CHAPTER 5
Circulation

A. Current Transportation Setting

The circulation study area for the Magnolia Avenue Specific Plan has been generally defined as the area along the Magnolia Avenue corridor from Ramona Drive on the north to Buchanan Street on the south. The Magnolia Avenue corridor is divided into six Specific Plan Districts, illustrated in Figure 5.1 and described in Chapter 1 of this Specific Plan.

The City of Riverside has designated all roadways in the City as local, collector or arterial streets, within the context of the City's General Plan. The General Plan existing roadway classifications map is presented in Figure 5.2. Within the study area, Magnolia Avenue carries four lanes for moving traffic throughout most of its length, with the exception of a six-lane section between Banbury Drive and Harrison Street. In most areas, on street parking is allowed, and a bike lane is provided throughout the entire length of the roadway. A landscaped or painted median is provided throughout the corridor, with breaks in the median for side streets and also at major driveway locations. The corridor includes the following roadway classifications, right-of-way (ROW) and existing number of through lanes.

- 120 foot arterial – Magnolia Avenue is classified in the General Plan as a 120 foot arterial roadway from Banbury Drive to Central Avenue. It is built as a 6 lane divided arterial from Tyler Street to Harrison Street. Magnolia Avenue from Polk Street to just south of Banbury Street and Harrison Street to Arlington Avenue is built as a 4 lane divided arterial. Magnolia Avenue north of Arlington Avenue to Jurupa Avenue is built as a 4 lane undivided arterial.
- 110 foot arterial – Magnolia Avenue from Western City Limit to Banbury Drive is designated as 110 foot arterial, and it is built as a 4 lane divided roadway.
- 100 foot arterial – Magnolia Avenue from Central Avenue to Ramona Drive is designated as a 100 foot arterial and is built as a 4 lane divided roadway

In summary, Magnolia Avenue is designated as a 120 foot arterial over most of its length within the corridor with smaller sections designated as a 100 or 110 foot arterial. It is generally built with four travel lanes with the exception of the section near the mall where it operates as a six lane divided arterial from Tyler Street to Banbury Drive.

Figure 5.1: Study Area

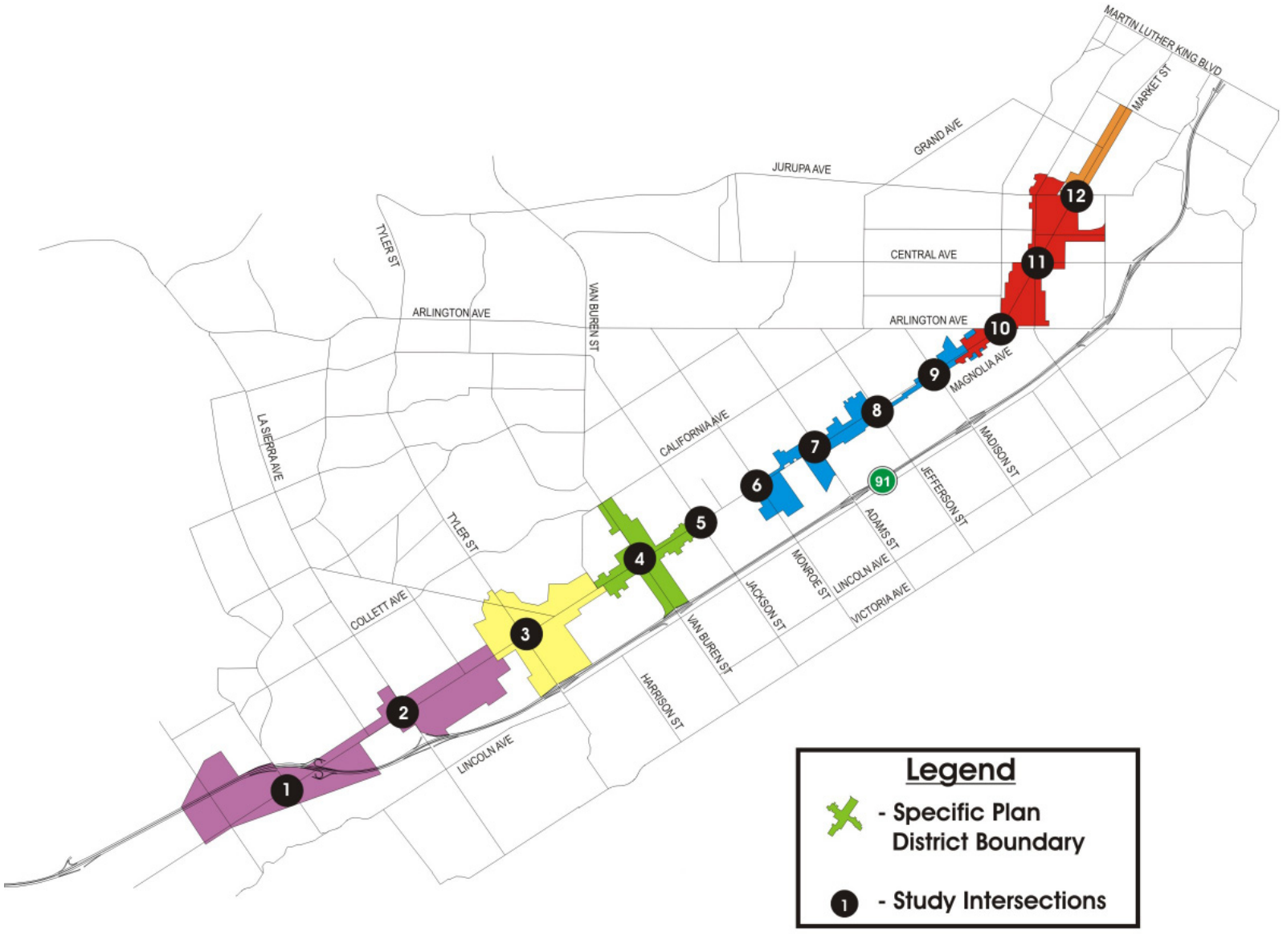
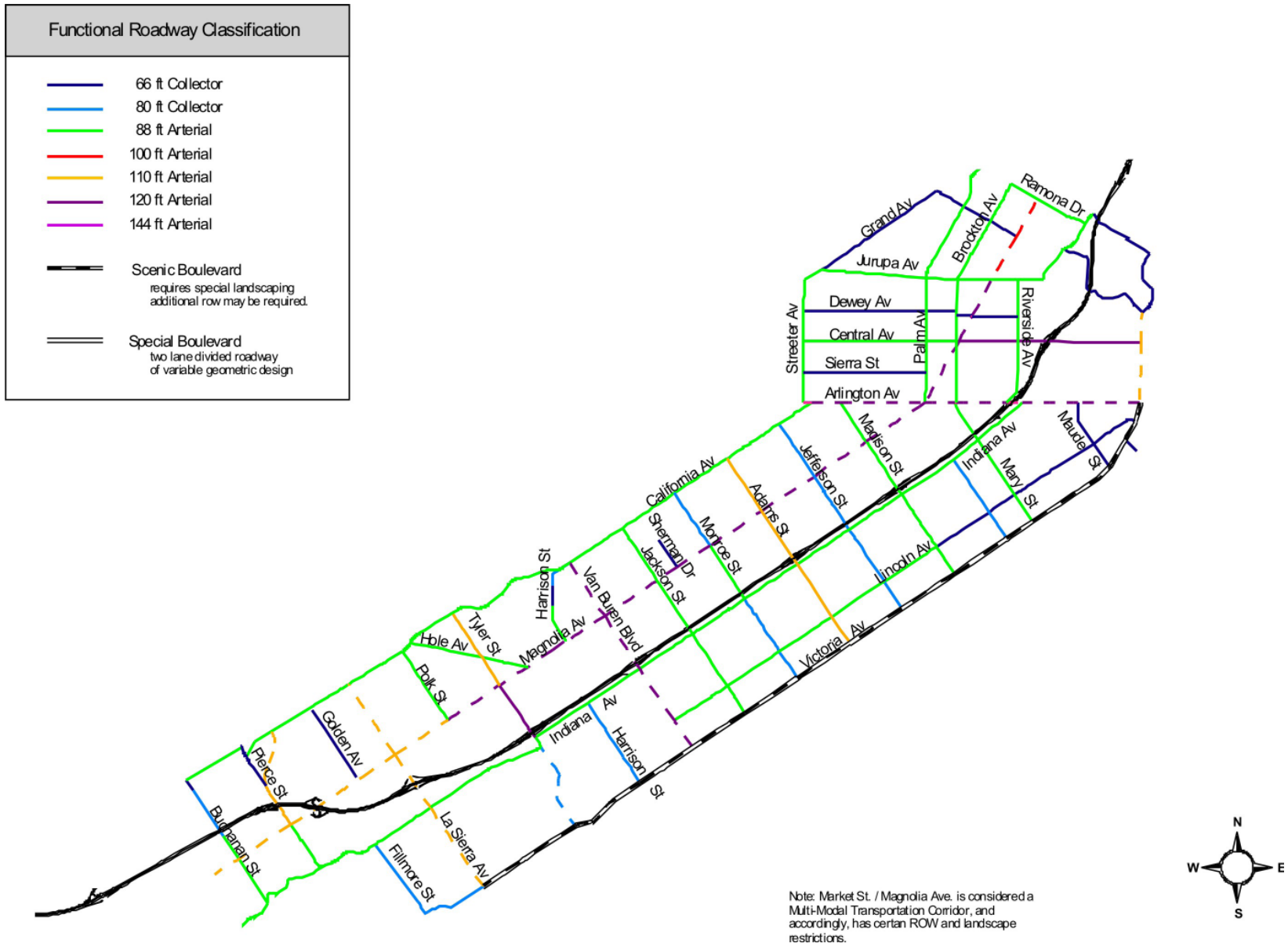


Figure 5.2: Existing Roadway Functional Classifications



Note: Market St. / Magnolia Ave. is considered a Multi-Modal Transportation Corridor, and accordingly, has certan ROW and landscape restrictions.

Cross Streets:
The intersecting streets along the study corridor are classified as follows within the City's General Plan:

- 120 foot arterial – Van Buren Boulevard, Arlington Avenue, Tyler Street and Central Avenue east of Magnolia Avenue are designated as 6 lane divided arterials with 120 foot right-of-way.
- 110 foot arterial – Pierce Street west of Magnolia Avenue, La Sierra Avenue, Tyler Street west of Magnolia Avenue and Adams Street on both sides are designated as 4 lane divided arterials with 110 foot right-of-way.
- 88 foot arterial – Buchanan Street, Pierce Street east of Magnolia Avenue, Polk Street, Harrison Street, Jackson Street, Monroe Street, Madison Street, Palm Avenue, Brockton Avenue, Central Avenue east of Magnolia Avenue and Jurupa Avenue are designated as 4 lane undivided arterials with 88 foot right-of-way.

A few other intersecting streets are designated as collector streets with 66 or 80 foot right-of-way.

B. Traffic Volumes

Figure 5.3 illustrates current Average Daily Traffic volumes along the corridor. In general, traffic volumes are highest in the middle portion of the corridor, at the six lane cross section, where the volumes approach 30,000 vehicles per day. At the southern end of the corridor, daily traffic volumes are over 26,000 vehicles per day, and the volume is nearly 23,000 vehicles at the north end, north of Central Avenue. Cross street volumes range widely from less than 10,000 on some streets to over 40,000 on Van Buren Boulevard. The highest volume intersection is Van Buren Boulevard / Magnolia Avenue. Existing volumes along Magnolia Avenue and the cross streets are the following:

Magnolia Avenue:

- 29,600 vehicles per day north of Tyler Street
- 26,700 vehicles per day north of La Sierra Avenue
- 22,800 vehicles per day north of Central Avenue
- 22,500 vehicles per day between Jackson Street and Monroe Street

Highest Volume Cross Streets:

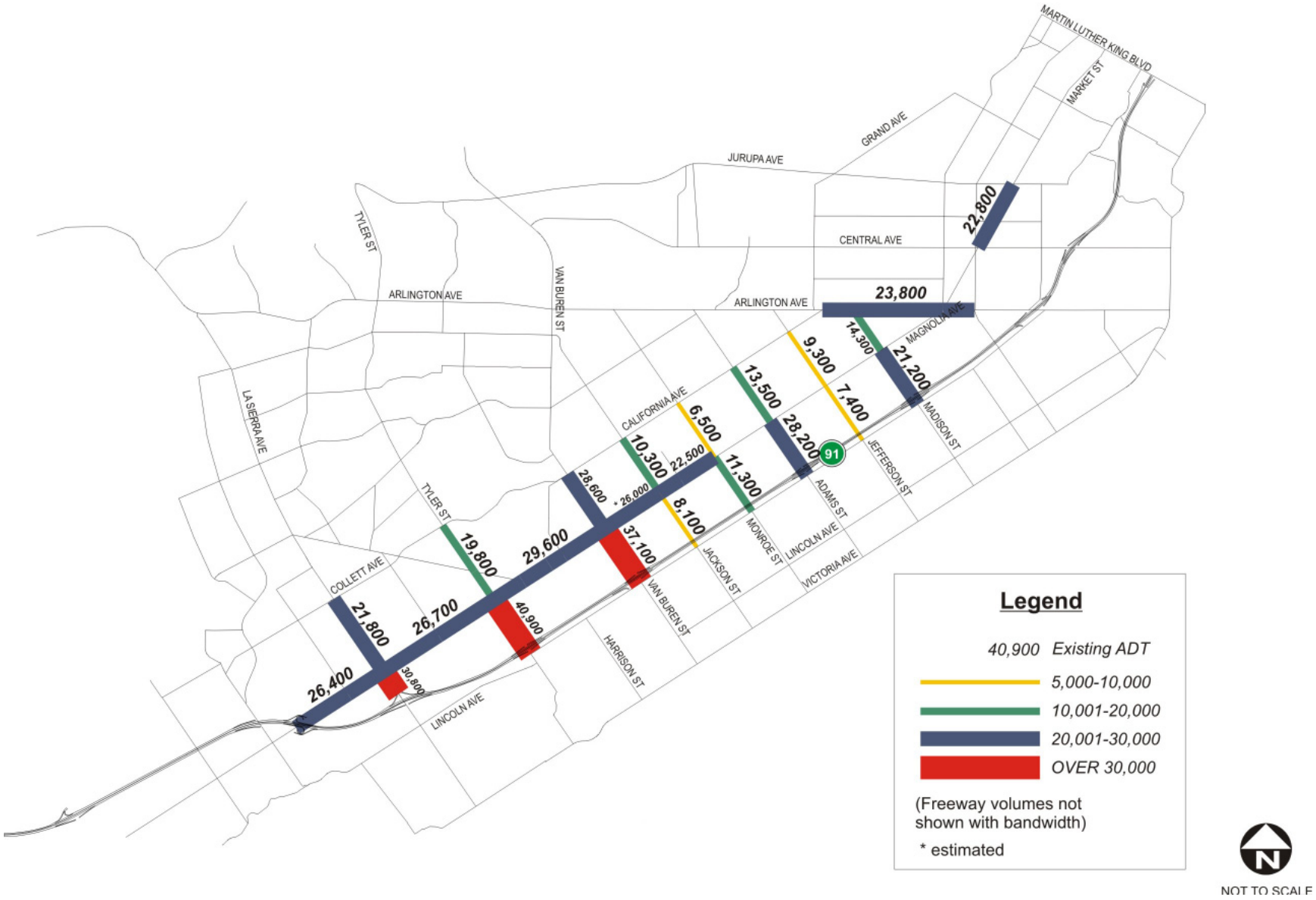
- 40,900 vehicles per day at Tyler Street
- 37,100 vehicles per day at Van Buren Boulevard
- 30,800 vehicles per day at La Sierra Avenue
- 28,200 vehicles per day at Adams Street
- 23,800 vehicles per day at Arlington Avenue
- 21,200 vehicles per day at Madison Street

Lower Volume Cross Streets:

- 11,300 vehicles per day at Monroe Street
- 10,300 vehicles per day at Jackson Street
- 9,300 vehicles per day at Jefferson Street

Cross street volumes range widely from less than 10,000 on some streets to over 40,000 on Van Buren Boulevard.

Figure 5.3: 2003 Average Daily Traffic



C. Intersection Level-of-Service

Intersection level-of-service analysis has been conducted at 12 key intersection locations within the study area. These locations were chosen based on understanding of the most significant cross streets along the corridor, field review and discussions with the City Traffic Engineer. The intersections that have been studied are illustrated in Figure 5.1. Peak hour intersection turning movement traffic counts were conducted at the study intersections in March 2004. Figures 5.4 and 5.5 illustrate the AM and PM peak hour turning movement volumes for the 12 study intersections.

Each intersection was reviewed in the field to determine the current operating conditions including number of lanes by type, type of traffic control (stop sign, traffic signal, etc.) and other special conditions. Using the traffic counts and field data, intersection levels of service were estimated using the "Highway Capacity Manual" vehicle delay-based methodology, which is the City's preferred method of intersection analysis. This analysis yields an intersection "Level of Service" (LOS) for each location which grades the intersection operation in terms of a scale of "A" to "F" with A representing excellent operations and F representing significant congestion. Table 5.1 outlines the level-of-service concept.

Figure 5.4: Existing AM Turning Volumes

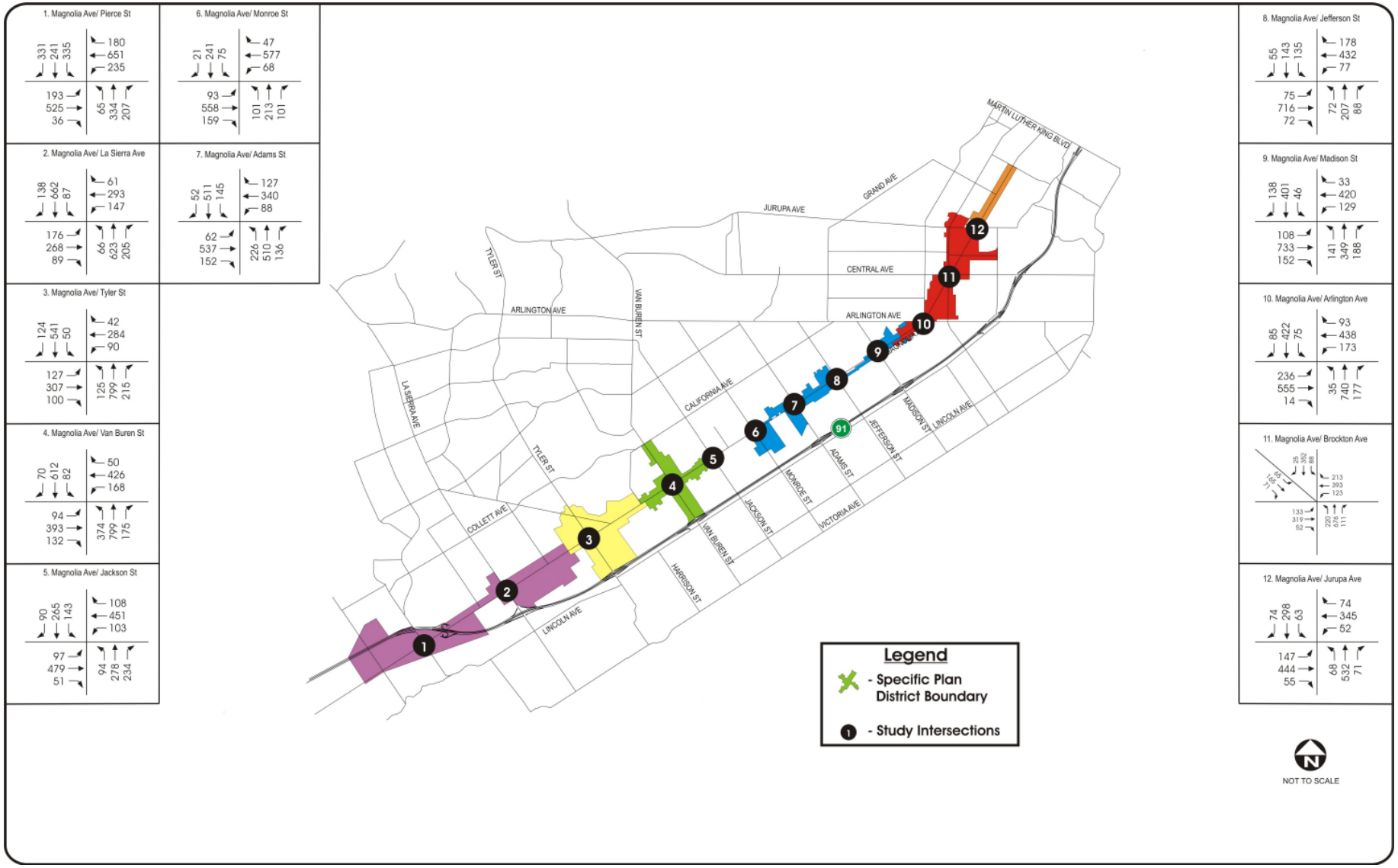


Figure 5.5: Existing PM Turning Volumes

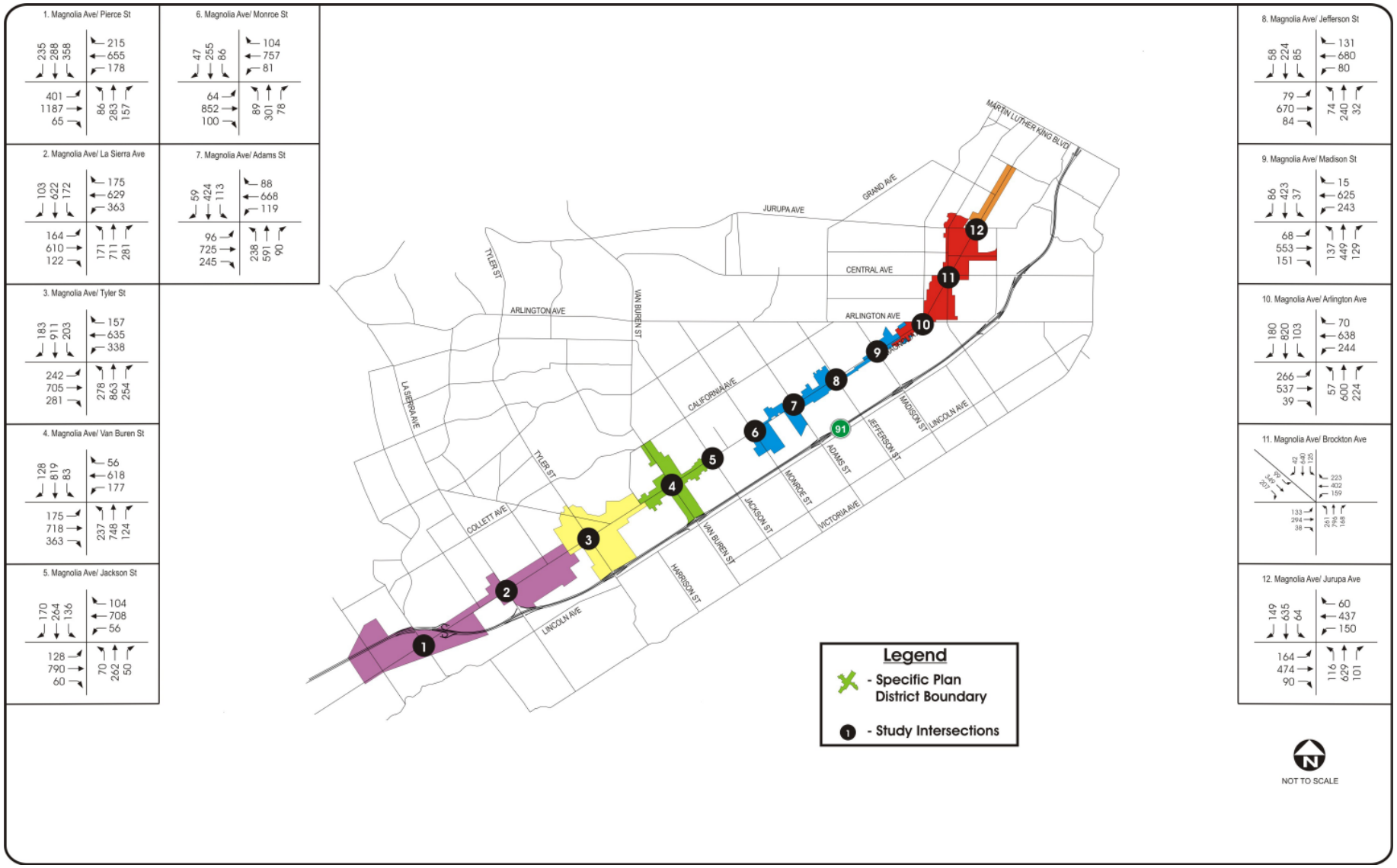


Table 5.1: Intersection Level of Service Definitions

LOS	*Interpretation*	*Signalized Intersection Delay (seconds per vehicle)*
A	Excellent operation. All approaches to the intersection appear quite open, turning movements are easily made, and nearly all drivers find freedom of operation.	≤ 10
B	Very good operation. Many drivers begin to feel somewhat restricted within platoons of vehicles. This represents stable flow. An approach to an intersection may occasionally be fully utilized and traffic queues start to form.	> 10 and ≤ 20
C	Good operation. Occasionally backups may develop behind turning vehicles. Most drivers feel somewhat restricted.	> 20 and ≤ 35
D	Fair operation. There are no long-standing traffic queues. This level is typically associated with design practice for peak periods.	> 35 and ≤ 55
E	Poor operation. Some long-standing vehicular queues develop on critical approaches.	> 55 and ≤ 80
F	Forced flow. Represents jammed conditions. Backups from locations downstream or on the cross street may restrict or prevent movements of vehicles out of the intersection approach lanes; therefore, volumes carried are not predictable. Potential for stop-and-go-type traffic flow.	> 80

Source: Highway Capacity Manual 2000, Exhibit 16-2 and Exhibit 17-2

LOS D is generally considered to be the minimum threshold for operating conditions while LOS E and F conditions are considered deficient and warrant improvement to reach LOS D or better. At some key locations, such as City arterial roadways which are used as a freeway bypass by regional thorough traffic and heavily traveled freeway interchanges, LOS E may be acceptable as determined on a case-by-case basis. The results of the existing conditions analysis, in addition to an analysis of the Magnolia/Central/Brockton intersection conducted by the City after intersection modifications were implemented, indicate that the 12 locations operate at LOS C during the AM and PM peak hours. Existing levels of service and vehicle delay are shown in Table 5.2.

Table 5.2: Level-of-Service / Delay Summary

LOCATION	AM Peak Hour		PM Peak Hour	
	LOS	Delay (sec)	LOS	Delay (sec)
Magnolia Avenue / Pierce Street	C	30.3	C	30.5
Magnolia Avenue / La Sierra Avenue	C	24.3	C	30.3
Magnolia Avenue / Tyler Street	C	20.1	C	27.1
Magnolia Avenue / Van Buren Street	C	27.0	C	29.5
Magnolia Avenue / Jackson Street	C	28.0	C	23.5
Magnolia Avenue / Monroe Street	C	24.7	C	22.9
Magnolia Avenue / Adams Street	C	28.4	C	27.4
Magnolia Avenue / Jefferson Street	C	27.7	C	23.1
Magnolia Avenue / Madison Street	C	28.4	C	27.2
Magnolia Avenue / Arlington Avenue	C	27.5	C	29.1
Magnolia Avenue / Brockton Avenue / Central Avenue*	N/A	N/A	C	26.0
Magnolia Avenue / Jurupa Avenue	C	25.7	C	27.4

**The intersection level-of-service analysis was conducted by Meyer Mohaddes Associates in 2004 as part of an existing conditions report for this Specific Plan. The intersection level-of-service analysis for the Magnolia/Brockton/ Central Avenue intersection was conducted in 2006 by the City of Riverside Public Works Department after intersection modifications were implemented, as described in detail in Section I of this Chapter.*

D. Future Traffic Operations along Magnolia Avenue

The update of the City of Riverside General Plan is underway and includes the update of the Circulation Element. The General Plan is being evaluated at three levels of development intensity. They range from the "typical" densities that the City expects to be built in the next 20 years to the absolute maximum allowable densities. The typical densities assume average residential densities for future areas of development with most existing built out areas generally staying the same as today. This is a likely scenario for how Riverside will grow in the future.

The update includes analysis of 15 intersections throughout the City as well as link (mid-block) analysis of roadway sections. Of the 15 study intersections, four are located in the Specific Plan study area. They include Tyler Street, Van Buren Boulevard, Arlington Avenue, and the Magnolia/Central/Brockton intersection. Where current mid-block link-level traffic volumes were available, they were compared to the roadway capacities based on the City's functional classification system. For the purpose of the Magnolia Avenue Specific Plan the typical densities were considered when estimating the LOS at the 4 key intersections and the link (mid-block) analysis of roadway sections. All roadway links show a current level of service D or better in all locations along Magnolia Avenue and cross streets.

A computer traffic model based on the regional model of the Southern California Association of Governments (SCAG) was used to estimate the future intersection and roadway segment levels of service in the City upon buildout of the proposed General Plan. This analysis included the Magnolia Avenue corridor. The future traffic conditions in the City resulting from buildout of the proposed General Plan were determined first by applying the trip generation rates for land uses based on data developed by the Institute of Transportation Engineers (ITE) and other sources. These trip generation rates were then used to estimate the number of future trips to and from various types of land uses in a day. Upon buildout of the proposed General Plan, trips in the Planning Area (defined as the City plus the sphere of influence area) are expected to increase to 2.53 million per day. SCAG also projects that the City's population is expected to grow by approximately 39 %, reaching well over 380,000 people.

The future conditions analysis indicates that the four General Plan Study intersections along the Magnolia Avenue corridor are expected to continue to operate at LOS of D or better in the future with buildout of the General Plan. The link level analysis of Magnolia Avenue traffic conditions upon buildout of the General Plan was conducted with the assumption that Magnolia Avenue

would remain a four-lane facility, except where it is currently six-lanes. The traffic model results indicate that Magnolia Avenue, as a four-lane facility, would operate at a LOS of D or better throughout its entire length, with the exception of a short segment immediately east of La Sierra. The volume to capacity (v/c) ratio at that location is projected to be 0.91, where 0.90 or greater is LOS E, and 1.00 or greater is LOS F. It is likely that that the LOS E condition at that location can be mitigated by improvements to signal operations in the vicinity. In summary, the General Plan analysis indicates that the Magnolia Avenue corridor is expected to operate at acceptable LOS D or better in the future, assuming no roadway widening beyond existing conditions.

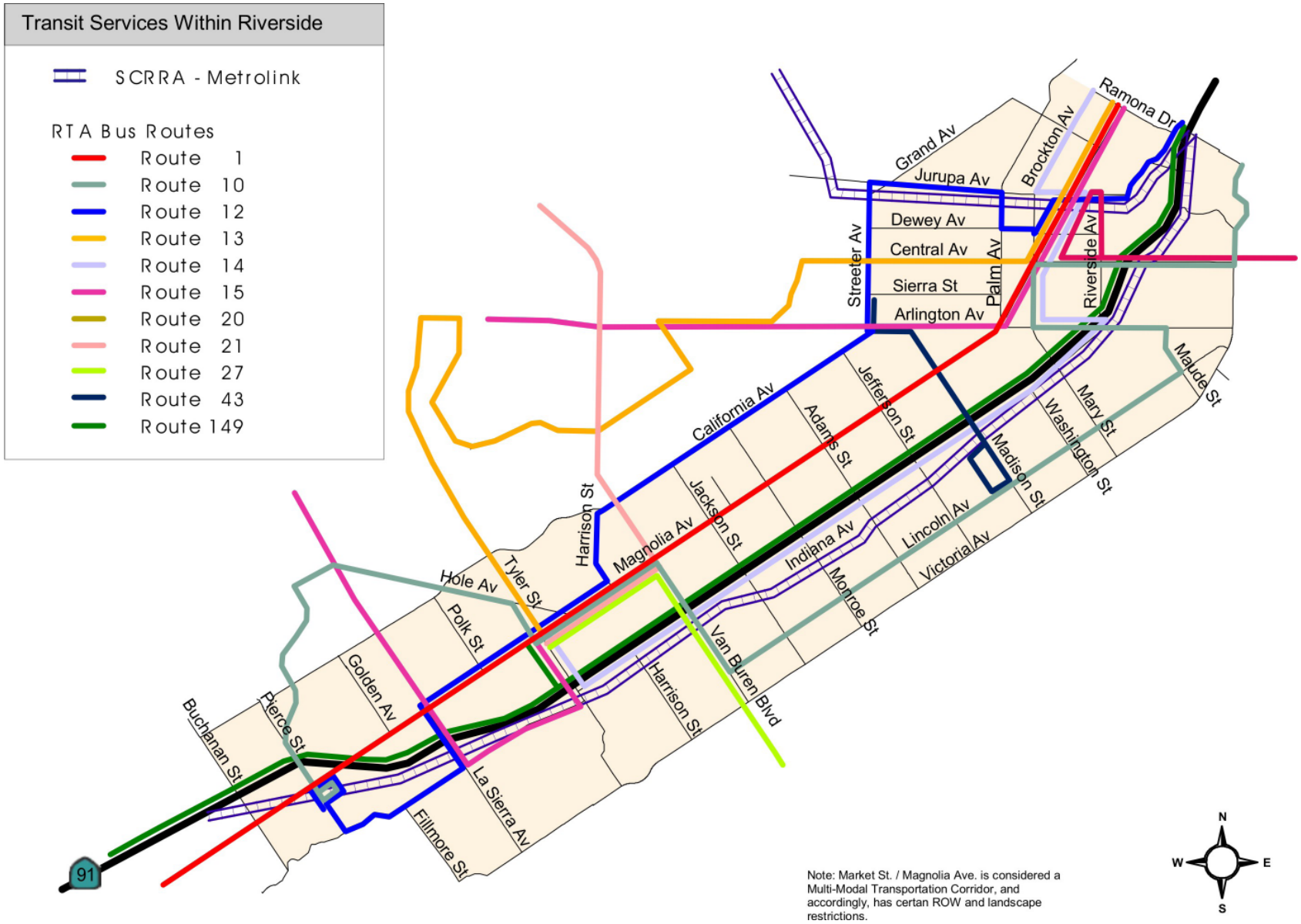
E. Transit Services

As an alternative to automobile travel, several transit routes serve the Magnolia Avenue Corridor. They include the bus transit provided by Riverside Transit Agency (RTA) and the Metrolink commuter rail line.

Riverside Transit Agency provides several bus routes that serve the Magnolia Avenue Corridor. The routes connect with the corridor at various points including the Riverside-Downtown Station on the Metrolink Commuter Rail system. Routes within the corridor are shown in Figure 5.6. A total of 11 RTA routes travel along the entire corridor or a portion of the corridor. Route 1 covers the entire corridor, while Routes 10, 12, 13, 14, 15, 20, 21, 27 and 149 travel along a portion of the corridor. Route 1 travels along Magnolia Avenue from the Western City Limit to Downtown, and it provides service every 20 minutes during peak hours and every 30 to 60 minutes during off peak hours. Headways during peak hours for most other routes range from 30 to 60 minutes.

Metrolink is a commuter rail service located south of the SR-91 freeway that parallels Magnolia Avenue. The program is operated by the Southern California Regional Rail Authority (SCRRA) and provides service from outlying suburban communities to employment centers such as Burbank, Irvine and downtown Los Angeles. The Metrolink stations near the Magnolia/Market Corridor are located in La Sierra and Downtown Riverside and are served by the Riverside Line and the Inland Empire/Orange County Line. The La Sierra Station is located on La Sierra Avenue south of SR-91. The Riverside-Downtown Station is located near 14th Street south of SR-91. Service is provided from 5:16 AM in the morning to 7:51 PM in the evening, with service every 15 minutes during the peak hour and 60 minutes throughout the day.

Figure 5.6: Transit Services within Riverside



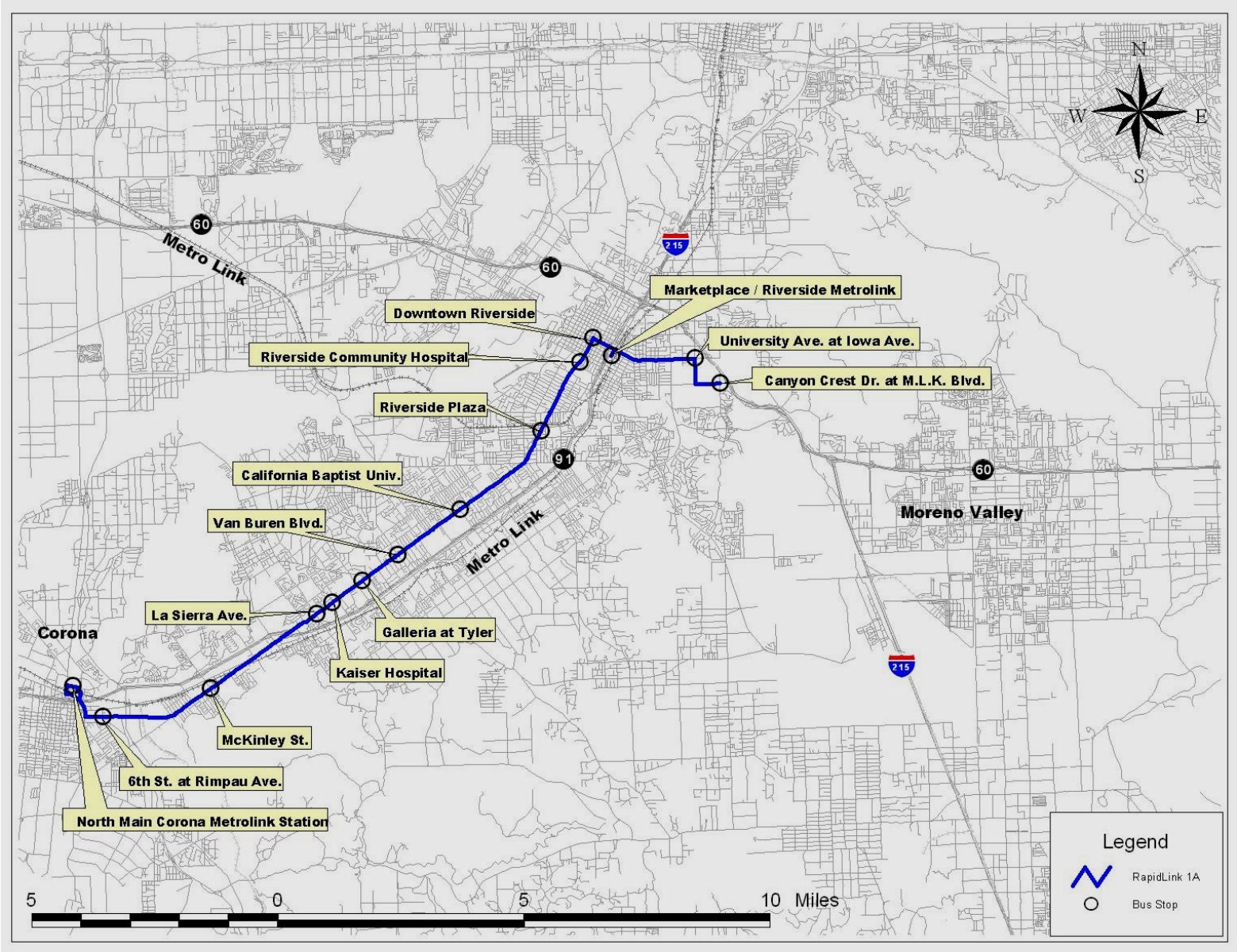
Note: Market St. / Magnolia Ave. is considered a Multi-Modal Transportation Corridor, and accordingly, has certan ROW and landscape restrictions.

F. Bus Rapid Transit

The Riverside Transit Agency (RTA) is interested in implementing a Bus Rapid Transit (BRT) system in Western Riverside County and RTA contracted with the Institute of Transportation Studies (ITS) at the University of California at Berkeley to investigate the feasibility of BRT in Western Riverside. In consultation with RTA staff, between April 2002 and February 2004, the ITS team carried out an in-depth analysis of possibilities for deploying some form of BRT improvements in Western Riverside County. Subsequently, a report was issued by RTA entitled "Phase II, Task 7 Report on: Planning Analysis for Bus Rapid Transit Deployment Project; Task 7: Synthesis and Development of Strategic Plan." The resulting strategic plan summarizes a recommended transit improvement plan for Riverside County and combines several improvements in a cost efficient and effective combination designed to attract choice riders and to make transit more appealing to current patrons. The recommended transit improvement plan's main components include the introduction of two new Bus Transit (BRT) routes by the year 2010 and enhancements to several of RTA's existing bus services. RTA's new BRT services, named RapidLink, will be integrated into the region's transportation system by connecting with existing local bus, express bus, and rail transit services at key locations.

The plan recommends local route enhancements, which create RapidLink-feeder routes and RapidLink implementation in two major transportation corridors. Proposed RapidLink Route 1A traverses the Magnolia Corridor. Proposed RapidLink stop locations were determined using historic and current RTA ridership counts as well as RapidLink forecasted ridership based on existing and forecasted land-uses and land-use densities. Figure 5.7 illustrates the proposed BRT route along Magnolia Avenue and the proposed stop locations. The stops could be revised (e.g. moving stop locations or adding stop locations) as growth continues and additional data becomes available. One of RapidLink's main design criteria was that it must provide more "rapid" service than contemporary local bus services by having faster average bus travel speeds than comparable local bus routes, and reasonably short wait times at bus stations. These goals were obtained by operational features such as a skip stop configuration and transit priority merges at RapidLink stations and by technological features such as transit signal priority at signalized intersections. Fifteen minutes is the maximum acceptable RapidLink design headway for the Magnolia RapidLink routes. In addition to this frequent service, the Rapid Link routes and RapidLink feeder routes will

Figure 5.7: RapidLink Route 1-A with 14 Stations



be enhanced with vehicle, stop, and scheduling improvements including:

- Advanced Traveler Information System (ATIS) and Automated Vehicle Locator (AVL) equipped buses on RapidLink and RapidLink feeder routes,
- A Skip-stop configuration for RapidLink routes,
- Full shelters on RapidLink routes, and multi-functional bus stops (safety lighting, benches, etc.) at the most heavily used RapidLink-feeder stops,
- Transit Centers at major transfer point between Rapid Link and RapidLink-feeder routes and at Metrolink Stations.
- Bus Priority Merges at RapidLink Stations and Local Bus Stops, and
- Attractive bus-scheme, logo and station names for all RapidLink Routes.

The recommended implementation plan is a seven year program that first upgrades several key local bus routes, in effect building a RapidLink feeder system of upgraded local routes. Next, the plan introduces RapidLink in the Magnolia corridor, then several more local bus routes are upgraded, expanding the Rapid Link feeder system.

G. Bicycle Lanes

Bicycling is a transportation mode that can play an increasingly significant role as an alternative to the single-occupant automobile. The City of Riverside has recognized this fact with its Bicycle Master Plan that designates a series of Class I and Class II bicycle facilities throughout the City. Class I facilities are those completely physically separated from other facilities (beach path, paths in parks, paths along rivers), while Class II routes are those striped along side of a roadway. For the Magnolia Avenue Corridor, Class II bike lanes exist on the street along the corridor except through the Arlington District due to the limited roadway width available for travel lanes and on-street parking. Bike lanes were removed from the center of the sidewalk to avoid compromising the sidewalk pedestrian environment.

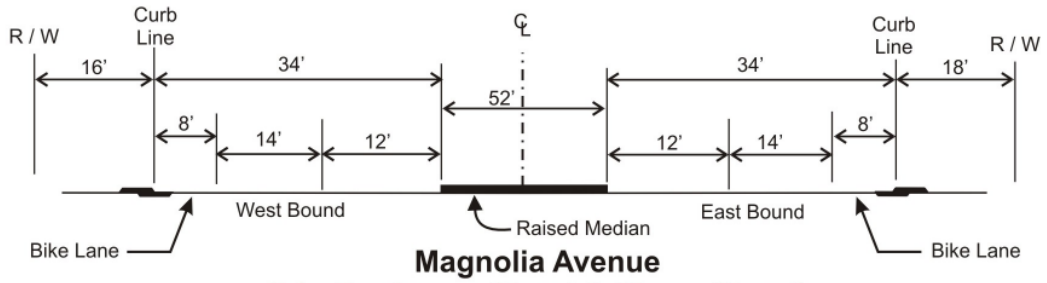
Figure 5.8 illustrates the existing cross sections for Magnolia Street at 11 locations. These locations were selected at various points throughout the corridor to represent typical conditions within each of the six districts. As shown, in some segments of the corridor, the bike lanes are very wide (up to 8 feet, which is wider than standards of the State of California Department of Transportation – Caltrans), while in other areas they are

substandard in width and design. Based on Caltrans standards, on-street Class II bike lanes should be a minimum of five feet if adjacent to the curb, and four feet if adjacent to on-street parking.

The long term objective for bicycle facilities along Magnolia Avenue is to provide a functional Class II bike facility through the length of the corridor that conforms to Caltrans standards. Figure 5.8 shows both an existing and also potential cross section for each study segment. In many of the locations, there is no difference between the existing and potential cross sections, due to the fact that the existing lane widths and bicycle lane widths meet or exceed Caltrans standards. In some sections, however, including the segments between Dowes Street and Harrison Street, and between Linwood Place and Bandini Avenue, the potential future cross section is revised to show a five foot bike lane. In the section between Dawes Street and Harrison Street, the extra two feet for the bike lanes is shown taken from outside the curb lane in the parkway, however it may be feasible to take it from the travel lanes since all lanes are 12 feet wide. In the other segment, however, the extra width for the bicycle lanes must come from the parkway since the travel lanes are only 11 feet wide, and further lane width reduction would not be feasible while maintaining proper traffic engineering standards on the roadway. In all other segments, the current bike lane meets or exceeds State standards. The exception is the segment in the Arlington District where the bike lanes are located on the sidewalk. It is unlikely that it would be feasible to provide standard Class II lanes in that District due to right-of-way constraints and adjacent properties and buildings.

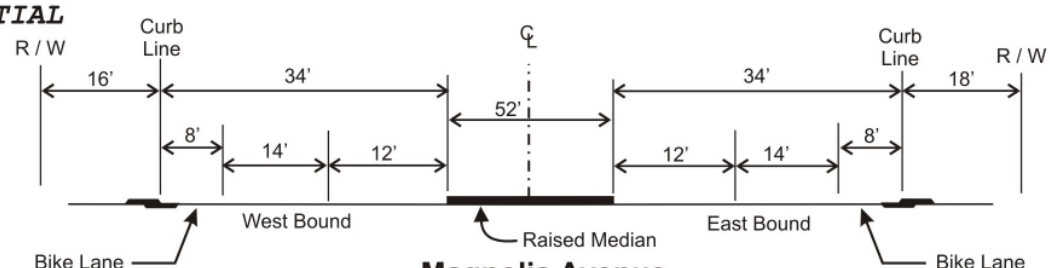
Figure 5.8A: Roadway Cross-Sections with Potential Buildout

EXISTING



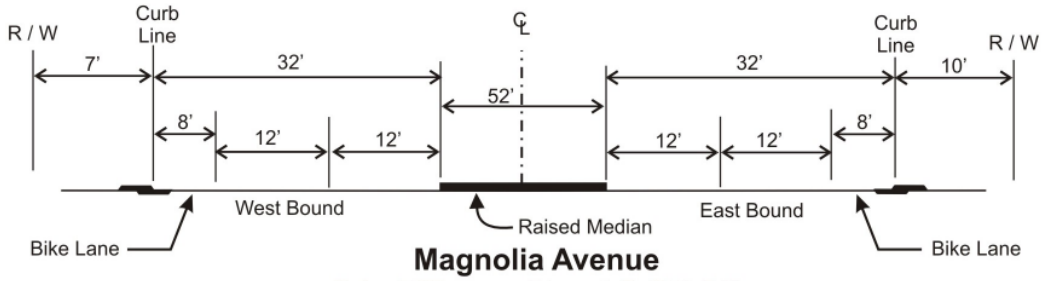
Magnolia Avenue
(b/w Buchanan Street & Pierce Street)
(Total Right of Way 154ft - varies depending on location)

POTENTIAL



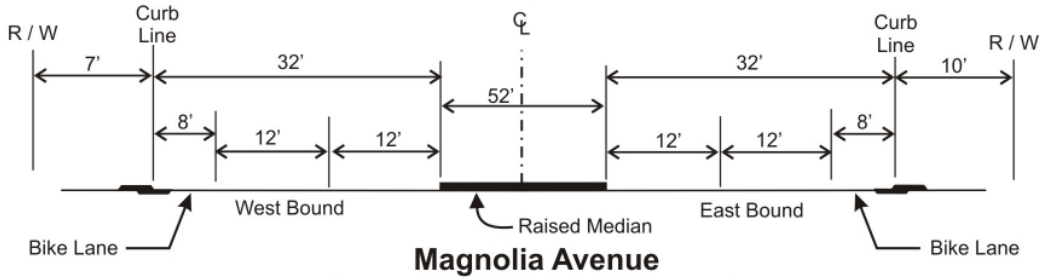
Magnolia Avenue
(b/w Buchanan Street & Pierce Street)
(Total Right of Way 154ft - varies depending on location)

EXISTING



Magnolia Avenue
(b/w Fillmore Street & SR 91)
(Total Right of Way 133ft - varies depending on location)

POTENTIAL

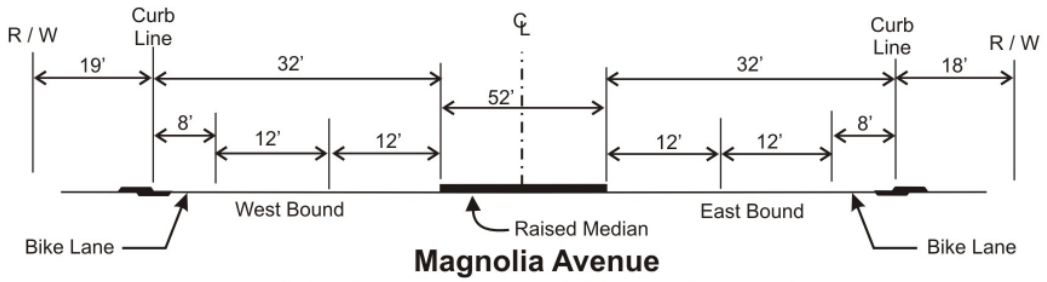


Magnolia Avenue
(b/w Fillmore Street & SR 91)
(Total Right of Way 133ft - varies depending on location)

(Not To Scale)

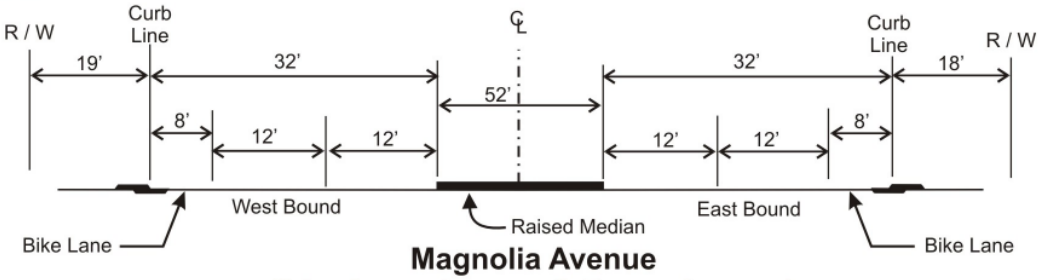
Figure 5.8B: Roadway Cross-Sections with Potential Buildout

EXISTING



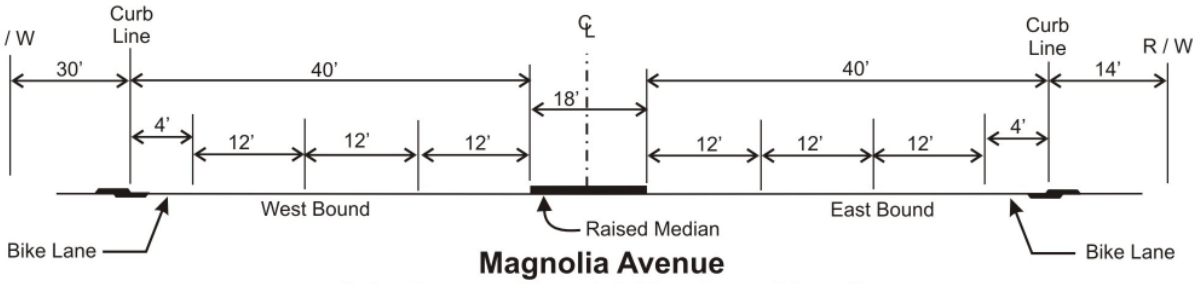
Magnolia Avenue
(b/w Jones Avenue & Burge Avenue)
(Total Right of Way 153ft - varies depending on location)

POTENTIAL



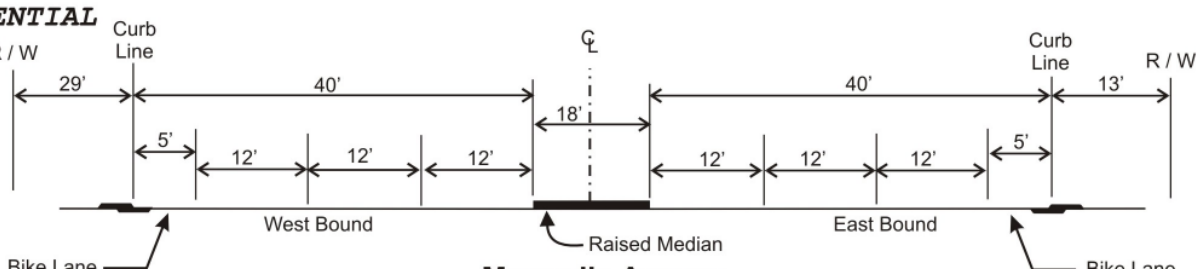
Magnolia Avenue
(b/w Jones Avenue & Burge Avenue)
(Total Right of Way 153ft - varies depending on location)

EXISTING



Magnolia Avenue
(b/w Dowes Street & Harrison Street)
(Total Right of Way 142ft - varies depending on location)

POTENTIAL

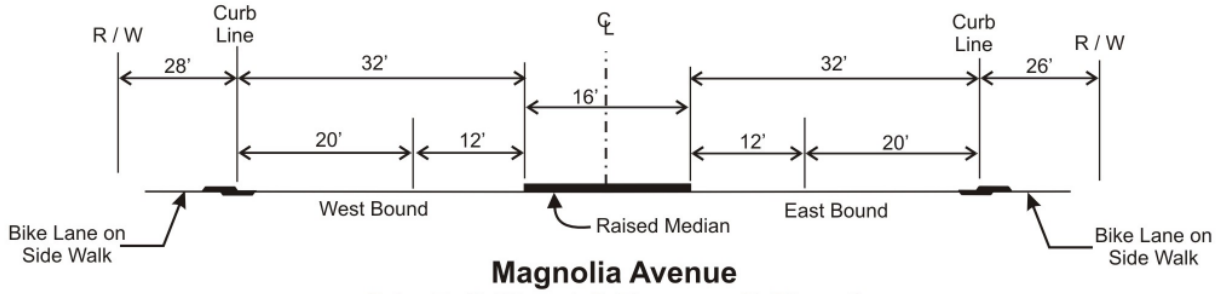


Magnolia Avenue
(b/w Dowes Street & Harrison Street)
(Total Right of Way 142ft - varies depending on location)

(Not To Scale)

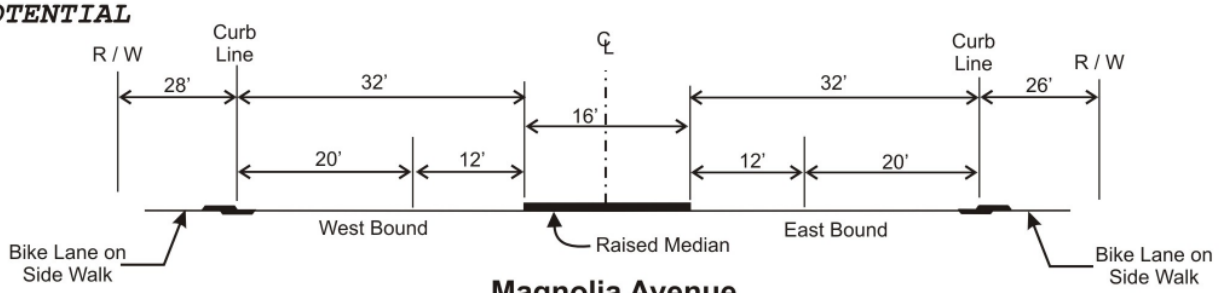
Figure 5.8C: Roadway Cross-Sections with Potential Buildout

EXISTING



Magnolia Avenue
(b/w Taft Street & Roosevelt Street)
(Total Right of Way 134ft - varies depending on location)

POTENTIAL

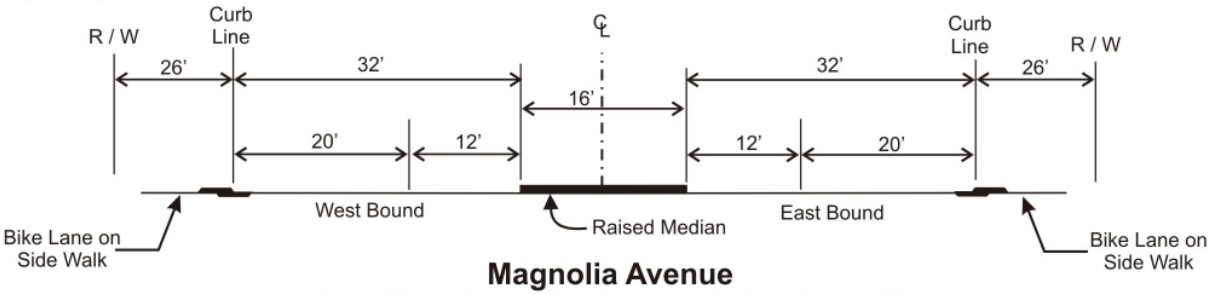


Options:
1. Add Standard Class II Bike Lane
2. Add Shared Parking / Bike Lane

Magnolia Avenue
(b/w Taft Street & Roosevelt Street)
(Total Right of Way 134ft - varies depending on location)

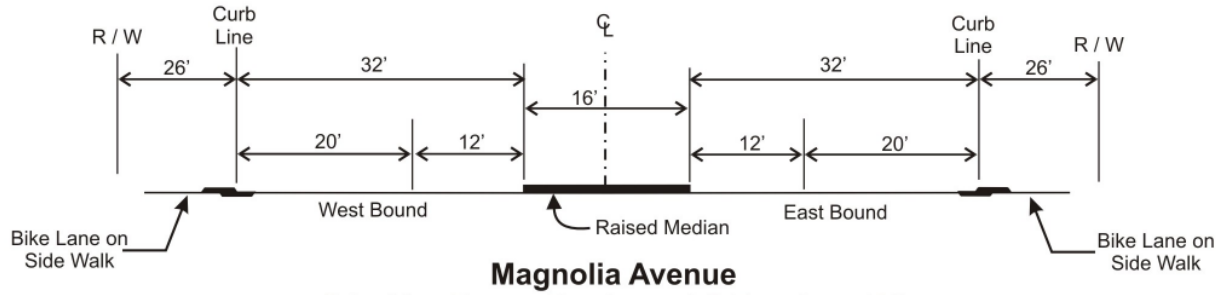
Options:
1. Add Standard Class II Bike Lane
2. Add Shared Parking / Bike Lane

EXISTING



Magnolia Avenue
(b/w Van Buren Boulevard & Farnham Pl)
(Total Right of Way 132ft - varies depending on location)

POTENTIAL

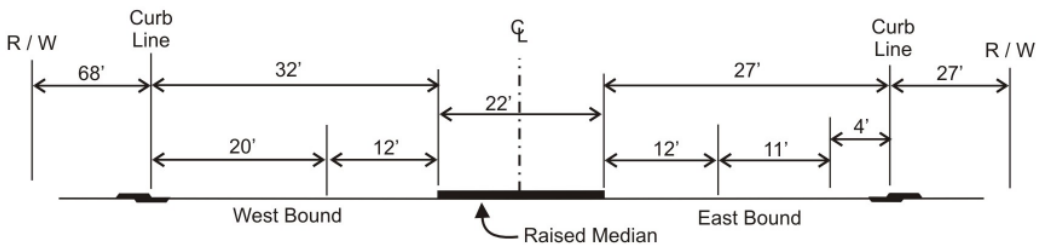


Magnolia Avenue
(b/w Van Buren Boulevard & Farnham Pl)
(Total Right of Way 132ft - varies depending on location)

(Not To Scale)

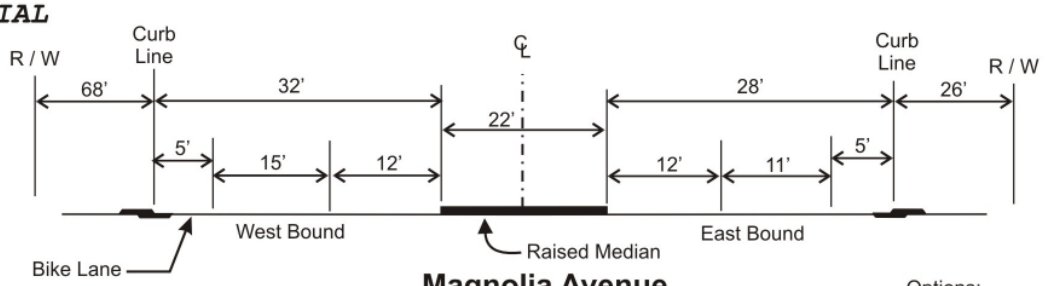
Figure 5.8D: Roadway Cross-Sections with Potential Buildout

EXISTING



Magnolia Avenue
(b/w Canterbury Road & Jefferson Street)
(Total Right of Way 176ft - varies depending on location)

POTENTIAL

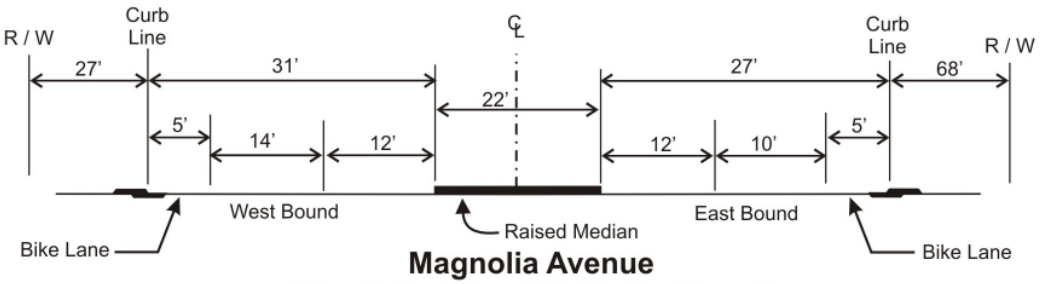


Options:
1. Add Class I Off-Street Bike Lane
2. Add Class II Bike Lane

Magnolia Avenue
(b/w Canterbury Road & Jefferson Street)
(Total Right of Way 176ft - varies depending on location)

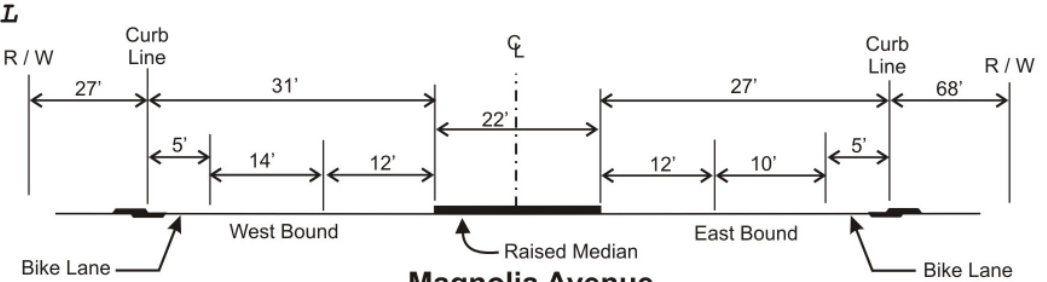
Options:
1. No Change
2. Add Class III Bike Lane

EXISTING



Magnolia Avenue
(b/w Lillian Street & Cortez Street)
(Total Right of Way 175ft - varies depending on location)

POTENTIAL

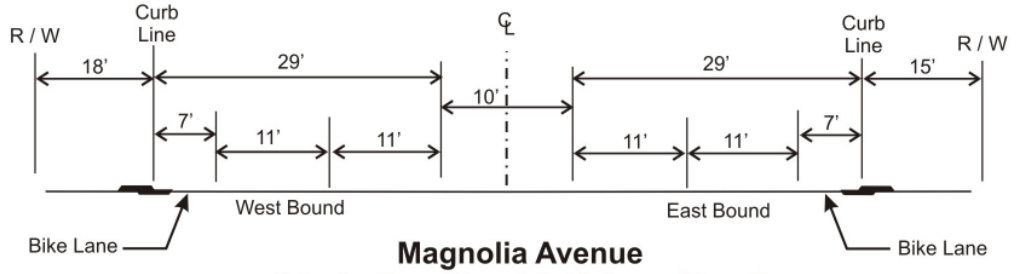


Magnolia Avenue
(b/w Lillian Street & Cortez Street)
(Total Right of Way 175ft - varies depending on location)

(Not To Scale)

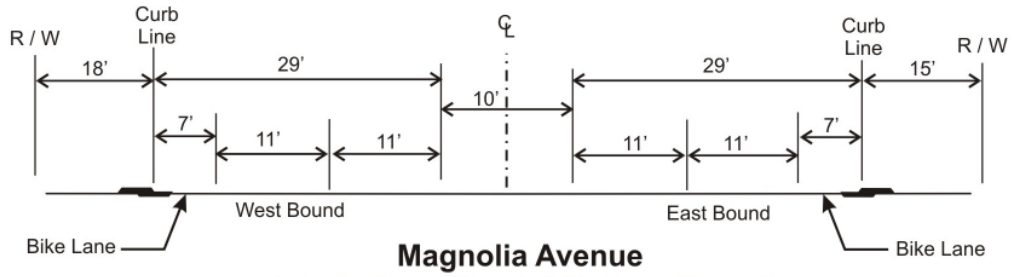
Figure 5.8E: Roadway Cross-Sections with Potential Buildout

EXISTING



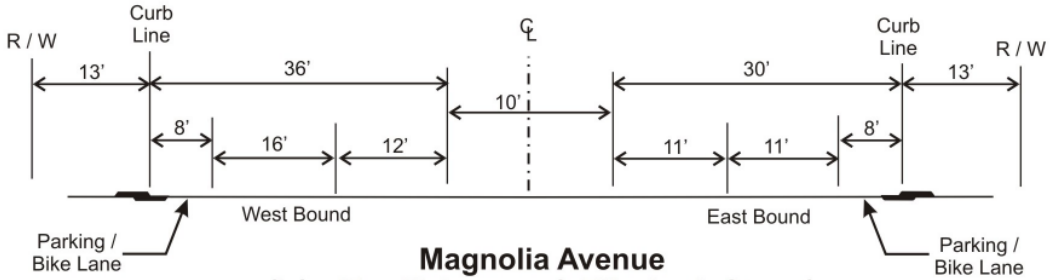
Magnolia Avenue
(b/w Luther Street & Nelson Street)
(Total Right of Way 101ft - varies depending on location)

POTENTIAL



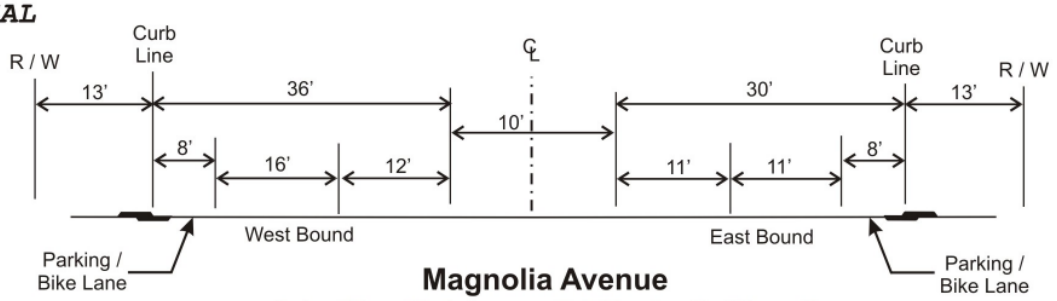
Magnolia Avenue
(b/w Luther Street & Nelson Street)
(Total Right of Way 101ft - varies depending on location)

EXISTING



Magnolia Avenue
(b/w Merrill Avenue & Elizabeth Street)
(Total Right of Way 102ft - varies depending on location)

POTENTIAL

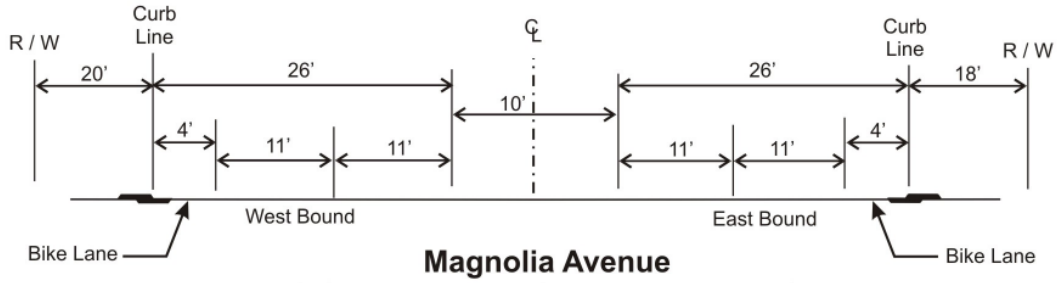


Magnolia Avenue
(b/w Merrill Avenue & Elizabeth Street)
(Total Right of Way 102ft - varies depending on location)

(Not To Scale)

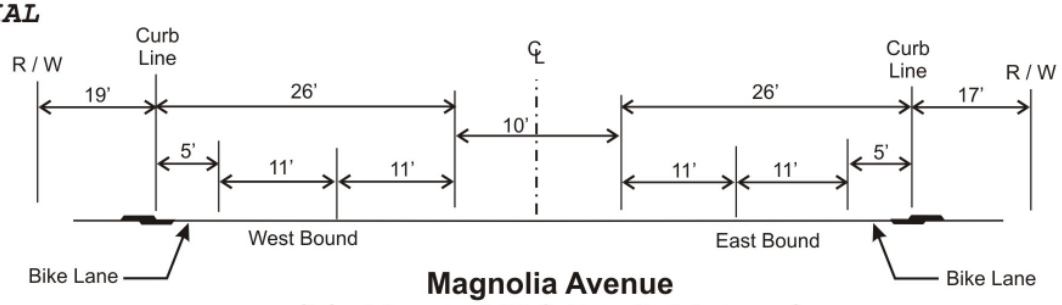
Figure 5.8F: Roadway Cross-Sections with Potential Buildout

EXISTING



Magnolia Avenue
(b/w Linwood Pl & Bandini Avenue)
(Total Right of Way 100ft - varies depending on location)

POTENTIAL



Magnolia Avenue
(b/w Linwood Pl & Bandini Avenue)
(Total Right of Way 100ft - varies depending on location)

H. Pedestrian Circulation

Sidewalks exist along all roadways on Magnolia Avenue for pedestrian use. The sidewalk widths vary between each district and roadway classification. Pedestrians gain a sense of security from the high traffic flow with large sidewalks. Although a large sidewalk exists through the Arlington District, it is compromised with a bike lane that runs through the center of the sidewalk creating a conflict between the pedestrian and bicyclist. The lack of pedestrian amenities such as lighting, crosswalks, signage (especially near crosswalks), etc. prohibits the corridor from being pedestrian-friendly in some locations. One of objectives of the Specific Plan is provide a more "pedestrian friendly" environment along the corridor via improved sidewalks, landscaping, street furniture and other pedestrian amenities.

I. Intersection at Magnolia/Brockton/Central Avenues

On January 17, 2006, the City Council approved a pilot project to convert Magnolia/Central/Brockton intersection from a five way to a conventional four way intersection. The intersection modification limited southbound Brockton Avenue to a right turn only onto Central Avenue. Access from Central Avenue onto Brockton Avenue remained the same. The intersection modification eliminated the need to provide a traffic signal phase for southbound Brockton and allowed the traffic signal cycle length to be reduced. It has also allowed the traffic signals on Magnolia Avenue to be coordinated from Van Buren Boulevard to Fourteenth Street. Likewise, the traffic signals on Central Avenue have been coordinated from Magnolia Avenue to State Route 91 and ultimately coordinated with the traffic signals on Alessandro Boulevard. The coordinated operation of signalized intersections has significantly reduced stops and delays The intersection modification has also increased the LOS from F to C. The Public Works Department will continue to monitor the operational conditions to determine whether to permanently implement the changes to the intersection.

J. Frontage Roads

The corridor currently includes residential frontage roads located (insert general location of frontage roads here). The frontage roads serve adjacent residential development, provide access to residential driveways and also provide on-street parking for adjacent multi-family dwelling units. In general, frontage roads allow access to abutting residential properties with minimal through traffic intrusion since they do not serve any trips

other than those to and from the residential units. However, they are a somewhat outdated design and they have several disadvantages. First, the intersections where the frontage roads connect to the main arterial are not desirable from a traffic operations standpoint since they have many more vehicle conflict points than a standard intersection. With frontage roads, there are often two closely spaced intersections where they meet the arterial roadway and there are turning movements to and from both the arterial and the frontage road. Thus, there are additional points of conflict for the turning vehicles, and more opportunities for collisions. Also, the frontage roads use up valuable land that could otherwise be used for development or landscaping.

When the parcels of land adjacent to the frontage roads along Magnolia Avenue redevelop over time, it is likely that the new site plans will result in the removal of the frontage roads, and the land on which the frontage roads are located will be used for other purposes. The parking configurations for the new developments will be more efficient and better designed to provide parking needed for the development without needed the on-street parking that the frontage roads currently provide. The land can be used for wider sidewalks, improved bike lanes, improved landscaping, project setback from the street and other purposes rather than for the frontage road. The function that the frontage road serves to provide access to the residential properties without impacting the mainline of Magnolia Avenue will be provided through better site planning and consolidation of driveways to the property. Therefore, it is recommended that all of the frontage roads be removed over time as adjacent land undergoes redevelopment.