

CHAPTER 3.0

CIRCULATION

3.1 INTRODUCTION

The basic function of the circulation system is to provide for the movement of goods and people, including pedestrians, bicycles, buses, trucks, and the automobile. However, the circulation system must accommodate more than just movement because it is vital to our economic and social prosperity. It must be efficient and well designed in order to ensure economic viability and preserve Fountain Valley's quality living environment. The Circulation Element provides the guidance to ensure the circulation system meets these key objectives.

City and regional growth will increase the use of local and regional roadways, and the Circulation Element guides the development of the City's circulation system to support this growth. In addition, because Fountain Valley is largely built-out, circulation patterns are heavily influenced by the regional system. Accordingly, the Circulation Element highlights Fountain Valley's need to participate in regional programs to alleviate traffic congestion through capacity enhancements and trip reduction.

In compliance with state law, the General Plan must contain a Circulation Element that designates future road improvements and extensions, and addresses nonmotorized transportation alternatives. Government Code Section 65302(b) mandates that general plans include "a circulation element consisting of the general location and extent of existing and proposed major thoroughfares, transportation routes, terminals, and other local public utilities and facilities, all correlated with the land use element of the plan."

Regional Transportation Planning

As part of a large metropolitan area, Fountain Valley must integrate its transportation systems with local cities and the Orange County Trans-

portation Authority (OCTA). The following are the regional transportation measures that impact circulation-related decisions in Fountain Valley:

By the year 2030, Orange County will:

- Experience a 24 percent population growth and a 27 percent growth in employment.
- See the miles traveled by vehicles grow by nearly 40 percent.
- Add almost 3 million more trips per year to the transportation system.
- Without improvements, during the morning commute period, about half of the roadways in Orange County will operate at speeds of less than 25 miles per hour and most of the freeways will be consistently or severely congested.

Source: Orange County 2006 Long Range Transportation Plan

Regional Roadway Planning

- o Long Range Transportation Plan. *New Directions*, the Orange County Transportation Authority's 2006 Long-Range Transportation Plan (LRTP), establishes multimodal policies, goals, and programs for the County and ties all of OCTA's programs into a unified transportation strategy designed to address the County's transportation needs in 2030.
- o State Highways. The California Department of Transportation (Caltrans) has authority over the state highway system, including roadways and interchanges. I-405 is the only state highway in Fountain Valley and any modifications to this facility requires approval from Caltrans.
- o Measure M. A voter-approved program for transportation improvements (freeway, roadways, and transit improvements) funded by a half-cent sales tax. Originally passed in 1990 with a sunset in 2011, it was renewed on November 7, 2006, for another 30 years to 2041. Through 2006, Fountain Valley received more than \$28 million in Measure

M funds for street maintenance, roadway improvements, and signal coordination.

- o Master Plan of Arterial Highways (MPAH). The MPAH, adopted and administered by OCTA, defines the future arterial roadway system for Orange County. All cities, including Fountain Valley, must reflect the MPAH in their General Plans to receive Measure M transportation funds.
- o Congestion Management Program (CMP). OCTA is also responsible for development, monitoring, and biennial updating of the state-mandated CMP (Proposition 111), which is intended to reduce traffic congestion and to provide a mechanism for coordinating land use development and transportation improvement decisions. Fountain Valley's conformity with the CMP is based on the following criteria.
 - Level of Service (LOS) Consistency: OCTA requires that the LOS standards at identified intersections in the CMP network maintain an LOS E or better to be eligible for certain state transportation funds.
 - Capital Improvement Programs (CIP): Adoption of a seven-year CIP that includes projects to maintain or improve the LOS on the CMP Highway System.
 - Traffic Impact Analysis (TIA): The purpose of the TIA is to analyze the impacts of land use decisions on the CMP roadway system and estimate the costs associated with mitigating those impacts. A TIA is required for development projects adjacent to the CMP Highway System that generate 2,400 trips or more and for projects directly accessing the CMP Highway System that generate 1,600 or more daily trips. In addition, a TIA is required for projects with the potential to create an impact of more than 3 percent of LOS E capacity to a CMP highway link.

- Transportation Demand Management (TDM): TDM programs are designed to reduce the need for trips, especially during peak periods. Strategies are geared toward increasing vehicle occupancy, promoting alternative travel modes, reducing the number of trips, and decreasing trip lengths. Fountain Valley's TDM ordinance (Chapter 21.26, Trip Reduction and Travel Demand Management, of the City's Zoning Ordinance) requires facilities such as carpool/vanpool parking, bicycle storage, and shower facilities and applies to all projects that employ 100 or more persons.

Regional Transit Planning

OCTA provides transit and paratransit service within Fountain Valley and throughout Orange County. The agency also coordinates commuter rail service in the County, including leading efforts to construct light rail routes consistent with adopted plans.

Paratransit services are provided by ACCESS, OCTA's shared-ride service for people who are unable to use the regular, fixed-route bus service because of functional limitations caused by a disability.

Regional Bikeway Planning

A comprehensive and complete bicycle network will greatly benefit Orange County. The County's Master Plan of Countywide Bikeways designates locations and classes of bike routes throughout the County. Fountain Valley's bikeway plan is based upon the County's Master Plan and utilizes the same classification and signage system and seamlessly links to the regional bicycle network.

The 2001 Commuter Bikeways Strategic Plan (CBSP) is a regional planning document that identifies existing and proposed bikeways in Orange County that are necessary to complete a comprehensive bicycle network. In addition to routes, the CBSP discusses ways to facilitate bicycling, such as bike lockers and parking,

changing facilities, signage and trail markings, bicycle safety and education programs, and funding.

According to the 2001 Commuter Bikeways Strategic Plan (CBSP):

- Fountain Valley had 1,157 bicycle commuters in 2001.
- When the County's bicycle system is fully developed, there could be 3,227 future daily bicycle riders in Fountain Valley.
- Four times a year, the City's Police Department conducts a bicycle safety program for grades 3-6.

Growth Management

Growth and land use decisions impact the circulation system and must be coordinated locally and regionally. The Measure M Growth Management Program was adopted by the County to assess and mitigate the impacts of local land use decisions on the transportation network. This program required all jurisdictions in Orange County to adopt a Growth Management Program that addresses a proportional balance of jobs to housing with the intent of reducing the amount and length of vehicle trips. With the renewal of Measure M, this program will be combined with the CMP. Fountain Valley complied with the original Measure M and incorporated growth management into Chapter 10, Growth Management Element, of the General Plan.

3.2 CIRCULATION SYSTEM

Existing Circulation System

Circulation consists of both the physical infrastructure systems (e.g., roadways, rails, and trails) as well as the method of travel (e.g., car, bike, bus, or on foot). In Fountain Valley, the physical system includes the local street network and several routes of regional significance: the San Diego Freeway (I-405), Edinger Avenue, Harbor Boulevard, Warner Avenue, and Brookhurst Street. I-405 provides the primary regional access to the City with interchanges at Magnolia

Street/Warner Avenue, Brookhurst Street, and Euclid/Ellis Avenue. While these roads provide Fountain Valley residents with ready access to surrounding destinations, the roads also bring regional traffic into and through the City. Much of the traffic on these regional roadways during peak periods simply passes through Fountain Valley to other destinations.

Fountain Valley's circulation system is based on a grid system of arterial roadways spaced at half-mile intervals. The grid is interrupted by features such as Mile Square Park, the Santa Ana River, and I-405. Primary east-west travel in the City is provided on Warner, Edinger, Slater, and Talbert Avenues, each of which contains a bridge crossing the Santa Ana River. Secondary east-west travel is provided by Heil, Ellis, and Garfield Avenues. Primary north-south travel is provided by Harbor Boulevard and Brookhurst, Magnolia, and Euclid Streets. Secondary north-south travel is provided by Newland, Bushard, Newhope, and Ward Streets.

Street Classification System

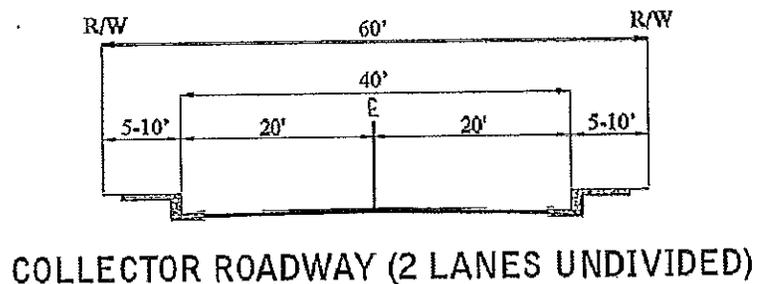
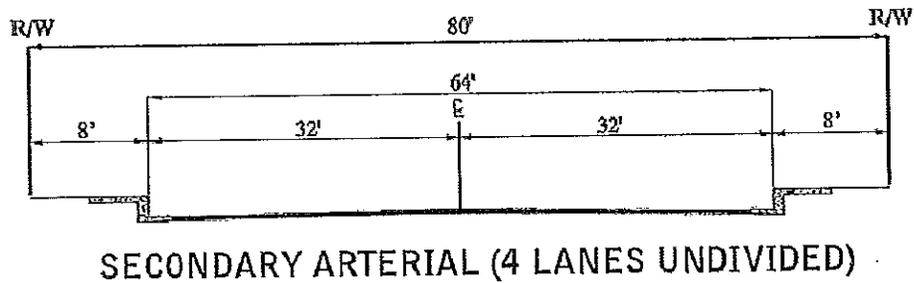
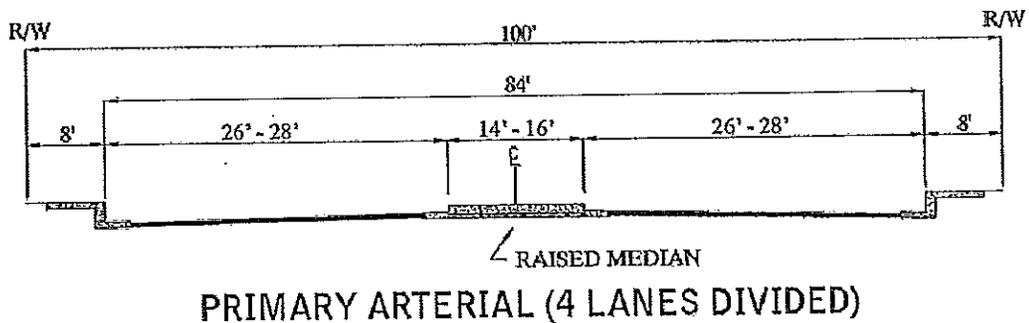
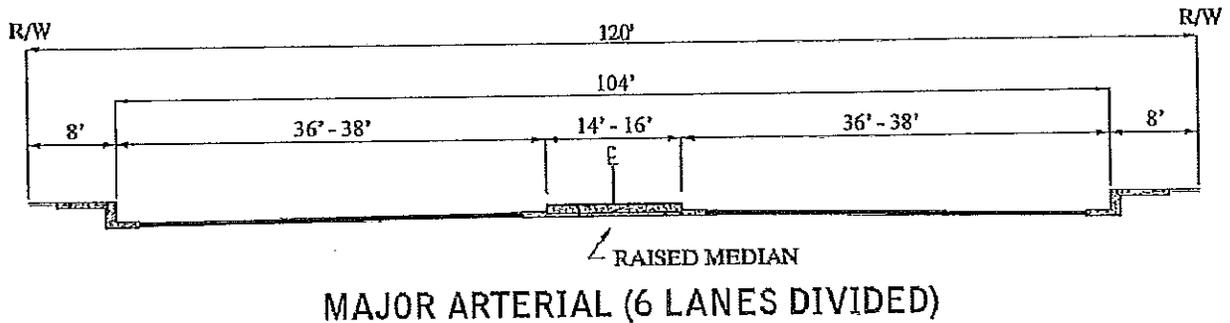
The street system is classified by size, function, and capacity as follows:

- o **Freeway:** Freeways are limited-access, high-speed travelways included in the state and federal highway systems. Their purpose is to carry regional through-traffic that passes through Fountain Valley and does not stop. Access is provided at interchanges. I-405 is the only freeway connecting Fountain Valley to regional destinations.
- o **Major Arterial:** Major Arterials are typically six-lane, divided roadways that carry a large volume of regional traffic not handled by the freeway. The roadway configuration and right-of-way width vary depending on local conditions, but they are typically constructed within a 120 foot right-of-way and a curb-to-curb pavement width of 104 feet. This roadway has a maximum capacity of 56,300 average daily trips and a peak-hour capacity of 5,630 trips.

- o Primary Arterial: Primary Arterials are typically four-lane divided roadways with a function similar to that of a Major Arterial but with less capacity. The roadway configuration and right-of-way width vary depending on local conditions, but they are typically constructed within a 100 foot right-of-way and a curb-to-curb pavement width of 84 feet. This roadway has a maximum capacity of 37,500 average daily trips and a peak-hour capacity of 3,750 trips.
- o Secondary Arterial: Secondary Arterials distribute traffic between local streets and arterials and are typically four-lane undivided roadways. The roadway configuration and right-of-way width vary depending on local conditions, but they are typically constructed within an 80 foot right-of-way and a curb-to-curb pavement width of 64 feet. Secondary Arterials may have medians at specific locations, such as where left-turn protection is needed. The maximum capacity is 25,000 average daily trips and 2,500 peak hour trips.
- o Collector Roadway: A collector roadway is typically two lanes with a function similar to a Secondary Arterial; however, it accommodates less traffic. This is not a common classification, but it can be used to provide connectivity and reflect the context of its surroundings. Collector roadways are not included on the General Plan circulation system because they are not considered part of the backbone circulation system.
- o Local Street: The primary function of a local street is to provide direct access to abutting properties. Local streets rarely have more than two travel lanes, and speed limits are generally low (25 miles per hour). Local streets are not included on the General Plan circulation system because they are not considered part of the backbone circulation system.
- o Augmented Roadway: Any of the three arterial street categories can be designated as an Augment Roadway, which is an overlay that allows flexibility from the standard street sections provided in the General Plan. The goal is to increase capacity, tailor street design to reflect local conditions, and make more efficient use of the street right-of-way. Such augmentation can range from adding lanes at intersections or midblock segments to adding, expanding, or eliminating a median or other midblock measures. Detailed engineering studies are necessary to identify the most effective and feasible types of improvements.
- o Enhanced Intersection: The Enhanced Intersection overlay allows flexibility from the standard intersection configuration to increase capacity, improve operation, and respond to local conditions. Intersection enhancements might include additional lanes, reduced median width, increased right-of-way width, removal of on-street bike lanes, or reduction of parkway width. Detailed engineering studies are necessary to identify the most effective and feasible types of improvements.
- o Right-of-Way Reserve: The Right-of-Way Reserve is unique designation created in response to the 2006 Memorandum of Understanding (MOU) regarding the Garfield-Gisler bridge. In this MOU, the right-of-way for the Garfield-Gisler bridge is preserved; however, the planned street is not assumed in the planning process and related traffic analyses. In Fountain Valley, the right-of-way is assumed to be that of a Primary Arterial.

Figure 3-1 shows schematic cross-sections of each roadway category. These sections represent desirable standards, but variations in median, bikeway, sidewalk, and lane widths/configurations may occur to respond to physical constraints, local community context, right-of-way limitations, turn lane requirements, and capacity requirements.

Figure 3-1 Roadway Cross Sections



Source: Austin-Foust Associates, Inc.

Note: Street sections are typical and variations may be permitted with approval of the traffic engineer.

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Bicycle System

Bikeways, like roadways, come in several forms. Fountain Valley has adopted three bikeway standards that parallel those presented in OCTA's Master Plan of Countywide Bikeways. Descriptions of these classifications are presented in Table C-1. Class I paths are currently constructed along the Santa Ana River and in Mile Square Park. Class II bike lanes make up the remainder of the existing bicycle system.

Performance Standards

About Performance Standards

Evaluating the ability of a circulation system to handle the existing and future traffic loads requires establishing suitable performance standards. Performance standards have both a policy component, which establishes the minimum LOS standards, and a technical component, that specifies how to measure and evaluate traffic forecasts in relation to the performance standards.

For Fountain Valley, the volume-to-capacity (V/C) ratio represents the criteria used to

measure LOS and is consistent with the requirements of OCTA. A V/C ratio is calculated based on average daily traffic volumes on a roadway and the daily capacity value for that roadway. A LOS scale is used to evaluate roadway performance based on the V/C ratio. The levels range from A to F, with LOS A representing free flow traffic and LOS F representing extreme congestion, with traffic levels above the capacity of the facility. Descriptions of traffic flow for the different levels of service are provided in Table C-2.

Performance Standards

Peak Hour Intersection Volumes are used to compare projected traffic volumes with future capacity in order to assess the adequacy of the circulation system. Peak hour intersection volumes are shown in Table C-3. LOS D (ICU value less than or equal to 0.90) is established as the lowest acceptable LOS for peak hour intersection volumes in the City.

**TABLE C-1
BICYCLE SYSTEM CLASSIFICATIONS**

Type	Class	Description
Bike Paths	I	Paved facilities designated for bicycle use that are physically separated from roadways by space or a physical barrier.
Bike Lanes	II	Lanes on the outside edge of roadways reserved for the exclusive use of bicycles and designated with special signing and pavement markings.
Bike Routes	III	Roadways recommended for bicycle use and often connect to bike lands and bike paths. Routes are designated with signs only and may not include additional pavement width.

Source: County's Master Plan of Countywide Bikeways

**TABLE C-2
INTERSECTION LOS DESCRIPTIONS BASED ON VOLUME TO CAPACITY RATIO**

LOS	Traffic Flow Conditions	Vehicle Delay (seconds/vehicle)	Volume/Capacity (V/C) Range
A	Low volumes; high speeds; speed not restricted by other vehicles; all signal cycles clear with no vehicles waiting through more than one signal cycle.	≤ 5.00	0.00–0.60
B	Operating speeds beginning to be affected by other traffic; between one and 10 percent of the signal cycles have one or more vehicles which wait through more than one signal cycle during peak traffic periods.	5.1–15.0	0.61–0.70
C	Operating speeds and maneuverability closely controlled by other traffic; between 11 and 30 percent of the signal cycles have one or more vehicles which wait through more than one signal cycle during peak traffic periods; recommended ideal design standards.	15.1–25.0	0.71–0.80
D	Tolerable operating speeds; 31 to 70 percent of the signal cycle have one or more vehicles which wait through more than one signal cycle during peak traffic periods, often used as design standard in urban areas.	25.1–40.0	0.81–0.90
E	Capacity; the maximum traffic volume an intersection can accommodate; restricted speeds; 71 to 100 percent of the signal cycles have one or more vehicles which wait through more than one signal cycle during peak traffic periods.	40.1–60.0	0.91–1.00
F	Long queues of traffic; unstable flow; stoppages of long duration; traffic volume and traffic speed an drop to zero; traffic volume will be less than the volume which occurs at LOS E.	≥ 60.0	>1.00

Source: Highway Research Board. Highway Capacity Manual. Special Report 87, National Academy of Sciences, Washington D.C. 1965, Page 320.

**TABLE C-3
PEAK HOUR INTERSECTION LOS**

LOS	Maximum ICU Value
A	0.60
B	0.70
C	0.80
D	0.90 (City Minimum Standard)
E	1.00

Note: Peak hour intersection LOS is based on intersection capacity utilization (ICU) values calculated as follows:

- o Saturation flow rate = 1,700 vehicles per hour (VPH)
- o Clearance Interval = .05 of an ICU value

3.3 FUTURE CIRCULATION SYSTEM

Future Vehicular Circulation Plan

The future Circulation Plan is illustrated in Figure 3-2. The Plan meets the long-term circulation needs, reflects City policies, and implements the Orange County MPAH. Over time, the City will pursue transportation system improvements consistent with the Circulation Plan. Focused improvements will enhance intersection function. Examples of planned improvements include:

- o Widening Ward Street/I-405 overcrossing from two to four lanes.¹
- o Widening of the Talbert Avenue/I-405 overcrossing from four to six lanes.¹
- o Completing the improvement of Euclid Avenue to six lanes from the northern City limits to Newhope Street.
- o Widening Heil Avenue east of Euclid Street from two lanes to four lanes.
- o Improvements per the 2006 MOU regarding the Garfield-Gisler bridge.

¹ Part of the I-405 Major Investment Study adopted by the Orange County Transportation Authority Board of Directors on October 14, 2005.

Future Truck Routes

Fountain Valley experiences moderate amounts of truck traffic generated by commercial and light industrial uses. Truck traffic may increase in future years in support of new businesses inside and outside of the City. To minimize truck traffic impacts on noise-sensitive uses, the City has developed a truck route plan that directs truck traffic to arterial roadways, as shown on Figure 3-3.

Parking

Parking typically is considered a separate issue from vehicle circulation. However, the presence of on-street parking has a direct effect on roadway capacity. In addition, off-street parking deficiencies can cause vehicles to recirculate on public streets, which increase traffic volumes, congestion, and emissions. The Development Code includes requirements and standards that address number of spaces, access, and location of parking.

Future Trails Plan

Figure 3-4 illustrates the Fountain Valley Trails Plan, designed to allow access to employment centers, educational facilities, surrounding communities, and to provide people with an excellent source of recreation and fun.

Public Transportation System

Promoting the use of alternative transportation modes, such as public mass-transit, produces a number of community benefits, including reduced traffic, reduced need for costly roadway improvement projects, and improved air quality. Mass-transit in particular reduces vehicles on roadways and offers mobility for those who cannot or do not wish to drive.

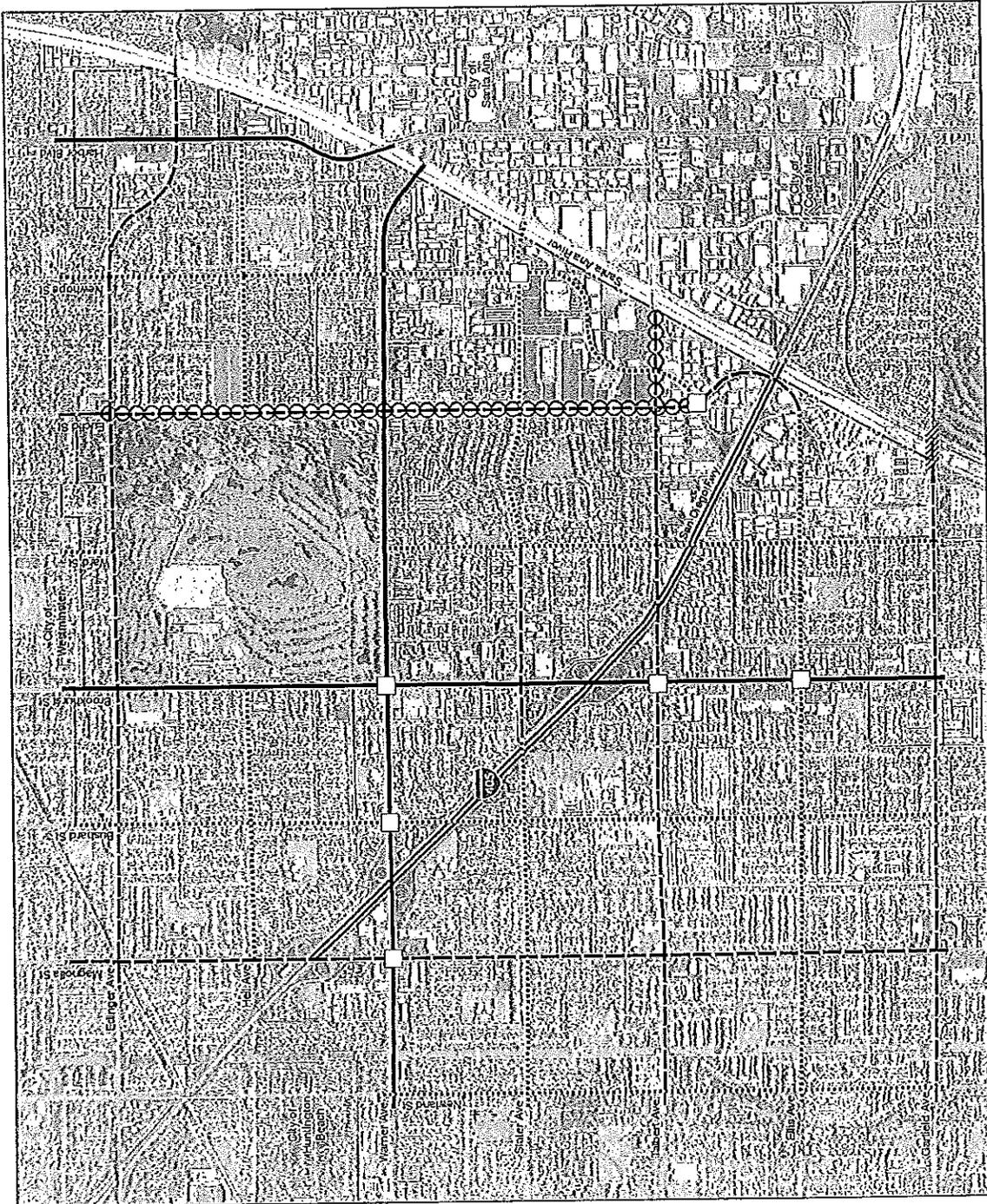
As shown on Figure 3-5, an established network of bus routes provides access to employment centers, shopping, and recreational areas within the City and region. OCTA periodically updates its Countywide Bus Service Implementation Program to respond to changes in service levels and route configurations. This may result in changes to Figure 3-5. For an up-to-date route description and route maps, contact OCTA.

In addition, OCTA's "Go Local" program is a process to plan and implement city-initiated transit extensions to Metrolink stations. The program begins with a \$100,000 grant from OCTA for planning rapid-transit extensions from Metrolink stations to major employment, residential, and activity centers. Extensions could include bus circulators, shuttles, rail lines or other transit projects. Cities would then compete for additional funding to further develop and implement the most promising projects.

Bus Rapid Transit (BRT) provides more frequent service than traditional bus service because it only stops at key locations and enjoys signal priority. The BRT system has a unique identity and serves customized bus shelters that display real-time schedule information. As of early 2008, OCTA was in the process of implementing a BRT system on Harbor Boulevard, the first of three BRT projects in Orange County.

**Figure 3-2
Circulation Plan**

- Freeway
- Major Arterial
- Augmented Primary Arterial
- Primary Arterial
- Secondary Arterial
- Enhanced Intersection
- Right-of-Way Reserve Overlay
- City Boundary



0 2,000 Feet

Fountain Valley General Plan

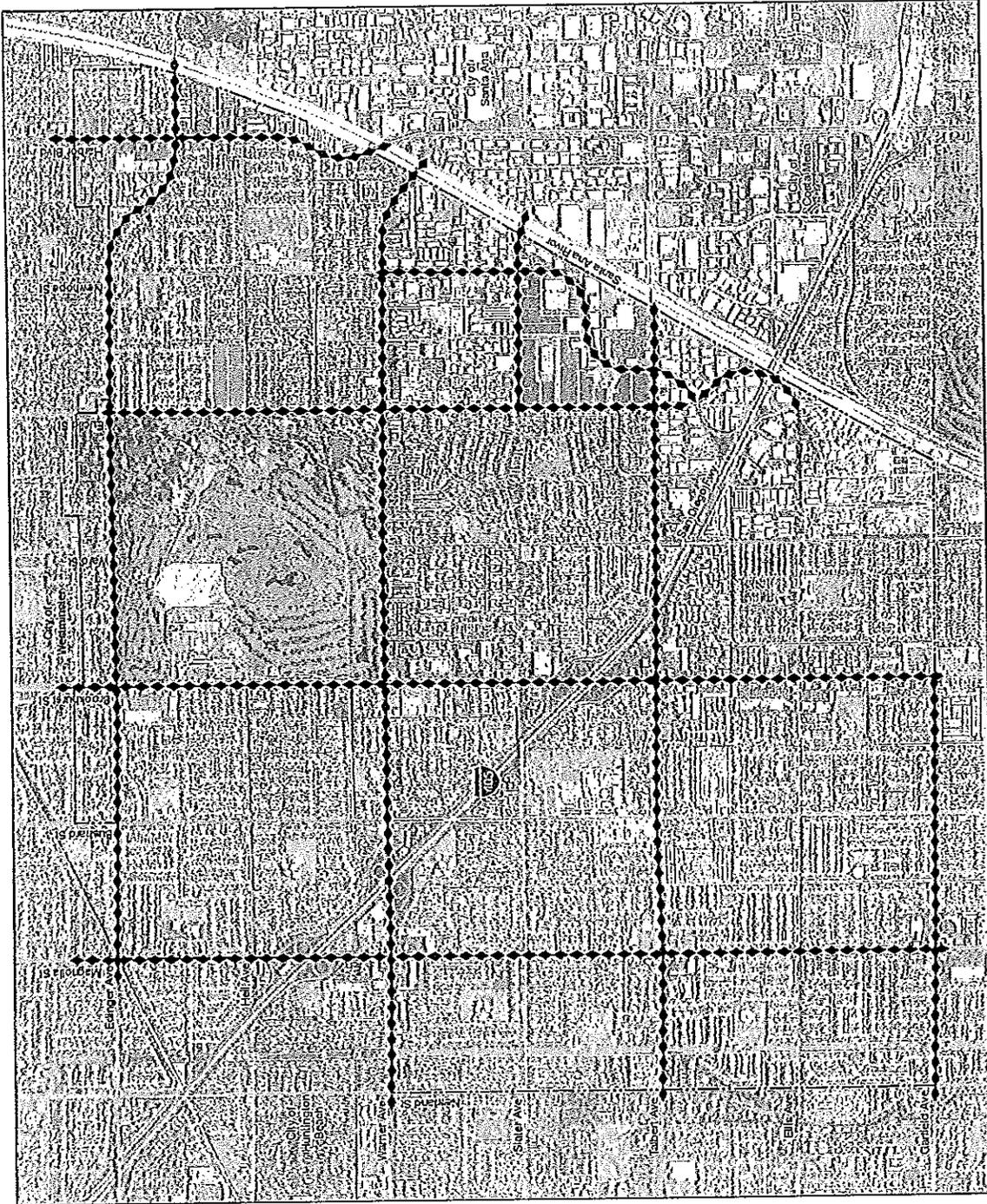


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**Figure 3-3
Designated
Truck Routes**

- ◆◆◆ Designated Truck Routes
- City Boundary



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Fountain Valley General Plan

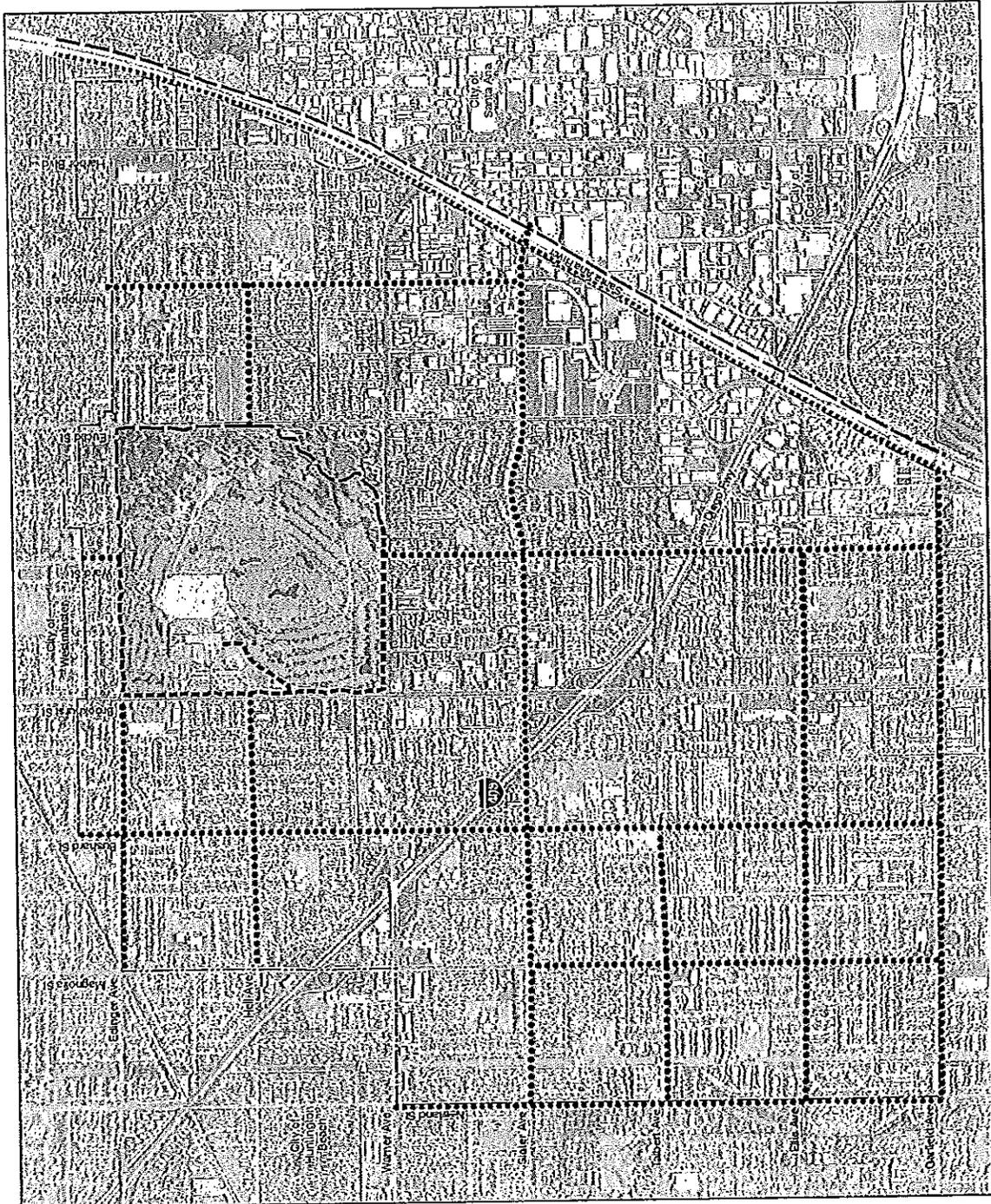


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**Figure 3-4
Trails Plan**

- Bike Path (Class I)
- Bike Path (Class II)
- Non-City Trails
- County Equestrian Trail
- City Boundary

Note: Does not include sidewalks, which are provided on all city streets.



0 2,000 Feet

Fountain Valley General Plan



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