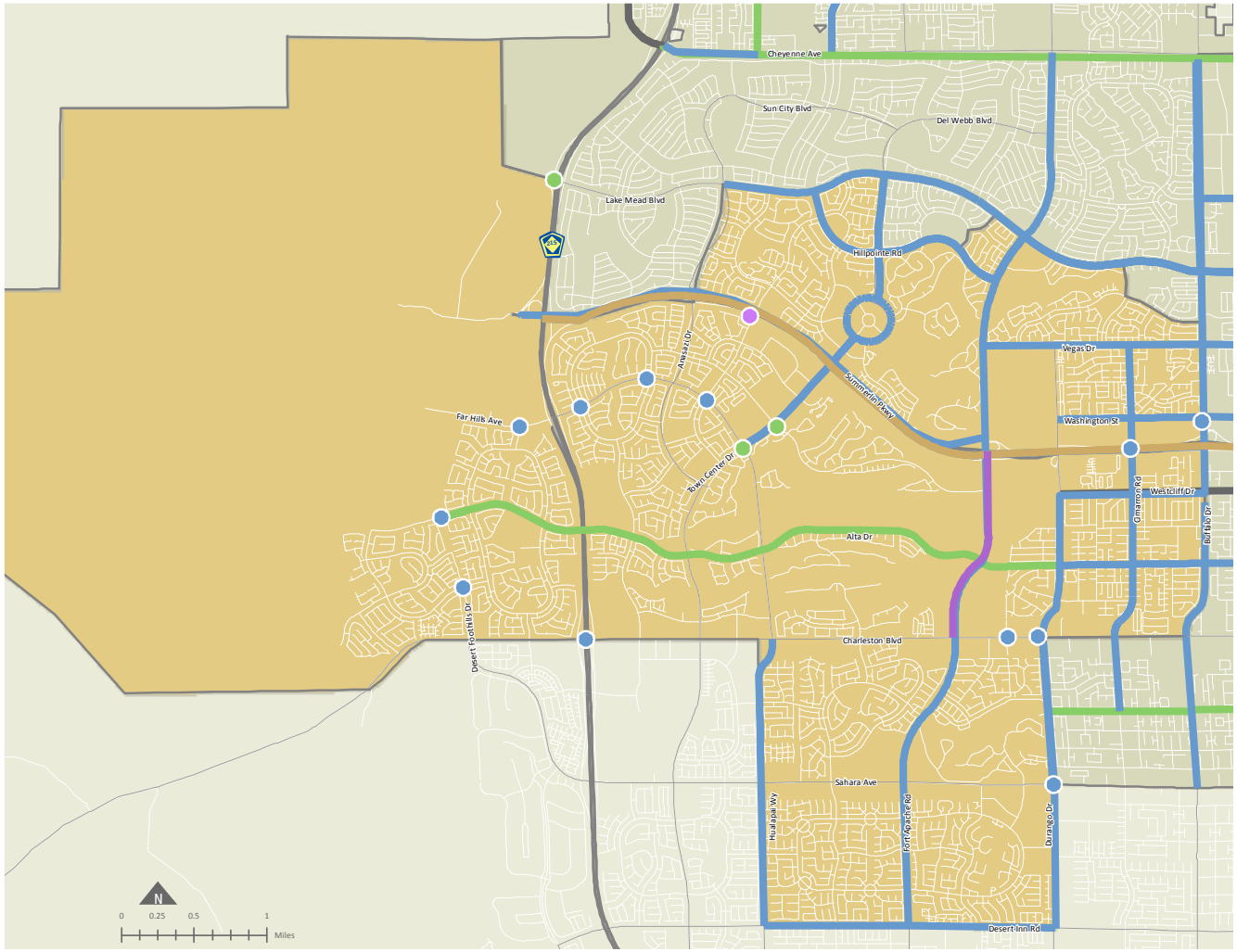


TABLE 7-2 WARD 2 PROJECTS

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
Alta Dr - Durango to Rainbow Street Rehab and Buffered Bike Lanes	●	●				FY 2018-2022
Bottleneck Improvement - Charleston/CC-215 Interchange					●	FY 2018-2022
Buffalo Rd - Cheyenne to Charleston Bus Turnouts and Shelter Relocations			●	●	●	FY 2018-2022
Cimarron Rd / Summerlin Pkwy Ped/Bike Bridge		●	●			FY 2018-2022
Cimarron Rd - Oakey to Vegas Buffered Bike Lanes, Traffic Calming and Street Rehab	●	●	●			FY 2018-2022
Desert Inn Rd - Fort Apache to Hualapai Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Durango Dr - Sahara to Charleston Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Durango/Westcliff/Buffalo - Route 121 Bus Turnouts and Shelter Relocations			●	●	●	FY 2018-2022
Fort Apache / Rampart - Route 120 Bus Turnouts and Shelter Relocations			●	●	●	FY 2018-2022
Fort Apache / Rampart / Durango - Desert Inn to Cheyenne Bike Lane Retrofit		●				FY 2018-2022
Hillpointe Dr - Lake Mead to Rampart Traffic Calming / Buffered Bike Lane Retrofit	●	●	●			FY 2018-2022
Hualapai Wy - Charleston to Sahara Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Hualapai Wy - Sahara to Desert Inn Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Lake Mead / Hills Center / Town Center - Route 210 Bus Turnouts and Shelter Relocations			●	●	●	FY 2018-2022
Lake Mead Blvd - Hills Center to Anasazi Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Summerlin Pkwy Overlay - CC-215 to Buffalo					●	FY 2018-2022
Summerlin Pkwy Trail - Rampart to CC-215		●	●			FY 2018-2022
Summerlin Area Traffic Signalization Project (Far Hills/Carriage Hills, Far Hills/Sageberry, Far Hills/Laurelglen, Hualapai/Crestdale, Alta/Desert Foothills, Desert Foothills/Desert Sunrise)					●	FY 2018-2022

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
Washington Ave - Rainbow to Durango Street Rehab and Enhanced Bike Corridor	✓	✓				FY 2018-2022
Various Intersection Improvements Citywide For Bike Lane Pinch Points (Sahara/Durango, Charleston/Durango, Tenaya/Cheyenne, Tenaya/Lake Mead, Tenaya/Azure, and Washington/Buffalo)		✓			✓	FY 2018-2022
Various Intersection Improvements Citywide For Capacity and Safety (Lake Mead/Jones, Charleston/Torrey Pines, Cheyenne/Rainbow, Sahara/Rancho, Charleston/Merialdo, Cheyenne/Jones, Charleston/Community College, Sahara/Las Vegas Boulevard)				✓	✓	FY 2018-2022
Vegas Dr - Rampart to Buffalo Street Rehab and Enhanced Bike Lanes	✓	✓				FY 2018-2022
Alta Dr - Desert Foothills to Durango Street Rehab and Enhanced Bike Lanes	✓	✓				FY 2023-2027
CC-215 Beltway Trail Bridges (Lake Mead, Grand Canyon, Torrey Pines)		✓	✓			FY 2023-2027
Town Center Dr - ADA Upgrade/Replacement of Roundabouts at Hualapai and Canyon Run					✓	FY 2023-2027
Summerlin Pkwy Ultimate Improvements - CC-215 to US 95					✓	FY 2028-2032
Crestdale / Summerlin Pkwy Direct Connect HOV Ramps					✓	FY 2032-2037
Rampart Blvd - Charleston to Summerlin Pkwy Auxiliary Lanes					✓	FY 2032-2037

Notes:

1. *Projects including street rehab will be constructed through the course of already scheduled rehabilitation/maintenance activities, reducing the need for subsequent construction efforts.*
2. *All projects that alter the street environment will include relevant PROWAG/ADAAG pathway improvements, as directed by the Americans with Disabilities Act.*
3. *Projects labeled as Complete Streets will generally comprise full streetscaping improvements, including 10-15 foot sidewalks, shade trees and other landscaping, upgraded lighting, and lane narrowing/reduction in roadway width. In some cases, provisions for bike lanes and/or transit will also be included.*

WARD 3

FIGURE 7-3. Ward 3 Projects

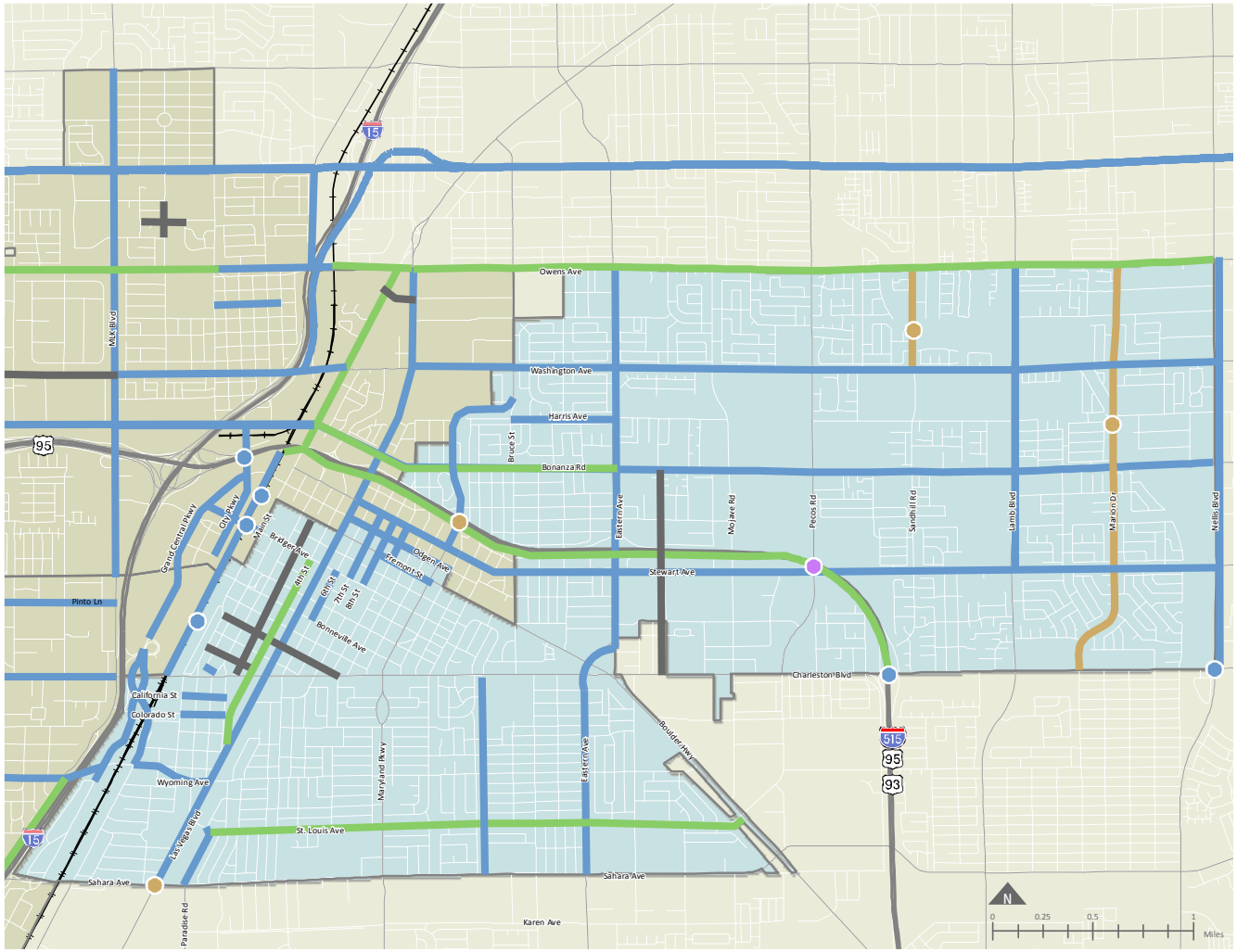


TABLE 7-3. Ward 3 Projects

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
6th St - Bridger to Bonneville Complete Street	●	●	●			FY 2018-2022
7th St - Bridger to Stewart Complete Street	●		●			FY 2018-2022
8th St - Bridger to Stewart Complete Street	●		●			FY 2018-2022
9th St - Fremont to Stewart Complete Street	●		●			FY 2018-2022
Bonanza Rd - Rancho to Nellis Bus Turnouts and Shelter Relocations				●	●	FY 2018-2022
Bottleneck Improvement - Charleston / Nellis					●	FY 2018-2022
Boulder Ave - 1st to Art Way Complete Street			●			FY 2018-2022
California Ave - Commerce to 3rd Complete Street	●		●			FY 2018-2022
Charleston / US 95 Interchange Safety and Capacity Improvements					●	FY 2018-2022
Colorado St - Commerce to 3rd Complete Street	●		●			FY 2018-2022
Eastern Ave - Cedar to Owens Complete Street	●	●	●	●	●	FY 2018-2022
Eastern Ave - Cedar to Sahara Bus Turnouts and Shelter Relocations				●	●	FY 2018-2022
Fremont East Phase 2 - 8th to Maryland Pedestrian Enhancements / Streetscape			●			FY 2018-2022
Grand Central / Industrial Connector over UPRR					●	FY 2018-2022
Harris Avenue Safe Routes to School Upgrades - Bruce to Wardelle	●	●	●		●	FY 2018-2022
Hoover Ave / UPRR Bike / Ped Bridge		●	●			FY 2018-2022
Lamb Blvd - Stewart to Owens Complete Street	●	●	●	●	●	FY 2018-2022
Las Vegas Blvd - Charleston to Sahara Pedestrian Friendly Reconstruction			●			FY 2018-2022

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
Las Vegas Blvd - Stewart to Charleston Pedestrian Friendly Reconstruction			●			FY 2018-2022
Maryland Pkwy - Stewart to Bruce Street Rehab and Bike Lane Retrofit	●	●	●	●	●	FY 2018-2022
Nellis Ave - Owens to Charleston Bus Turnouts and Shelter Relocations				●	●	FY 2018-2022
Ogden Ave - Las Vegas Blvd to 13th Complete Street			●			FY 2018-2022
Paradise Rd - Sahara to St Louis Complete Street/Gateway Conversion	●		●	●		FY 2018-2022
Spencer Urban Trail - Charleston to Sahara		●	●			FY 2018-2022
Stewart Ave - 13th to Nellis Complete Street with Protected Bike Lane	●	●	●	●	●	FY 2018-2022
Stewart Ave - Las Vegas Blvd to 13th Complete Street with Protected Bike Lane	●	●	●	●	●	FY 2018-2022
Symphony Park Pedestrian Bridge north of Fremont		●	●			FY 2018-2022
Various Intersection Improvements Citywide For Capacity and Safety (Lake Mead/Jones, Charleston/Torrey Pines, Cheyenne/Rainbow, Sahara/Rancho, Charleston/ Merialdo, Cheyenne/Jones, Charleston/Community College, Sahara/Las Vegas Boulevard)					●	FY 2018-2022
Washington Ave - Las Vegas Blvd to Bruce Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Washington Ave - Bruce to Nellis Street Rehab and Buffered Bike Lanes		●	●			FY 2018-2022
Wyoming - Industrial to Las Vegas Blvd, Capacity Improvements and Complete Street	●	●	●	●	●	FY 2018-2022
4th St - Las Vegas Blvd to Bridger Two-Way Cycle Track	●	●	●	●		FY 2023-2027
Arterial / Collector Rehab (corridors to be determined)	●					FY 2023-2027
Bonanza Rd - Main to Eastern Bike Lane Retrofit and Sidewalk Widening		●	●			FY 2023-2027
I-515 Trail - UPRR to Charleston		●	●			FY 2023-2027

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
Maryland Pkwy LRT Local Match Funds (misc upgrades along Carson, Bonneville, Tonopah)						FY 2023-2027
Owens Ave - Las Vegas Blvd to Nellis Street Rehab and Bike Lane Retrofit						FY 2023-2027
St Louis - Paradise to Boulder Hwy Street Rehab, Enhanced Bike Lanes, and Decorative Medians						FY 2023-2027
Marion Dr - Charleston to Owens Traffic Calming and Overpass at Las Vegas Wash						FY 2028-2032
Maryland Pkwy / I-515 Interchange						FY 2028-2032
Sahara Ave / Las Vegas Blvd Circular Pedestrian Bridge						FY 2028-2032
Sandhill Rd - Owens to Washington Traffic Calming and Overpass at Las Vegas Wash						FY 2028-2032
US 95 / Pecos-Stewart Interchange						FY 2032-2037

Notes:

1. *Projects including street rehab will be constructed through the course of already scheduled rehabilitation/maintenance activities, reducing the need for subsequent construction efforts.*
2. *All projects that alter the street environment will include relevant PROWAG/ADAAG pathway improvements, as directed by the Americans with Disabilities Act.*
3. *Projects labeled as Complete Streets will generally comprise full streetscaping improvements, including 10-15 foot sidewalks, shade trees and other landscaping, upgraded lighting, and lane narrowing/reduction in roadway width. In some cases, provisions for bike lanes and/or transit will also be included.*

WARD 4

FIGURE 7-4. Ward 4 Projects

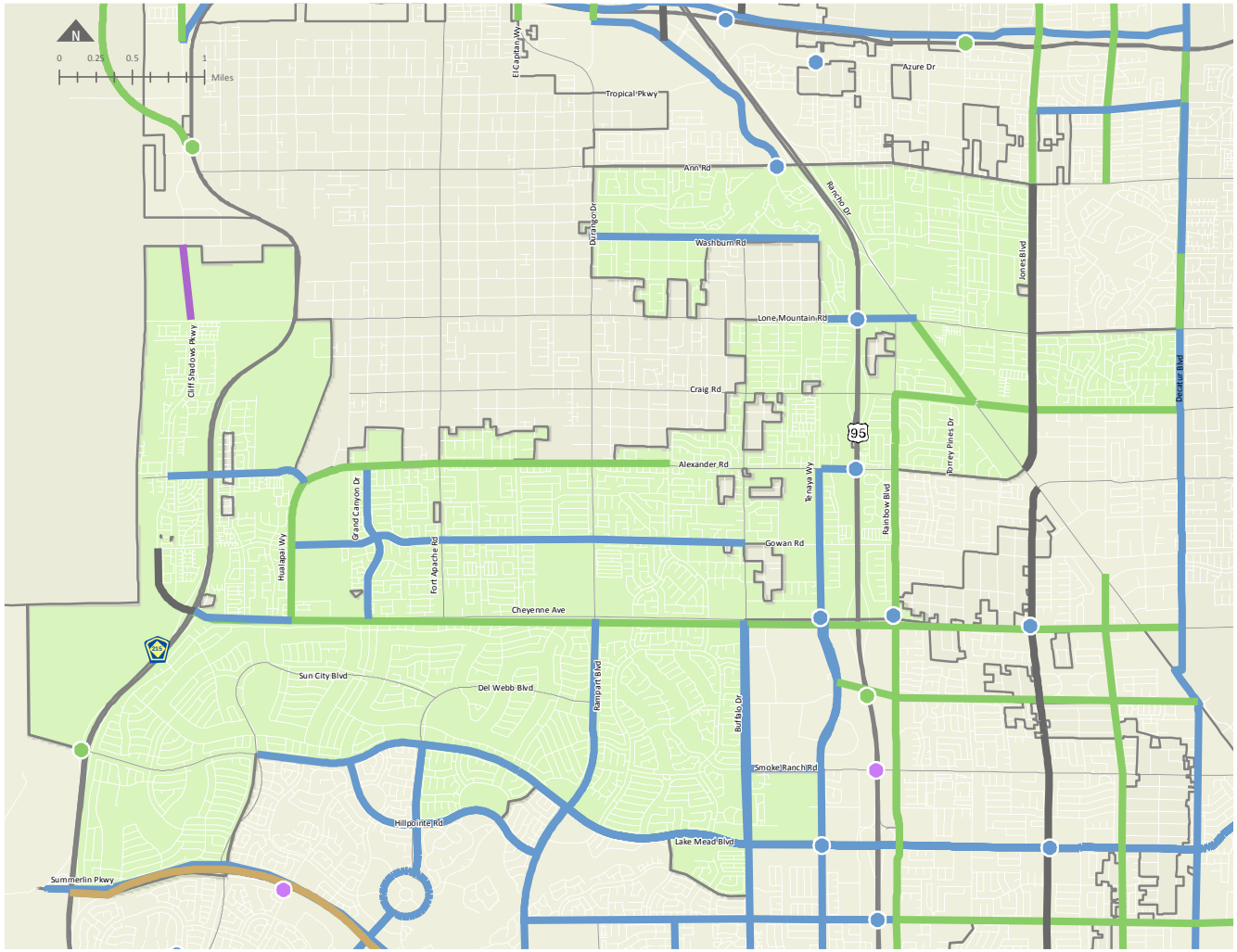


TABLE 7-4. Ward 4 Projects

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
Alexander Rd - Hualapai to Cliff Shadows Street Rehab and Buffered Bike Lanes	●	●				FY 2018-2022
Bottleneck Improvement - Ann / Centennial Center					●	FY 2018-2022
Buffalo Rd - Cheyenne to Charleston Bus Turnouts and Shelter Relocations				●	●	FY 2018-2022
Buffalo Rd - Lake Mead to Cheyenne Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Cheyenne Ave - CC-215 to Hualapai Street Rehab	●					FY 2018-2022
Decatur Blvd - US 95 to Elkhorn Bus Turnouts and Shelter Relocations				●	●	FY 2018-2022
Durango/Westcliff/Buffalo - Route 121 Bus Turnouts and Shelter Relocations				●	●	FY 2018-2022
Fort Apache / Rampart - Route 120 Bus Turnouts and Shelter Relocations				●	●	FY 2018-2022
Fort Apache / Rampart / Durango - Desert Inn to Cheyenne Bike Lane Retrofit		●				FY 2018-2022
Gowan Rd - Hualapai to Buffalo Road Diet / Buffered Bike Lanes / Traffic Calming Medians	●	●	●			FY 2018-2022
Grand Canyon Dr - Cheyenne to Alexander Street Rehab and Buffered Bike Lanes	●	●				FY 2018-2022
Hillpointe Dr - Lake Mead to Rampart Traffic Calming / Buffered Bike Lane Retrofit		●	●			FY 2018-2022
Jones Blvd - Lone Mountain to Rancho Street Rehab and Buffered Bike Lanes	●	●			●	FY 2018-2022
Lake Mead / Hills Center / Town Center - Route 210 Bus Turnouts and Shelter Relocations				●	●	FY 2018-2022
Lake Mead Blvd - Hills Center to Anasazi Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Smoke Ranch Rd - Rainbow to Buffalo Street Rehab and Buffered Bike Lanes	●	●				FY 2018-2022
Summerlin Pkwy Overlay - CC-215 to Buffalo					●	FY 2018-2022
Summerlin Pkwy Trail - Rampart to CC-215		●	●			FY 2018-2022

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
Tenaya Wy - Alexander to Smoke Ranch Street Rehab and Enhanced Bike Lanes	●	●				FY 2018-2022
Tenaya Wy - Smoke Ranch to Lake Mead Street Rehab and Enhanced Bike Lanes	●	●				FY 2018-2022
US 95 / Alexander Road - Overpass Completion and Bike Lane Extension	●	●	●		●	FY 2018-2022
US 95 / Lone Mountain - Overpass Completion and Bike Lane Extension	●	●	●		●	FY 2018-2022
Various Intersection Improvements Citywide For Bike Lane Pinch Points (Sahara/Durango, Charleston/Durango, Tenaya/Cheyenne, Tenaya/Lake Mead, Tenaya/Azure, and Washington/Buffalo)		●			●	FY 2018-2022
Various Intersection Improvements Citywide For Capacity and Safety (Lake Mead/Jones, Charleston/Torrey Pines, Cheyenne/Rainbow, Sahara/Rancho, Charleston/Merialdo, Cheyenne/Jones, Charleston/Community College, Sahara/Las Vegas Boulevard)					●	FY 2018-2022
Washburn Rd - Durango to Tenaya Sawtooth Infill and Traffic Calming			●		●	FY 2018-2022
Alexander Rd - Hualapai to Cimarron Street Rehab and Buffered Bike Lanes	●	●				FY 2023-2027
CC-215 Beltway Trail Bridges (Lake Mead, Grand Canyon, Torrey Pines)		●	●			FY 2023-2027
Cheyenne Ave - 215 to Decatur Bus Turnouts / Shelter Relocations				●	●	FY 2023-2027
Craig Rd - Decatur to Rancho Bus Turnouts and Shelter Relocations				●	●	FY 2023-2027
Hualapai Wy - Cheyenne to Alexander Street Rehab and Buffered Bike Lanes	●	●				FY 2023-2027
Jones Blvd - Ann to CC-215 Street Rehab and Buffered Bike Lanes	●	●			●	FY 2023-2027
Rainbow Blvd - US 95 to Lone Mountain Bus Turnouts and Shelter Relocations				●	●	FY 2023-2027
Summerlin Pkwy Ultimate Improvements - CC-215 to US 95					●	FY 2028-2032
Cheyenne Trail - CC-215 to Ronemus		●	●			FY 2033-2037
Cliff Shadows Pkwy / Shaumber Rd Connector - Lone Mountain to Washburn					●	FY 2033-2037

Notes:

1. *Projects including street rehab will be constructed through the course of already scheduled rehabilitation/maintenance activities, reducing the need for subsequent construction efforts.*
2. *All projects that alter the street environment will include relevant PROWAG/ADAAG pathway improvements, as directed by the Americans with Disabilities Act.*
3. *Projects labeled as Complete Streets will generally comprise full streetscaping improvements, including 10-15 foot sidewalks, shade trees and other landscaping, upgraded lighting, and lane narrowing/reduction in roadway width. In some cases, provisions for bike lanes and/or transit will also be included.*

WARD 5

FIGURE 7-5. Ward 5 Projects

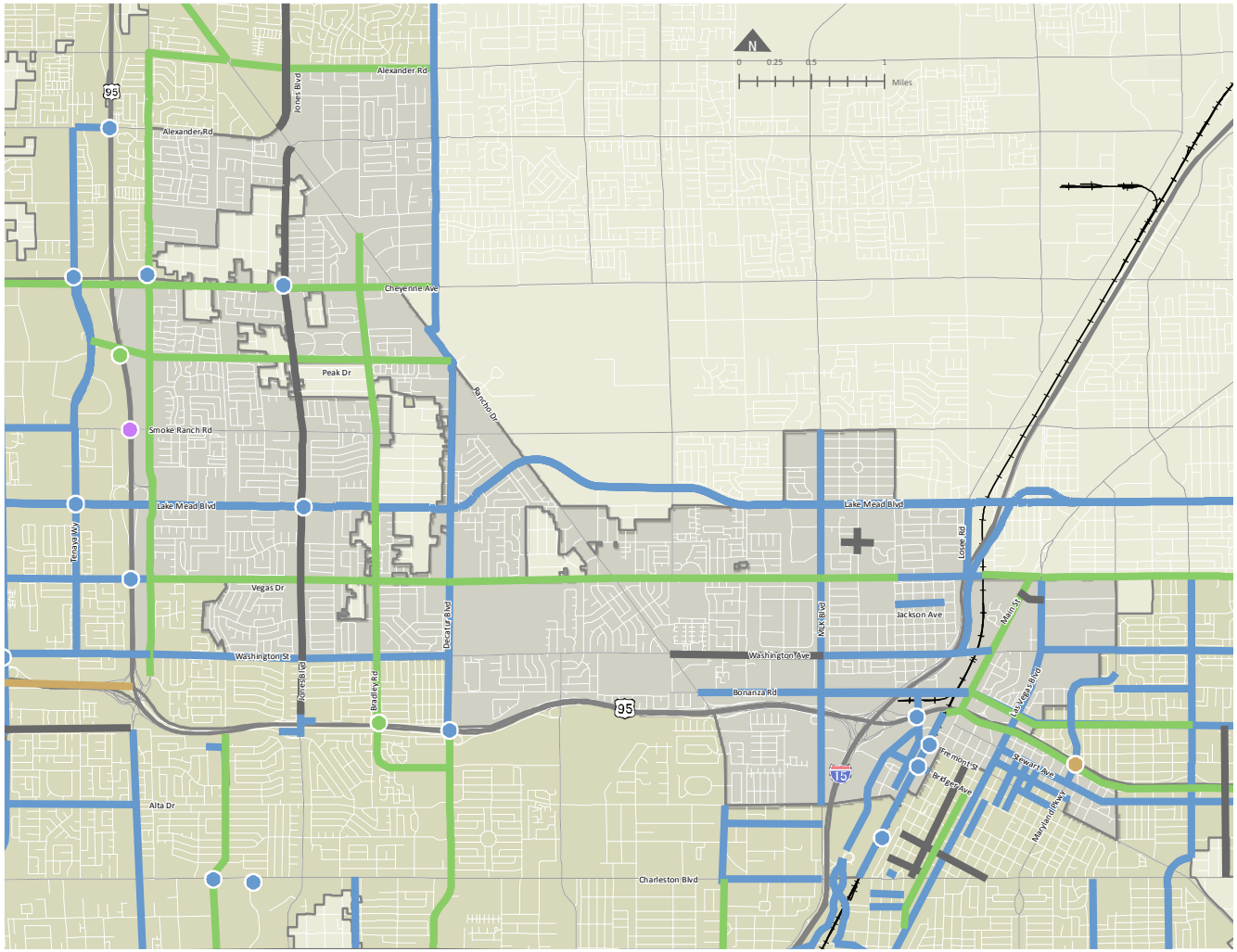


TABLE 7-5. Ward 5 Projects

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
7th St - Bridger to Stewart Complete Street	●		●			FY 2018-2022
8th St - Bridger to Stewart Complete Street	●		●			FY 2018-2022
9th St - Fremont to Stewart Complete Street	●		●			FY 2018-2022
Bonanza Rd - MLK to Main Streetscape and Bike Lane Retrofit		●	●			FY 2018-2022
Bonanza Rd - Rancho to Nellis Bus Turnouts and Shelter Relocations				●	●	FY 2018-2022
Bottleneck Improvement - US 95 / Decatur southbound off ramp					●	FY 2018-2022
City Pkwy - Bonanza to Grand Central Capacity and Complete Street	●	●	●	●	●	FY 2018-2022
City Pkwy / US 95 Interchange					●	FY 2018-2022
Decatur Blvd - US 95 to Elkhorn Bus Turnouts and Shelter Relocations				●	●	FY 2018-2022
Grand Central Street Rehab - Iron Horse to City Parkway	●					FY 2018-2022
I-15 Frontage Road - Washington to Lake Mead					●	FY 2018-2022
Jackson Avenue - "H" to "C" Complete Street Improvements	●	●	●			FY 2018-2022
Lake Mead / Hills Center / Town Center - Route 210 Bus Turnouts and Shelter Relocations				●	●	FY 2018-2022
Lake Mead Blvd - Losee to Tonopah Complete Street	●	●	●	●	●	FY 2018-2022
Las Vegas Blvd - Stewart to Charleston Pedestrian Friendly Reconstruction			●			FY 2018-2022
Las Vegas Blvd - Stewart to Owens Complete Street / Bike Lane Retrofit		●	●			FY 2018-2022
Losee Rd Extension - Lake Mead to Owens					●	FY 2018-2022
Maryland Pkwy - Stewart to Bruce Street Rehab and Bike Lane Retrofit	●	●	●	●	●	FY 2018-2022
MLK Blvd - Alta to Carey Bus Turnouts and Shelter Relocations				●	●	FY 2018-2022
Ogden Ave - Las Vegas Blvd to 13th Complete Street			●			FY 2018-2022

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
Owens Ave - H to UPRR Crossing Complete Street	●	●	●	●	●	FY 2018-2022
Smoke Ranch Rd - Rainbow to Buffalo Street Rehab and Buffered Bike Lanes	●	●				FY 2018-2022
Stewart Ave - 13th to Nellis Complete Street with Protected Bike Lane	●	●	●	●	●	FY 2018-2022
Stewart Ave - Las Vegas Blvd to 13th Complete Street with Protected Bike Lane		●	●			FY 2018-2022
Symphony Park Ave - Main to Grand Central Extension with Bridge over UPRR		●	●	●	●	FY 2018-2022
Symphony Park Pedestrian Bridge north of Fremont		●	●			FY 2018-2022
Symphony Park Phase 2 Parcel Roadway Infrastructure			●		●	FY 2018-2022
UPRR Trail - Charleston to I-515		●	●			FY 2018-2022
US 95 / Vegas Drive Overpass Completion	●	●	●	●	●	FY 2018-2022
Various Intersection Improvements Citywide For Capacity and Safety (Lake Mead/Jones, Charleston/Torrey Pines, Cheyenne/Rainbow, Sahara/Rancho, Charleston/ Merialdo, Cheyenne/Jones, Charleston/Community College, Sahara/Las Vegas Boulevard)					●	FY 2018-2022
Washington Ave - Jones to Decatur Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Washington Ave - Jones to Rainbow Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Washington Ave - Las Vegas Blvd to Bruce Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Washington Ave - MLK to Main Bike Lane Retrofit/Streetscape		●	●			FY 2018-2022
Washington Ave - Rainbow to Durango Street Rehab and Enhanced Bike Lanes	●	●				FY 2018-2022
Bonanza Rd - Main to Eastern Bike Lane Retrofit and Sidewalk Widening		●	●			FY 2023-2027
Cheyenne Ave - 215 to Decatur Bus Turnouts / Shelter Relocations				●	●	FY 2023-2027
Craig Rd - Decatur to Rancho Bus Turnouts and Shelter Relocations				●	●	FY 2023-2027

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
I-515 Trail - UPRR to Charleston						FY 2023-2027
Main St - US 95 to Owens Complete Street						FY 2023-2027
Michael Wy / US 95 Bike / Ped Bridge						FY 2023-2027
Michael Wy - Lake Mead to Rancho Enhanced Bike Lanes						FY 2023-2027
Owens Ave - Las Vegas Blvd to Nellis Street Rehab and Bike Lane Retrofit						FY 2023-2027
Owens Ave - MLK to H Street Rehab and Enhanced Bike Lanes						FY 2023-2027
Owens Ave - UPRR to Las Vegas Blvd Street Rehab and Pedestrian Safety Countermeasures						FY 2023-2027
Rainbow Blvd - US 95 to Lone Mountain Bus Turnouts and Shelter Relocations						FY 2023-2027
Rainbow Blvd - US 95 to Smoke Ranch Street Rehab and Bike Lane Retrofit						FY 2023-2027
Vegas Dr - Decatur to Rancho Street Rehab and Enhanced Bike Lanes						FY 2023-2027
Vegas Dr - Jones to Decatur Street Rehab and Enhanced Bike Lane						FY 2023-2027
Vegas Dr - Rainbow to Jones Street Rehab and Enhanced Bike Lanes						FY 2023-2027
Vegas Dr - Rancho to MLK Street Rehab and Enhanced Bike Lanes						FY 2023-2027
Arterial / Collector Rehab (corridors to be determined)						FY 2028-2032
Maryland Pkwy / I-515 Interchange						FY 2028-2032
Peak Trail - Tenaya to Rancho with Ped / Bike Bridge over US 95						FY 2032-2037
US 95 / Smoke Ranch Direct Connect HOV Ramps						FY 2032-2037

Notes:

1. *Projects including street rehab will be constructed through the course of already scheduled rehabilitation/maintenance activities, reducing the need for subsequent construction efforts.*
2. *All projects that alter the street environment will include relevant PROWAG/ADAAG pathway improvements, as directed by the Americans with Disabilities Act.*
3. *Projects labeled as Complete Streets will generally comprise full streetscaping improvements, including 10-15 foot sidewalks, shade trees and other landscaping, upgraded lighting, and lane narrowing/reduction in roadway width. In some cases, provisions for bike lanes and/or transit will also be included.*

WARD 6

FIGURE 7-6. Ward 6 Projects

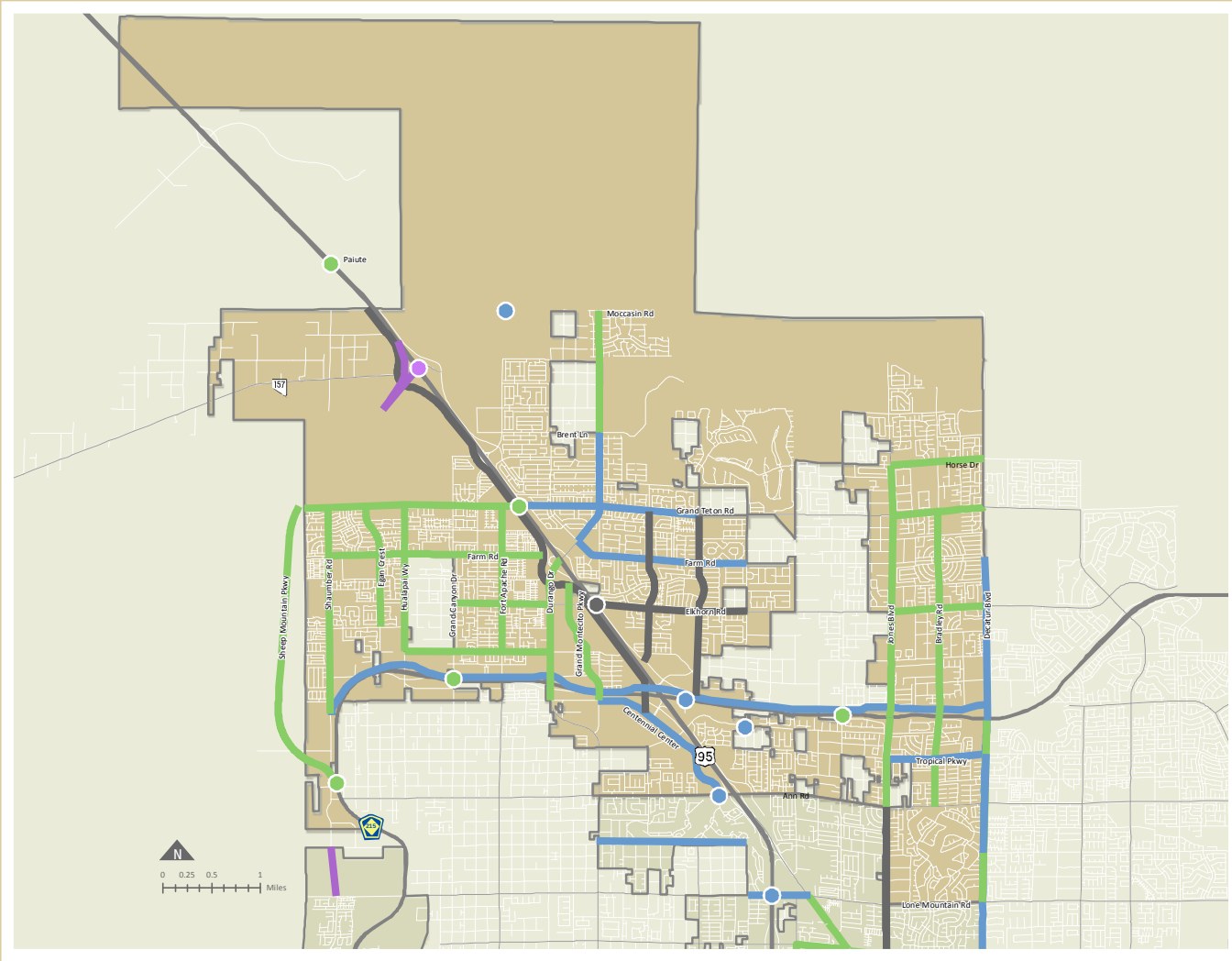


TABLE 7-6. Ward 6 Projects

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
Bottleneck Improvement - Ann / Centennial Center					●	FY 2018-2022
CC-215 Beltway Trail - Centennial to Decatur		●				FY 2018-2022
Centennial Center - Ann to Grand Montecito Traffic Calming		●	●		●	FY 2018-2022
Centennial Hills Sawtooth Infill (Various Locations)					●	FY 2018-2022
Decatur Blvd - Farm to Elkhorn Street Rehab and Bike Lane Retrofit	●	●				FY 2018-2022
Decatur Blvd - US 95 to Elkhorn Bus Turnouts and Shelter Relocations				●	●	FY 2018-2022
Decatur Blvd - Washburn to Tropical Street Rehab	●					FY 2018-2022
Durango Dr -Farm to Brent Lane Street Rehab and Buffered Bike Lanes	●	●				FY 2018-2022
Farm Rd - Tenaya to Durango Street Rehab and Enhanced Bike Lanes	●	●				FY 2018-2022
Grand Teton Dr - Durango to Buffalo Street Rehab and Buffered Bike Lanes	●	●				FY 2018-2022
Grand Teton Dr - Sky Pointe to Durango Street Rehab and Buffered Bike Lanes	●	●				FY 2018-2022
John Herbert / CC-215 Interchange / Frontage Road to Oso Blanca / Oso Blanca Underpass		●	●	●	●	FY 2018-2022
City 600 Acre Site Phase 1					●	FY 2018-2022
Tropical Pkwy - Decatur to Jones Street Rehab and Enhanced Bike Lanes	●	●				FY 2018-2022
Bradley Rd - Ann to Grand Teton Road Diet / Buffered Bike Lanes	●	●	●		●	FY 2023-2027
CC-215 Beltway Trail Bridges (Lake Mead, Grand Canyon, Torrey Pines)		●	●			FY 2023-2027
City 600 Acre Site, Phase 2					●	FY 2023-2027
Decatur Blvd - Lone Mountain to CC-215 Street Rehab and Bike Lane Retrofit	●	●				FY 2023-2027

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
Deer Springs - Hualapai to Durango Street Rehab and Bike Lane Retrofit	●	●				FY 2023-2027
Durango Blvd - Brent to Moccassin Street Rehab and Buffered Bike Lanes	●	●				FY 2023-2027
Durango Blvd - Centennial to US 95 Street Rehab and Bike Lane Retrofit	●	●				FY 2023-2027
Egan Crest - Dorell to Grand Teton Bike Lane Retrofit	●	●				FY 2023-2027
Elkhorn Rd - Grand Canyon to Durango Street Rehab and Buffered Bike Lanes	●	●				FY 2023-2027
Elkhorn Rd - Jones to Decatur Street Rehab and Buffered Bike Lanes	●	●				FY 2023-2027
Farm Rd - Shaumber to Oso Blanca Bike Lane Retrofit	●	●				FY 2023-2027
Fort Apache Rd - Deer Springs to Grand Teton Street Rehab and Buffered Bike Lanes	●	●				FY 2023-2027
Grand Canyon Dr - Deer Springs to Grand Teton Street Rehab and Enhanced Bike Lanes	●	●				FY 2023-2027
Grand Montecito Pkwy - Centennial to Oso Blanca Street Rehab and Enhanced Bike Lanes	●	●				FY 2023-2027
Grand Teton / US 95 Overpass		●	●		●	FY 2023-2027
Grand Teton Dr - Jones to Decatur Street Rehab and Buffered Bike Lanes	●	●				FY 2023-2027
Grand Teton Dr - Puli to Oso Blanca Street Rehab and Buffered Bike Lanes	●	●				FY 2023-2027
Horse Dr - Jones to Decatur Street Rehab and Buffered Bike Lanes	●	●				FY 2023-2027
Jones Blvd - CC-215 to Elkhorn Street Rehab and Buffered Bike Lanes	●	●				FY 2023-2027
Jones Blvd - Elkhorn to Horse Street Rehab and Enhanced Bike Lanes	●	●			●	FY 2023-2027
Jones Blvd - Ann to CC-215 Street Rehab and Buffered Bike Lanes	●	●			●	FY 2023-2027

Project Name	Project Elements					Project Phase
	Street Rehab	Bicycle	Pedestrian	Transit	Vehicular Mobility	
Shaumber Rd - Grand Teton to Centennial Street Rehab and Bike Lane Retrofit						FY 2023-2027
Sheep Mountain Pkwy - CC-215 to Grand Teton With Direct Ramps to/from CC-215						FY 2023-2027
US 95 / Paiute / City 600 Acre Site Interchange						FY 2023-2027
Northwest Expansion Area Interchange At US 95 north of Snow Mountain						FY 2028-2032
Sheep Mountain Pkwy - Kyle Canyon Rd to US 95 with Direct Ramps						FY 2032-2037

Notes:

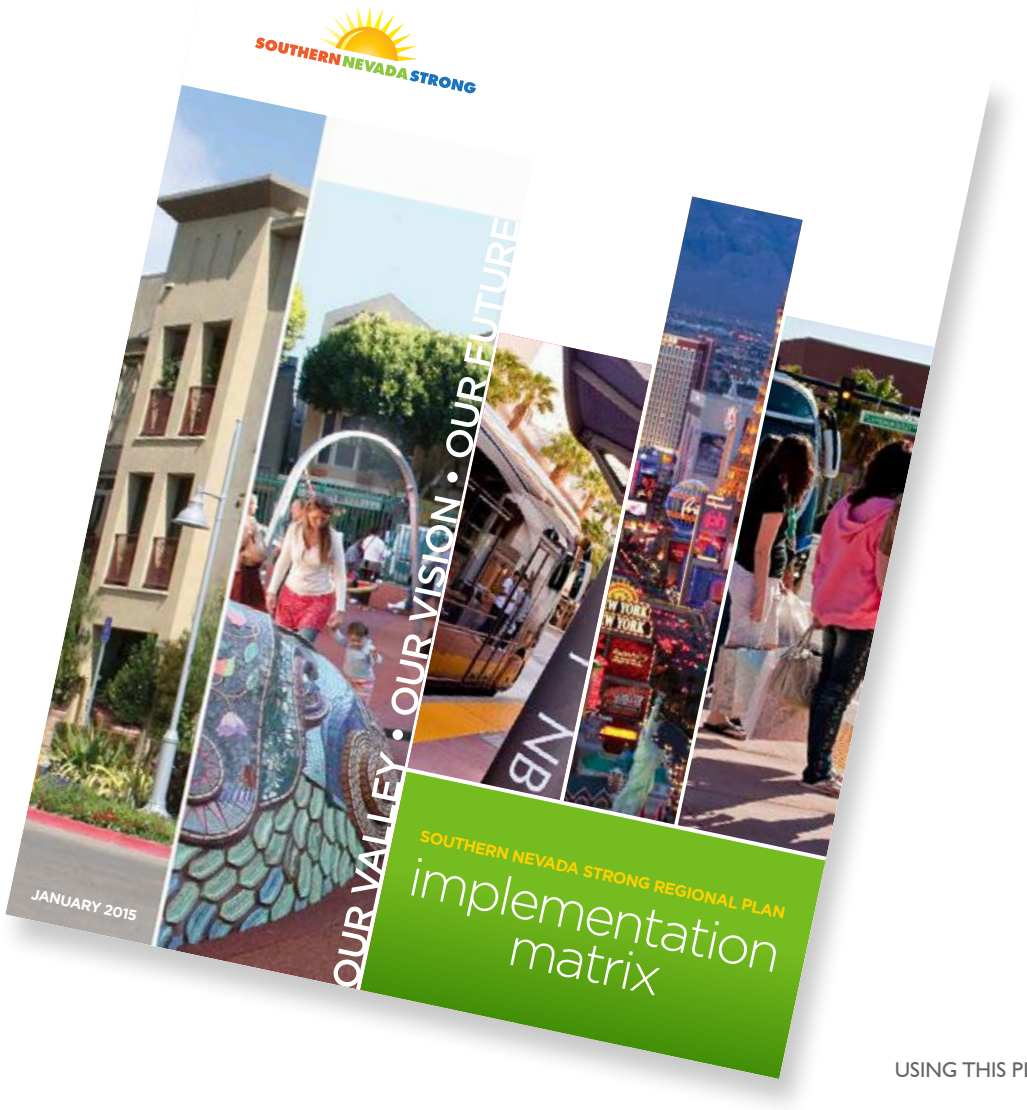
1. *Projects including street rehab will be constructed through the course of already scheduled rehabilitation/maintenance activities, reducing the need for subsequent construction efforts.*
2. *All projects that alter the street environment will include relevant PROWAG/ADAAG pathway improvements, as directed by the Americans with Disabilities Act.*
3. *Projects labeled as Complete Streets will generally comprise full streetscaping improvements, including 10-15 foot sidewalks, shade trees and other landscaping, upgraded lighting, and lane narrowing/reduction in roadway width. In some cases, provisions for bike lanes and/or transit will also be included.*

CONSISTENCY WITH THE SOUTHERN NEVADA STRONG REGIONAL PLAN

The Southern Nevada Strong Regional Plan is a community-driven guide outlining regional goals and presenting a set of strategies that local governments can use to address challenges and achieve these goals. The region's top priorities serve to organize the goals into the Plan's three main themes:

1. **Improve Economic Competitiveness and Education**
2. **Invest in Complete Communities**
3. **Increase Transportation Choice**

The Mobility Master Plan directly supports the priority to increase transportation choice. The goals, objectives, and strategies in this theme focus on developing a world-class transportation system and coordinating future transit investments with urban development. Table xx summarizes the elements of the Mobility Master Plan that are consistent with and support the Southern Nevada Strong strategies.



SNS Strategy	Mobility Master Plan Consistency
Goal 1: Develop a modern transit system that is integrated with vibrant neighborhood and employment centers, better connecting people to their destinations	
Objective 1.1: Work with the Regional Transportation Commission and other partners to develop a comprehensive transit master plan, which focuses on enhanced services that supplement existing routes.	
1.1.1 - Pursue light rail and improved transit options in low and moderate income areas, including improvements to make walking and biking pleasant, safe and viable transportation options.	Recommend light rail on Charleston Blvd, light rail or BRT on Rancho Dr, and improved transit options on many other corridors in low and moderate income areas
1.1.2 - Leverage recently completed transit infrastructure projects as a foundation to develop a comprehensive transit master plan.	Develop a network of enhanced transit within the City of Las Vegas that can be incorporated into the RTC's comprehensive transit master plan
1.1.3 - Incorporate land use, multi-modal transportation and air quality planning considerations into future updates of the Regional Transportation Plan (RTP) multi-modal transportation plan.	Considered land use, air quality, and other criteria for selecting the multi-modal transportation network that that can be incorporated into the RTC's RTP
1.1.4 - Develop implementation criteria by which future corridors will be prioritized including: potential ridership, economic development/Transit Oriented Development (TOD) potential, proximity to jobs, housing and education, enhanced quality of life, and integration with the bike and pedestrian network.	Used these criteria to identify and select recommendations
1.1.5 - Develop a strategy to combine public input and best practices to support the decision- making process when considering the locations and alignments of multi-modal connections to the airport and other destinations.	Successfully used a combination of pop-up meetings, presentations, media, and an invited Steering Committee to gather input
1.1.6 - Continue to evaluate Maryland Parkway as a BRT or rail corridor under the National environmental Policy act (NEPA), with consideration given to the implementation strategies identified in the Maryland Parkway opportunity Site study.	Integrated Maryland Parkway Streetcar into ridership modeling and projections for the Charleston and Rancho corridors
1.1.7 - Identify lines that would have increased frequency, limited stops, express, bus rapid transit (BRT), and light rail services.	Recommend light rail on Charleston Blvd, light rail or BRT on Rancho Dr, and improved transit options on many other corridors
1.1.8 - Designate a baseline transit network and set of operating standards that can serve as the foundation of the transit system.	To be developed by the RTC
1.1.9 - Improve the rider experience by locating stops away from adjacent travel lanes, offering robust lighting, and making other site considerations that maximize visibility and safety.	Several corridors have proposed bus route improvements. These are existing high-volume local bus routes that may receive a number of improvements to increase operational performance and/or the overall user experience for people who walk and take transit. Enhancements may include streetscape improvements to make walking safer and easier; bus pullouts; bus shelters; signal prioritization; and/or other operational improvements to increase travel efficiency. All of these routes intersect with the proposed high-capacity transit routes, creating a network of north-south and east-west transit connectivity.
1.1.10 - Update design standards to create wider sidewalks with street trees, benches, trash receptacles, streetlighting, and other streetscape amenities along key transportation corridors to make walking to transit stops more welcoming for riders and to shield them from heat during extreme temperatures.	Identified numerous roadways for complete street enhancements

SNS Strategy	Mobility Master Plan Consistency
1.1.11 - Coordinate with relevant agencies to pursue interstate regional passenger rail service.	Outside the scope of this Plan
1.1.12 - Identify and pursue the use of complementary alternative funding sources for mass transit improvements, including national public and private funds, and existing local and state funds that are intended for public purpose and positive outcomes in the areas of: economic development or growth; green infrastructure; environmental protection; land conversion; urban land development; access to jobs, housing and education for low or moderate income individuals (IMI); and public health.	Identified and evaluated alternative funding sources for mass transit improvements
Objective 1.2: Support safe neighborhood connections in marginalized communities.	
1.2.1 - analyze the feasibility of transit stations with bicycle and pedestrian infrastructure provisions adjacent to existing and future mixed-income developments.	Identified possible transit station locations on Charleston and Rancho within marginalized communities, spaced adequately to make them within easy walking distance and yet far enough apart to reduce transit travel time
1.2.2 - Consider partnerships between the RTC and private developers to create Park & Ride facilities in outlying areas that could provide access to express transit services and reduce travel time.	Identified Park & Ride facilities in outlying areas that could provide access to express transit services
1.2.3 - Ensure that transit amenities are supported by ADA/PROWAG-compliant pedestrian facilities, universal design, and adequate directional signage.	All improvements will be compliant with ADA/PROWAG
1.2.4 - Revise and develop bus stop/station design standards based on passenger volumes, locations, and other characteristics	Station design standards are developed by the RTC
1.2.5 - Reduce the dependence on paratransit through facility enhancements and education about the transit system for people with disabilities or limited mobility.	Outside the scope of this Plan
Objective 1.3: Support the RTC to secure funding for the expansion, operation and maintenance of transit systems and routes.	
1.3.1 - Pursue funding opportunities for system completion, right-of-way acquisition, and implementation through federal, state, and local sources.	Identified and evaluated alternative funding sources for mass transit improvements
1.3.2 - Identify and pursue creative funding strategies to better balance transportation investments between roadway, transit, bike and pedestrian improvements.	Identified and evaluated alternative funding sources for all transportation investments including roadway, transit, bike and pedestrian improvements
1.3.3 - Promote community pride in marketing and promotional materials with the idea that the region's transportation system should be a source of community pride.	Outside the scope of this Plan
1.3.4 - Continue to monitor effectiveness of communication methods with priority target audiences and enhance outreach efforts to raise awareness of existing services.	Outside the scope of this Plan
1.3.5 - Strive to provide effective, efficient, and equitable service to all individuals regardless of their ability to speak, read, or write English.	Outside the scope of this Plan

SNS Strategy	Mobility Master Plan Consistency
Objective 1.4: Integrate future land-use planning with existing and future transportation improvements.	
1.4.1 - Ensure coordination between local governments and the RTC to evaluate frequent service transit corridors for potential designation as Transit oriented Development (TOD) areas.	Identified Charleston Blvd and Rancho Drive as a TOD corridors. Coordinated with the RTC, and developed an FTA approved transit ridership model the RTC can use to evaluate other TOD corridors throughout the Valley.
1.4.2 - Pursue an analysis of the economic benefits of transit to highlight the importance of fixed transit lines in economic development and redevelopment.	Outside the scope of this Plan
1.4.3 - Consider using space/land dedications or impact fees for transit amenities that support employment centers, such as multi-modal centers, transit centers, bike lanes, etc.	Identified and evaluated alternative funding sources for all transportation investments
1.4.4 - Tailor parking requirements to encourage more concentrated development in mixed-use areas, reflect actual demand, and increase development feasibility.	Outside the scope of this Plan
1.4.5 - Require interim sidewalks along incomplete roadways, when feasible.	This is a policy action outside the scope of this Plan
GOAL 2: Connect and enhance bike and pedestrian facilities throughout the region.	
Objective 2.1: Implement policies and design concepts that encourage safety and ease of movement for pedestrians and cyclists.	
2.1.1 - Work with the RTC to implement a regional system of fully multi-modal interconnected arterial and local streets, pathways and bikeways that are integrated with public transit in order to increase mode share.	Identified a network of enhanced bicycle facilities that traverse the City and intersect with transit facilities and activity centers
2.1.2 - Enhance safety for marginalized groups, taking into consideration the particular needs of vulnerable populations, such as the homeless, unemployed, underemployed and other marginalized groups.	Identified numerous complete street improvements to enhance safety, especially within our most vulnerable populations
2.1.3 - Ensure that information about transportation options is available and distributed in creative ways to promote and educate Southern Nevada's most vulnerable populations, such as homeless, unemployed, underemployed and other marginalized groups.	Outside the scope of this Plan
2.1.4 - Pursue a pedestrian safety study to identify priority locations with high pedestrian-vehicle conflicts to focus retrofit plans, conduct an incident management analysis, and define crash hot spots.	Used NDOT pedestrian crash data to identify priority locations for complete street safety improvements
2.1.5 - Develop a regionally-shared traffic safety database.	Outside the scope of this Plan
2.1.6 - Work with local bike groups and transportation advocates to update the RTC's multi-modal transportation plan and identify strategies to increase safety and make walking and bicycling more viable as primary transportation modes.	Worked with representatives from the Southern Nevada Bicycle Coalition, Southern Nevada Pedestrian Task Force on the Steering Committee, and others to develop corridors and strategies
2.1.7 - Establish an off-street bicycle parking policy, which considers security, placement, quality of facilities, and provision of signs directing bicyclists to the parking facilities.	Outside the scope of this Plan

SNS Strategy	Mobility Master Plan Consistency
Objective 2.2: Increase funding strategies for investments in the bicycle and pedestrian network.	
2.2.1 - In coordination with Clark County School District, support Safe Routes to Schools and identify funding sources for all aspects of Safe Routes to Schools programs.	Coordinated with the Clark County School District, Safe Routes to Schools program. Ensured recommendations are consistent with the RTC's Regional Schools Multimodal Access Study.
2.2.2 - Develop financial or regulatory incentives for development projects that include multi-modal transportation infrastructure in low- income communities.	Outside the scope of this Plan
2.2.3 - Consider alternative funding sources to connect the bicycle and pedestrian network to the transit network.	Identified and evaluated alternative funding sources for all transportation investments
2.2.4 - Coordinate with and continue to support the Outside Las Vegas Foundation and the Regional open Space and Trails Working Group to integrate priorities into local ordinances and/or comprehensive plans and support the development and funding of the trails system and supporting programs.	Received input from representatives of Outside Las Vegas Foundation and the Regional open Space and Trails Working Group that guided the recommendations and prioritization of off-street trails
2.2.5 - Continue to implement the RTC's public education campaign on multi-modal transportation and pursue a campaign on the Region's transportation vision.	Outside the scope of this Plan
2.2.6 - Promote educational opportunities to the local engineering and planning community on the role of design and land use in pedestrian safety, such as an educational event about how to repurpose right-of-way, and design streets and streetscapes as amenities.	Outside the scope of this Plan
2.2.7 - Celebrate accomplishments through special events and community outreach activities (e.g., cyclovias, family rides, etc.).	Outside the scope of this Plan
GOAL 3: Develop a safe, efficient road network that supports all transportation modes.	
Objective 3.1: Establish a road network with improved and acceptable local and regional connectivity and traffic congestion levels.	
3.1.1 - Evaluate planned transportation infrastructure to reflect the land use vision.	Transportation network recommendations developed that support the land use vision
3.1.2 - Revise and adopt regional and local design standards to include multi-modal street design, safety and improved access management.	Outside the scope of this Plan
3.1.3 - Pursue a regional policy change to require roadways to be designed for target speeds as recommended in the Complete Streets Design Guidelines for livable Communities, based on the context of the corridor and overall safety and comfort of all users, including pedestrians and bicyclists, and require justification for all target design speeds and speed limits.	Speed limits were not considered in this Plan
3.1.4 - Consider the potential impacts of the development of the I-11 corridor, currently being studied by the Arizona and Nevada Departments of Transportation.	I-11 will open economic development opportunities along the corridor, especially in the currently undeveloped northwest corner of the City, and increase the need for high capacity transit along the Rancho Drive corridor—a recommendation of this Plan.

SNS Strategy	Mobility Master Plan Consistency
Objective 3.2: Overhaul design standards to support multiple modes and support healthy lifestyles, with special attention to the Region's extreme summer temperatures.	
3.2.1 - Working with local stakeholders, support more stringent criteria to justify roadway capacity expansion and ensure that any capacity expansions accommodate viable multi-modal transportation options.	This Plan seeks to create additional capacity on key corridors through transit enhancements. Almost all other roadway recommendations include an equitable complete street component.
3.2.2 - Ensure that all traffic studies provide a justification for roadway capacity and speed limit.	Outside the scope of this Plan
3.2.3 - Consider a regional review of RTC's TIP and local road CIPs to justify project need.	Outside the scope of this Plan
3.2.4 - Promote "Complete Streets" cross section revisions whenever corridor reconstruction or reconfiguration occurs. Activities could include removing block walls, limiting cul-de-sacs, increasing sidewalk and bike lane widths, reducing curb cuts, and limiting driveways.	Routine street renovation projects provide a low-cost opportunity to make complete street improvements—a key recommendation of this Plan
3.2.5 - Develop a road diet/retrofit plan for road networks in Southern Nevada to improve connectivity and access for multiple modes, starting with areas identified through the pedestrian safety study.	Lower volume, lower speed roadways were identified for road diets to allow for widened pedestrian and bicycle zones, and increased safety
3.2.6 - Develop neighborhood and regional connectivity ratios/standards.	Outside the scope of this Plan
3.2.7 - Encourage the development of design standards and land use policies that require investments in low-income or at-risk communities to include the basic attributes such as sidewalks, adequate lighting, street trees, and other strategies to create walkable communities, with special attention to designing for shade and heat absorbent materials to provide respite to transit riders.	Identified numerous complete street improvements to enhance safety, especially within low-income or at-risk communities
Objective 3.3: Reduce transportation-related emissions of ozone and carbon monoxide.	
3.3.1 - Consider collaborating with state regulatory agencies and the Department of Motor Vehicles (DMV) to strengthen the standard for vehicle emission.	Outside the scope of this Plan
3.3.2 - Reduce vehicle miles traveled to reduce mobile emissions and therefore improve regional air quality.	This Plan includes an aggressive transit plan to minimize the number of vehicular trips
3.3.3 - Promote responsible auto use, including refueling motor vehicles after sunset to prevent gasoline fumes from interacting with sunlight, and keeping vehicle engines finely tuned.	Outside the scope of this Plan

8

LOOKING TO THE FUTURE: AUTONOMOUS AND CONNECTED VEHICLE TECHNOLOGIES

According to the U.S. Department of Transportation (USDOT) study, *Beyond Traffic: 2045 Trends and Choices* (USDOT, 2015), the previous 50 years have seen the U.S. population depending more and more on automobiles. However, today, trends are shifting and travel patterns are changing. Americans are driving less. Per capita vehicle miles traveled – a measure of how much people drive – began declining in 2006 and has not increased, even as the economy has recovered from the Great Recession.

Technology is playing a role in this shift in many different ways. The rise of online shopping has allowed consumers to stay home and make purchases – offsetting the number of non-work vehicle trips. The changing U.S. workplace is shifting demand; telecommuting has allowed many Americans to work from home, cutting the number of necessary trips to and from their job sites. Other workplace changes, such as 4-day workweeks, have reduced commuting numbers.

As the Baby Boomers retire, a large share of commuters will be removed from the roadways. Moreover, they will not necessarily be replaced with young professionals. Millennials are coming of age in a time of rapid technological change. Their comfort in connecting with people using smart phone technology or social media means fewer trips to see those people face to face. Driving is not their preferred mode of transport, and many are choosing not to apply for drivers licenses – or they are getting them several years after they qualify. Public transit ridership has risen across the United States. Living and working in close proximity are allowing more bicycle and walking trips.

These trends set up the Mobility Master Plan and the desire to introduce more transportation choice into the system. And what about autonomous vehicles?

How will we move?

- America's population will grow by 70 million by 2045; population growth will be greatest in the South and West; existing infrastructure might not be able to accommodate it.
- It is possible that Americans, particularly millennials, will continue reducing trips by car in favor of more trips by transit and intercity passenger rail.
- In 2045, there will be nearly twice as many older Americans – thus, more people needing quality transit connections to medical and other services.

How will things move?

- By 2045, freight volumes will increase 45 percent.
- Online shopping is driving up demand for small package home delivery, which could soon substitute for many household shopping trips.

How will we move better?

- Technological changes and innovation may transform vehicles, infrastructure, logistics, and the delivery of transportation services to promote efficiency and safety.
- New sources of travel data have the potential to improve travelers' experience, support efficient management of transportation systems, and enhance investment decisions.
- Automation will affect all modes of transportation.

FROM BEYOND TRAFFIC: 2045 Trends and Choices, USDOT 2015.

What are they? How will they impact our choices and the way our transportation system works? This region, and Nevada as a whole, is known to take risks and push boundaries. It is just a matter of time before emerging developments in technology and changes in traveler demand will shift how we move from Point A to Point B.

But, the bottom line is this: all these differing technologies and modes depend on an underlying roadway network. Regardless of vehicle choice, demand for our roads and highways will continue to rise. In Clark County, vehicle miles traveled climbed to 17.4 billion in 2014, a 24 percent increase from 2004. Continued growth in population and vehicle miles traveled will further challenge the region's transportation infrastructure. And in fact, the projected ease of using autonomous vehicles could drive up that number even further. So the question that remains is how we can better utilize our roads?

Automated vehicles and public transit systems can help manage demand, but they won't eliminate the need for streets and highways. The Mobility Master Plan seeks to identify those infrastructure improvements that allow our residents to address today's needs and to optimize the efficiency of current and future transportation networks. However, we also must be prepared to look ahead, adapt, and respond to the needs of its residents.

AUTONOMOUS AND CONNECTED VEHICLES

Automated and connected vehicle technologies are becoming some of the most heavily researched automotive technologies. An autonomous car – also known as an uncrewed vehicle, driverless car, self-driving car and robotic car – is an autonomous vehicle capable of fulfilling the main transportation capabilities of a traditional car without human input. The primary vision of autonomous vehicles is to create crash-free, injury-free and delay-free travel by maximizing the efficient use of infrastructure. Today, crashes and other traffic incidents are to blame for about one-third of all congestion in the U.S. (USDOT 2015), with more than one-third due to driver error (Figure 8-1). By significantly reducing crashes through technology, a major cause of congestion could potentially be virtually eliminated. If a crash or other traffic incident does occur, automated vehicles could reroute trips on the fly using global-positioning systems and real-time traffic flow information to avoid the area and help reduce delays at the congestion point.

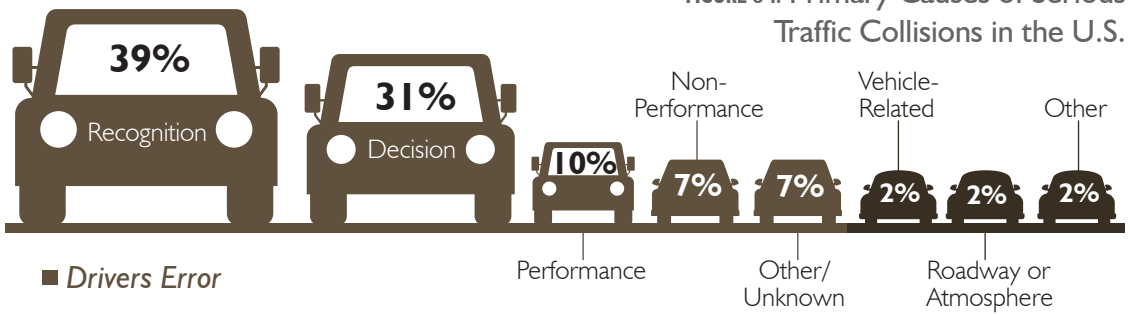
Connected vehicles are vehicles that use any of a number of different communication technologies to communicate with the driver, other cars on the road, roadside infrastructure, and the "Cloud." This technology can be used to not only improve vehicle safety, but also to improve vehicle efficiency and commute times. Limited or full autonomous vehicles will all incorporate connected vehicle technologies.

While research and development are actively underway to put autonomous vehicles on our roads, they will not change the world of transportation overnight. Many of the components of the automated vehicle are already being installed in current vehicles, such as sensors, global-positioning systems and computer-controlled brakes. Today, these components might allow a car to park itself, warn the driver of an oncoming hazard, or apply the brakes to avoid a crash. In the future, this technology will allow vehicles to drive themselves while their passengers, freed from the duties of driving and the concentration it requires, spend their commute time working, relaxing or socializing on the way to their destination (USDOT 2015).

The transition to full automation is likely to be gradual, requiring traffic control systems to safely accommodate varying combinations of autonomous and human-driven vehicles over time. The National Highway Traffic Safety Administration (NHTSA) defines five levels of vehicle automation (RAND Corporation 2014):

- Level 0 No Automation: The human driver is in complete control of all functions of the car.
- Level 1 Function Specific Automation: One function is automated.
- Level 2 Combined Function Automation: More than one function is automated at the same time (e.g., steering and acceleration), but the driver must remain constantly attentive.
- Level 3 Limited Self-Driving Automation: The driving functions are sufficiently automated that the driver can safely engage in other activities.
- Level 4 Full Self-Driving Automation: The car can drive itself without a human driver.

FIGURE 8-1. Primary Causes of Serious Traffic Collisions in the U.S.



Source: **NHTSA 2015**

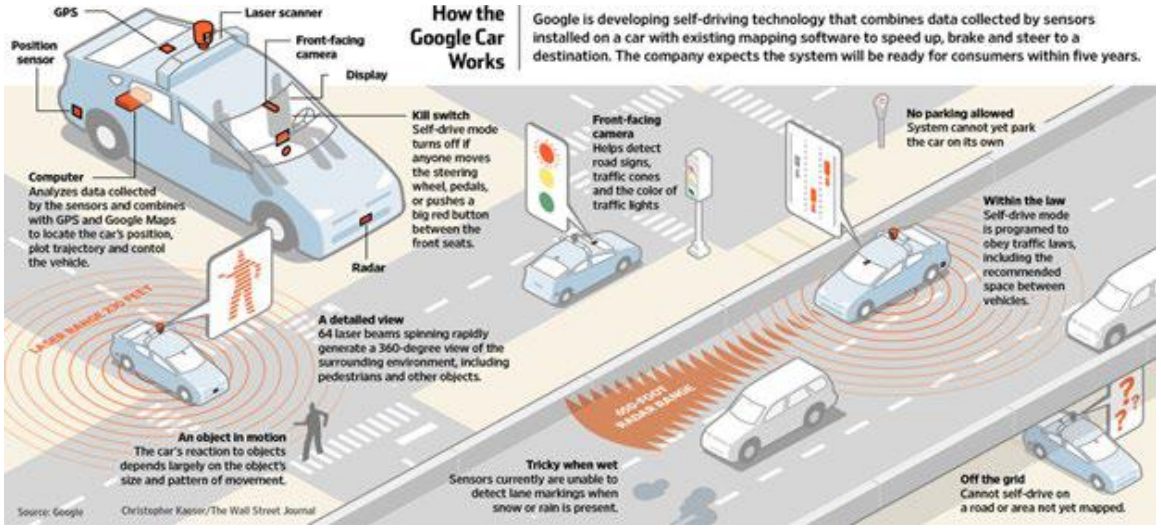
Benefits and Tradeoffs

Implementing autonomous vehicle technology can have many benefits to our transportation system and society as a whole. Perhaps the most touted benefit is the ability for passengers to make use of travel time in another manner that is not focused on operation of the vehicle, such as beginning work tasks before arriving at the office, or spending quality time with family while traveling between destinations. However, today's technology, infrastructure, and policy environment is not ready to handle all the implications of a driverless transportation network. Google, as one manufacturer moving forward with self-driving car technology, illustrates some of the current technical and infrastructure-related limitations (Figure 8-2).

By significantly reducing crashes through technology, a major cause of congestion could potentially be virtually eliminated. If a crash or other traffic incident does occur, automated vehicles could reroute trips on the fly using global-positioning systems and real-time traffic flow information to avoid the area and help reduce delays at the congestion point.

Increased safety could accelerate the transition to electric and other propulsion technologies, as the need for the current tank-like safety protective design may not be important, allowing lighter vehicles that consume less fuel. This has a whole set of different infrastructure implications (e.g., charging stations).

FIGURE 8-2. Limitations of Implementing Autonomous Vehicles on Local Roads




13-6

WHAT DOES THIS MEAN FOR LAS VEGAS?

The technology for autonomous and connected vehicles is maturing rapidly and several automakers are planning on the capability of a fully autonomous vehicle for sale by 2020. As the technology for continues to develop, the City will continually address the potential impacts of these vehicles on the transportation system and begin putting the right infrastructure in place. After all, Las Vegas is an epicenter for innovation: there is no bigger stage for rolling out and promoting new ideas capitalizing on Las Vegas' world-renowned brand. To date, 16 states have passed enabling legislation for the testing of autonomous vehicles. Nevada was the first, authorizing the operation of autonomous vehicles in 2011.

Where to start?

- Deploy a series of **innovative projects** that enhance information and communications technologies throughout our infrastructure, develop operational concepts, and identify policy and administrative gaps.
- Establish a **downtown urban environment** that promotes the use of advanced transportation technologies.
- Establish a fully interoperable, **open-source data-sharing platform** among partners.
- Deploy an **automated decision support system** to measure City performance and change operational parameters based on changes in performance indicators.
- Enhance existing **City dashboards, websites, and mobile apps** to show real-time City activities and provide real-time status and information to managers and the public.
- Augment **planning and City improvement activities**, using robust data to better target areas for economic investment, improved resident and tourist safety, and a fully sustainable environment.

The City has identified an "Innovation District" Downtown to promote and adopt new transportation infrastructure and mobility technologies, and to create partnerships with autonomous vehicle and mobility technology companies to establish demonstration sites. Two possible sets of demonstration projects have been identified that will incrementally lay the pathway for autonomous and connected vehicles – and together, create an innovation hub to transform transportation city-wide (Figure 8-3).

Phase 1 Demonstration Projects

AV/CV Test Beds – Deploy two automated vehicle/connected vehicle (AV/CV) test beds: one corridor test bed throughout the urban Innovation District, and a second offsite test bed to conduct controlled testing.

Vehicle-to-Pedestrian Safety Improvement Project – Connect urban employees throughout the Innovation District (near the new Zappos Corporate Headquarters) with priority access, and integrated AV and CV collision avoidance systems.

Downtown Bike Share Safety Project – Deploy technology to 180 Bike Share bicycles throughout our Innovation District to monitor cyclist and emissions data, synchronize traffic signals, and integrate with AV and CV collision avoidance systems.

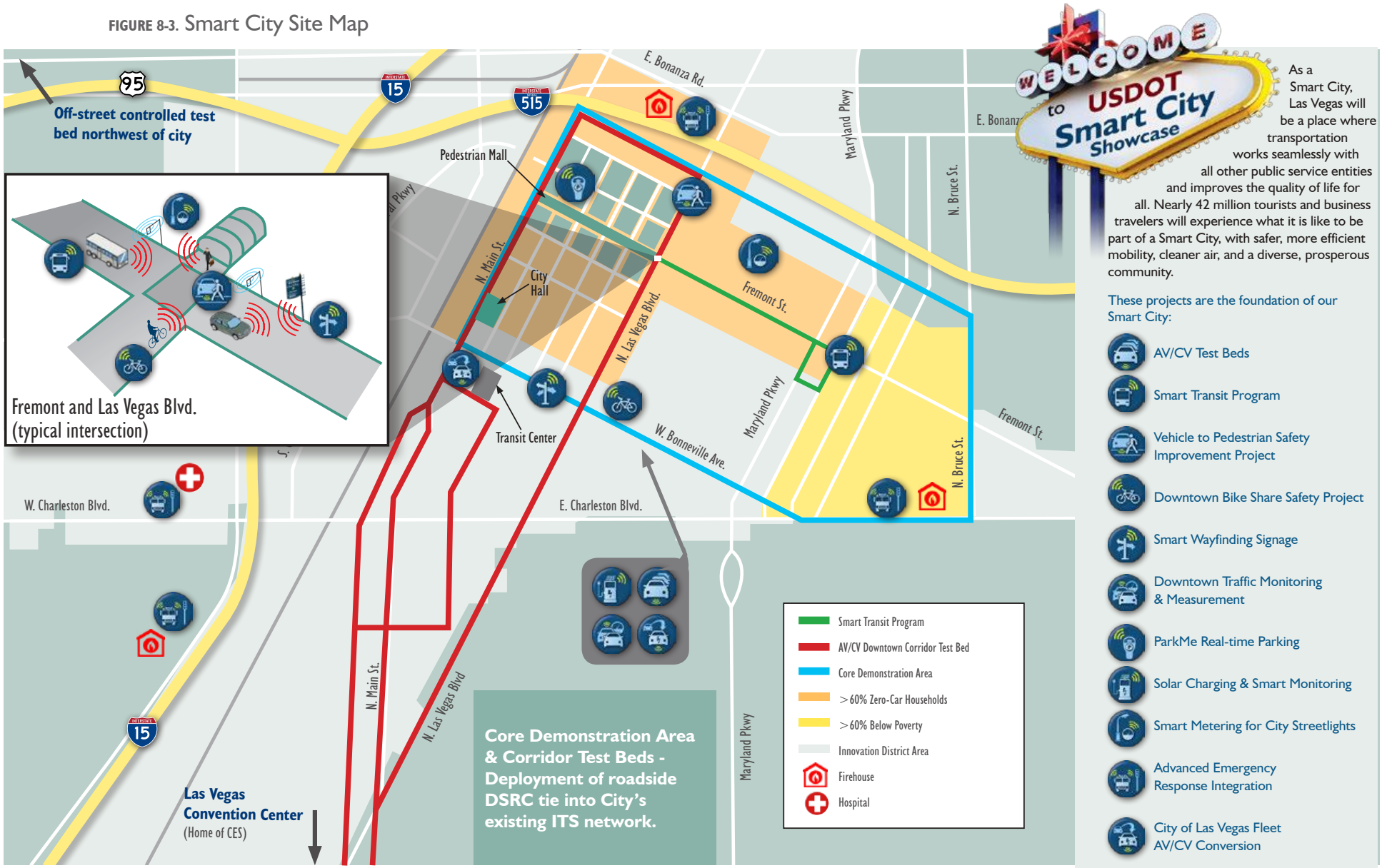
Smart Wayfinding Signage – Deploy smart wayfinding signs integrated with the City of Las Vegas Mobile App, and the Smart City Command and Control system to collect interest data and display relevant information to users.

ParkMe Real-Time Parking – Transmit real-time commercial and freight parking availability (5,200 City-owned spaces and 500 private spaces) to the City of Las Vegas ParkMe location and reservation app; navigating drivers to available parking.

Solar Charging & Smart Monitoring – Install solar-powered smart charging stations that transfer charging information and power efficiency data to the Smart City Command and Control system. Integrate with the ParkMe app to display and automatically route AV and CV test vehicles to available stations.

Smart Metering for City Streetlights – Integrate consumption data from 50,000 streetlights and 3,000 power taps into NV Energy's smart meter network and the Smart City Command and Control.

FIGURE 8-3. Smart City Site Map



As a Smart City, Las Vegas will be a place where transportation works seamlessly with all other public service entities and improves the quality of life for all. Nearly 42 million tourists and business travelers will experience what it is like to be part of a Smart City, with safer, more efficient mobility, cleaner air, and a diverse, prosperous community.

These projects are the foundation of our Smart City:

- AV/CV Test Beds
- Smart Transit Program
- Vehicle to Pedestrian Safety Improvement Project
- Downtown Bike Share Safety Project
- Smart Wayfinding Signage
- Downtown Traffic Monitoring & Measurement
- ParkMe Real-time Parking
- Solar Charging & Smart Monitoring
- Smart Metering for City Streetlights
- Advanced Emergency Response Integration
- City of Las Vegas Fleet AV/CV Conversion

Phase 2 Demonstration Projects

Smart Transit Program – Enhance Las Vegas' public transit choices through on-demand fleet management, automatic trip planning, and an autonomous mass transit vehicle.

Downtown Traffic Monitoring & Measurement – Collect data to monitor real-time traffic congestion, accidents, and emissions; displayed on the Real-time City Dashboard; integrate into Smart City Command and Control to redirect traffic and minimize congestion.

Advanced Emergency Response Integration – Integrate first responder computer-aided dispatch/automatic vehicle location data into the Smart City Command and Control system to monitor emergency vehicle locations and resynchronize traffic signals when preempted during responses.

City of Las Vegas Fleet AV/CV Conversion – Retrofit 50 City of Las Vegas fleet vehicles with AV/CV technologies to promote traffic harmonization, reduce carbon emissions, and promote safety for City workers.

The eleven demonstration projects, which when connected, will create the foundation of Las Vegas' Smart City and preparation for autonomous vehicle technology.

ACRONYMNS AND ABBREVIATIONS

ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
AV	Autonomous vehicle
CC-215	Clark County Route 215
CCSD	Clark County School District
City	City of Las Vegas
CV	Connected vehicle
BRT	Bus Rapid Transit
EV	Electric Vehicle
FTA	Federal Transit Administration
GHG	Greenhouse Gas
HAWK	High-Intensity Activated Crosswalk Beacon
HOV	High-Occupancy Vehicle
I-11	Interstate 11
I-15	Interstate 15
ITS	Intelligent Transportation System
LRT	Light Rail Transit
NDOT	Nevada Department of Transportation
PELICAN	Pedestrian Light Control Activation
Plan	City of Las Vegas Mobility Master Plan
PRT	Personal Rapid Transit
ROW	Right-of-Way
RTC	Regional Transportation Commission of Southern Nevada
RTP	Regional Transportation Plan
SNRPC	Southern Nevada Regional Planning Coalition
SRTS	Safe Routes to School
STOPS	Simplified Trips on Project Software
TOD	Transit-Oriented Development
TIBP	Transportation Investment Business Plan
TTI	Texas Transportation Institute
UNLV	University of Nevada, Las Vegas
UPRR	Union Pacific Railroad
US 95	U.S. Route 95
USDOT	U.S. Department of Transportation
Valley	Las Vegas Valley

REFERENCES

City of Las Vegas. 2015. *2015 General Population Survey Results.*

Chicago Department of Transportation. 2011. *Initial Findings: Kinzie Street Protected Bike Lane.* Available at: http://www.chicagobikes.org/pdf/Kinzie_Initial_Findings.pdf.

Indiana University Public Policy Institute. 2015. *Assessment of the Impact of the Indianapolis Cultural Trail.* Available at: http://indyculturaltrail.org.s3.amazonaws.com/wp-content/uploads/2015/07/15-C02-CulturalTrail-Assessment.pdf.

Federal Transit Administration (FTA). 2009. *Characteristics of Bus Rapid Transit for Decision Making.* Available at: http://www.fta.dot.gov/documents/CBRT_2009_Update.pdf.

Federal Transit Administration (FTA). 2016. "STOPS – User Guide and Other Documentation." March 16.

FHWA. 2013. *Safety Benefits of Raised Medians and Pedestrian Refuge Areas.* Available at: http://safety.fhwa.dot.gov/ped_bike/tools_solve/medians_brochure/medians_brochure.pdf.

Forbes. 2015. *America's Fastest-Growing Cities 2015.* Available at: http://www.forbes.com/sites/erincarlyle/2015/01/27/americas-fastest-growing-cities-2015/#4e2dfd436158.

Land Use Working Group. 2016. RTC. *Population by Entities for Year 2015 to Year 2040.*

Las Vegas Convention and Visitors Authority (LVCVA). 2015. *Las Vegas Year-to-Date Visitor Summary.* Available at: http://www.lvcva.com/includes/content/images/media/docs/ES-YTD-2013.pdf.

National Association of City Transportation Officials (NACTO). 2011. *NACTO Urban Bikeway Design Guide.* Available at: http://nacto.org/publication/urban-bikeway-design-guide/

New York City Department of Transportation (NYCDOT). 2013. *Making Safer Streets.* Available at: http://www.nyc.gov/html/dot/downloads/pdf/dot-making-safer-streets.pdf.

New York City Department of Transportation (NYCDOT). 2012. *Measuring the Street: New Metrics for 21st Century Streets.* Available at: http://www.nyc.gov/html/dot/downloads/pdf/2012-10-measuring-the-street.pdf.

People for Bikes. 2013. *Car Users Would Prefer Separated Bike Lanes Too.* Available at: http://www.peopleforbikes.org/blog/entry/car-users-would-prefer-separated-bike-lanes-too-study-finds.

PIRG Education Fund. 2014. *Millennials in Motion: Changing Travel Habits of Young Americans and the Implications for Public Policy.* Available at: http://www.uspirg.org/sites/pirg/files/reports/Millennials%20in%20Motion%20USPIRG.pdf.

Reconnecting America. 2015. *What is TOD?* Available at: http://reconnectingamerica.org/what-we-do/what-is-tod/.

Regional Transportation Commission of Southern Nevada (RTC). 2015. "Regional Travel Demand Model, Daily Vehicle Matrices."

Regional Transportation Commission of Southern Nevada (RTC). 2014. *Transportation Investment Business Plan.* Existing Conditions Report.

Rockefeller Foundation and Transportation for America. 2014. *Public Information Survey of Millennials.* Summary available at: http://www.rockefellerfoundation.org/newsroom/access-public-transportation-top.

Sound Transit. 2012. *Link OMSF Corridor Analysis.* September. Available at: http://www.soundtransit.org/sites/default/files/documents/pdf/projects/OMSF/OMSF_Task_5.3A_Corridor_Analysis.pdf.

Southern Nevada Regional Planning Coalition. 2011. *Regional Emissions Inventory, Greenhouse Gas Emissions (2005-2009).*

Texas A&M Transportation Institute (TTI). 2015. *Urban Mobility Scorecard.* Available at: http://d2dtl5nnlpfr0r.cloudfront.net/tti.tamu.edu/documents/mobility-scorecard-2015.pdf.

Teschke, K. et al. 2012. American Journal of Public Health. *Route Infrastructure and the Risk of Injuries to Bicyclists: A Case-Crossover Study.* Available at: http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2012.300762?journalCode=ajph&.

Transit Cooperative Research Program (TCRP). 2013. *Report 165, Transit Capacity and Quality of Service Manual, Third Edition.* Available at: http://www.trb.org/Main/Blurbs/169437.aspx.

TriMet. 2009. *MAX: The Next Generation.* Available at: https://web.archive.org/web/20090831081224/http://trimet.org/max/newtrains.htm.

UNLV. 2015. *The Hundred Plan For the Historic Westside Community.*

U.S. Census. 2014. *American Community Survey.* Available at: http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF.

U.S. Department of Transportation (USDOT). 2015. *Beyond Traffic: 2045 Trends and Choices. February.* Available at: https://www.transportation.gov/sites/dot.gov/files/docs/Draft_Beyond_Traffic_Framework.pdf

U.S. Forest Service (USFS). 2004. *Desert Southwest Community Tree Guide: Benefits, Costs, and Strategic Planning.* Center for Urban Forest Research and Education, Pacific Southwest Research Station. Available at: https://www.itreetools.org/streets/resources/Streets_CTG/CUFR_72_Desert_Southwest_CTG.pdf.

White House, National Economic Council and President's Council of Economic Advisers. 2014. *An Economic Analysis of Transportation Infrastructure Investment.* Available at: https://www.whitehouse.gov/sites/default/files/docs/economic_analysis_of_transportation_investments.pdf.


GRAND
ASHLEY
Martin L King Blvd


STOP


CenturyLink