



City of Des Moines

THE COMPREHENSIVE TRANSPORTATION PLAN

Street System and Parking

Pedestrian and Bike Network

Transit Service and Travel Demand Management



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THE COMPREHENSIVE TRANSPORTATION PLAN

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Des Moines Comprehensive Transportation Plan

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Comprehensive Transportation Plan Overview

The Comprehensive Transportation Plan (CTP) is a twenty-year road map for the City of Des Moines which sets the policies, goals, and strategies that will help guide decisions regarding the existing and envisioned transportation system, including the approval of development proposals, and transportation investments in the street network for all modes of travel – walking, biking, driving, and transit. The CTP has been developed to meet the transportation demand associated with the planned and expected growth in population and jobs through year 2030 (Figures 4-8 and 4-9). The goals and policies established in the CTP form the foundation for the Transportation Element of the City's Comprehensive Plan.

The CTP establishes the future network for auto traffic by designating the Street Classification System (Figure 4-14) and identifying the capacity improvement projects needed to support the planned growth (Figures 4-18 and 4-19). The CTP identifies a priority pedestrian network (Figure 5-2) where sidewalks are envisioned to provide access to schools, parks, public facilities, commercial centers, and transit. The CTP identifies a bicycle system (Figure 5-6) where bike lanes and bike routes help guide cyclists through and about Des Moines with connections to the Des Moines Creek Trail and the planned Barnes Creek Trail, leading to destinations beyond Des Moines boundaries.

A vision for future transit in Des Moines (Figure 6-4) shows both the planned regional transit improvements with Rapid Ride Bus Rapid Transit on Pacific Highway South and Link Light Rail stations in Midway near Highline Community College and near South 272nd Street and Star Lake. The transit vision for Des Moines also clarifies the need for high frequency, day-long service to get riders around town, to regional centers, and to deliver them to three important transit hubs/activity centers within Des Moines – Downtown, the Midway/College neighborhood, and the Gateway at South 216th Street and Pacific Highway South.

The maps illustrating the planned street network, priority pedestrian network, planned bicycle facilities, and preferred transit system in Des Moines make up the vision of the transportation network needed to meet the anticipated travel demand in all modes over the coming 20 years. To deliver the envisioned transportation network, a list of recommended projects (Table 8-1) was developed as the City's Transportation Facility Plan (TFP) for the 20 year horizon. An annual examination of priorities and opportunities will translate the TFP into a six-year Transportation Improvement Plan (TIP), and a fundable Capital Improvement Plan (CIP).

In addition to the 20-year TFP, the CTP includes recommendations for collaboration with neighboring cities and agencies for projects of common interest (such as the SR 509 Extension Project), strategies for parking management in the downtown and near the college, plus recommendations for expanded transit service and participation in the demonstration project for passenger-only ferry service between Des Moines and Seattle.

Overall, the 2009 CTP defines a manageable network of arterials, a priority pedestrian network, a bicycle system plan and transit service priorities to support the City. As Des Moines continues to grow, the 2009 CTP will provide guidance to meet the City's transportation goals for mobility while maintaining the high livability in Des Moines.

Adoption of the Comprehensive Transportation Plan

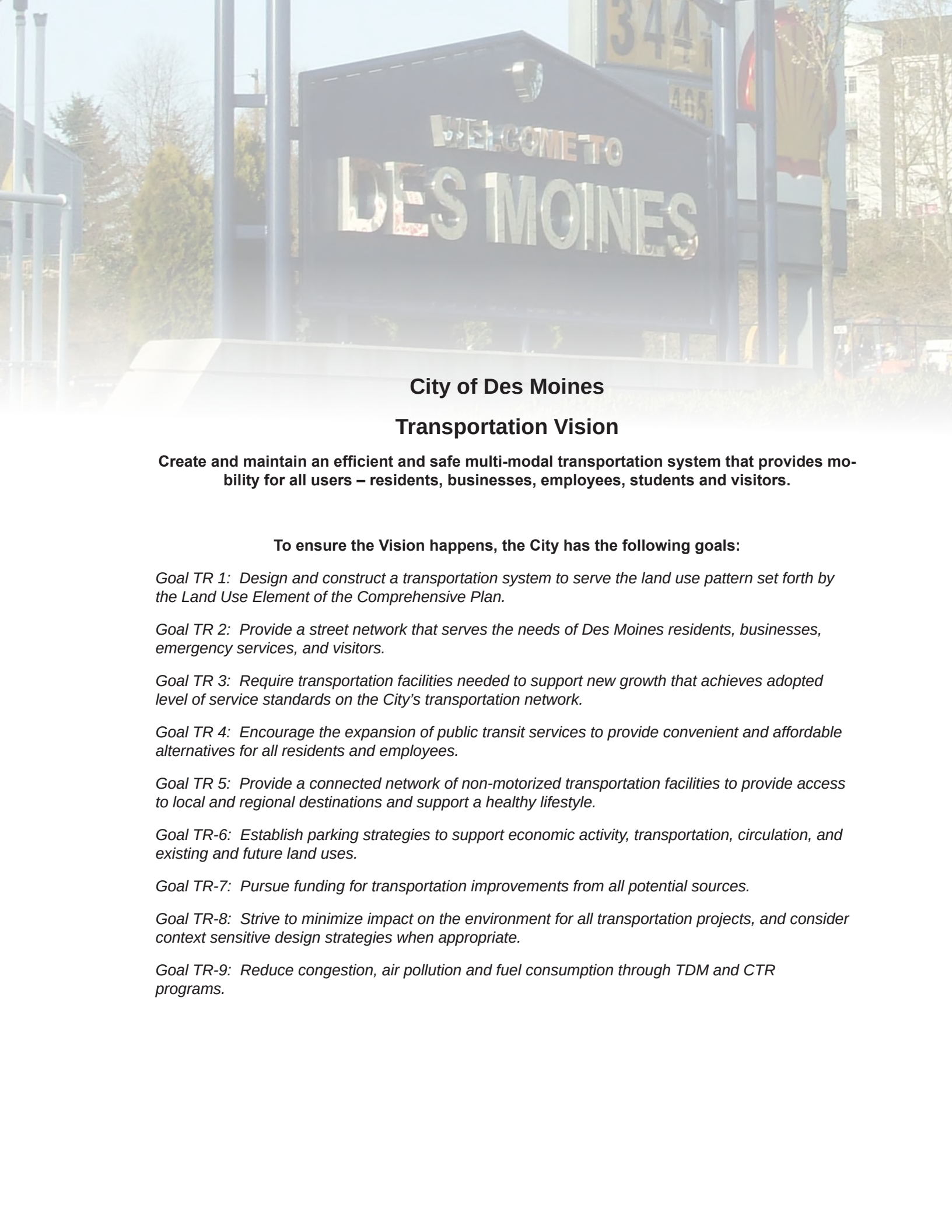
Adoption of the Comprehensive Transportation Plan is required by the Growth Management Act. Adoption of the CTP does the following:

- Establishes growth thresholds for housing and employment
- Establishes a recommended street network with capacity and operational improvement projects needed to support the planned growth
- Establishes a priority pedestrian network and bicycle system
- Provides recommendations for the preferred transit system
- Provides parking management strategies for consideration
- Updates the functional classification system for the street network
- Updates and strengthens the City's Level of Service (LOS) Standard for intersections
- Forms the foundation for the Transportation Element of the City's Comprehensive Plan
- Provides suggestions of opportunities for funding the recommended improvements
- Provides the basis for a new rate study that will be used as a guide in the update of the traffic impact fee rate and DMMC 12.56
- Provides the background and justification for projects that are included in the City's annual 6-year TIP and CIP
- Provides valuable information about the vision and long range plans for the Des Moines transportation system to neighboring cities and agencies, and utility providers

The CTP is not intended to bind or restrict future City Council actions, but rather provide a comprehensive policy framework, relative priorities and menu of strategies and options for decision making in the future. These decisions are expected to be based on needs and resources available at that time.

However, the CTP is intended to be prescriptive with respect to transportation system development and transportation system management, by defining required capacity and operational improvements for street, intersections, bicycle, pedestrian and transit systems to support existing needs and growth.





City of Des Moines

Transportation Vision

Create and maintain an efficient and safe multi-modal transportation system that provides mobility for all users – residents, businesses, employees, students and visitors.

To ensure the Vision happens, the City has the following goals:

Goal TR 1: Design and construct a transportation system to serve the land use pattern set forth by the Land Use Element of the Comprehensive Plan.

Goal TR 2: Provide a street network that serves the needs of Des Moines residents, businesses, emergency services, and visitors.

Goal TR 3: Require transportation facilities needed to support new growth that achieves adopted level of service standards on the City's transportation network.

Goal TR 4: Encourage the expansion of public transit services to provide convenient and affordable alternatives for all residents and employees.

Goal TR 5: Provide a connected network of non-motorized transportation facilities to provide access to local and regional destinations and support a healthy lifestyle.

Goal TR-6: Establish parking strategies to support economic activity, transportation, circulation, and existing and future land uses.

Goal TR-7: Pursue funding for transportation improvements from all potential sources.

Goal TR-8: Strive to minimize impact on the environment for all transportation projects, and consider context sensitive design strategies when appropriate.

Goal TR-9: Reduce congestion, air pollution and fuel consumption through TDM and CTR programs.

Chapter 1 | The Planning Process

The State of Washington decided nearly 20 years ago to view growth as a good economic goal and to maintain the quality of life that residents valued in the state it was essential to manage that growth. Therefore, each city in the state must prepare and regularly update a Comprehensive Plan to manage growth. The Transportation Element, the focus of this report, is one of seven mandatory elements of the Comprehensive Plan required by the State's Growth Management Act. The purpose of the Transportation Element is to establish goals and policies that will guide the development of the transportation system in the City of Des Moines.

Washington State's 1990 Growth Management Act (GMA) requires that transportation planning be directly tied to the City's land use decisions and financial planning (RCW 36.70A.070 and WAC 365-195-325). This is traditionally accomplished through the adoption of the Transportation Element portion of the Comprehensive Plan. Des Moines fulfills this mandate by adopting the Comprehensive Transportation Plan as the Transportation Element of the City's Comprehensive Plan.

The development and update of the Comprehensive Transportation Plan (referred to as the CTP) is recorded in this report. Each step in the process is described by mode - streets, pedestrian and bicycles, and transit. The CTP identifies a vision of a transportation system that will support the 2030 land use described in the Comprehensive Plan.

VISION FOR TRANSPORTATION

Transportation plays an important role today and in the City envisioned by the community and the Des Moines City Council. The transportation system not only affects the quality of life for residents, but the City's economic vitality. The entire community relies on the system to get people where they want to go, to bring goods to and from the community, and to connect people to the services they need. The transportation system is the backbone of the community, and it defines the character of our City.

Des Moines' transportation system is comprised of several facilities, including streets, sidewalks, bicycle facilities, state highways, and King County Metro and Sound Transit public transit services. These components cross or overlap jurisdictional boundaries. For example, King County Metro Transit operates the buses in Des Moines, relying on City's streets and signal systems to support these services. The City's responsibility is to provide a reasonably safe, efficient, and dependable transportation system for residents and businesses.

The City Council's Transportation Vision for the City is supported by the nine goals shown on the opposite page. These goals will guide the City's decisions about projects and funding ensuring that the Transportation Vision is reached. Later in Chapter 7 policies for each of these goals are identified.

What is in this Chapter

- City's Vision for Transportation
- Goals to Obtain the Vision
- State, Regional and County Planning Requirements
- The Many Ways the Transportation Plan is Used
- Regional Coordination
- Projects Completed Since the Last Transportation Plan
- The Transportation Planning Process
- Organization of this Report

STATE, REGIONAL AND COUNTY PLANNING REQUIREMENTS

Because of the overlapping boundaries of the transportation system, the City's planning effort takes place within requirements from the state, the county and regional agencies.

WASHINGTON STATE – GROWTH MANAGEMENT ACT REQUIREMENTS

The Growth Management Act of 1990 requires rapidly growing communities to prepare a transportation plan directly tied to the City's land use decisions and financial planning. This Comprehensive Transportation Plan fulfills the mandate.

The transportation plan addresses the following items required by the GMA:

- Use land use assumptions to estimate travel, including impacts to state-owned facilities;
- Inventory the existing transportation system in order to identify existing capital facilities and travel levels as a basis for future planning;
- Identify level of service (LOS) standards for all arterials, transit routes, and state-owned facilities as a gauge for evaluating system performance;
- Determine existing deficiencies of the system;
- Specify actions and requirements for bringing into compliance locally owned transportation facilities or services that are below an established level of service standard;
- Identify future improvement needs from at least ten years of traffic forecasts based on the adopted land use plan;
- Include a multiyear financing plan based on the identified needs;
- Address intergovernmental coordination; and,
- Include transportation demand management strategies.



PUGET SOUND REGIONAL COUNCIL – VISION 2040 AND DESTINATION 2030

The Puget Sound Regional Council (PSRC) is the regional planning agency, setting policy for King, Pierce, Kitsap, and Snohomish Counties through its long-range planning document, VISION 2040, and its regional transportation plan, *Destination 2030* (an update is in progress). VISION 2040 is the result of an extensive public involvement process to determine the growth pattern for counties and cities and to craft a policy direction to manage that growth. In response to the public comments received, the concept of sustainability is woven throughout VISION 2040.

VISION 2040's goal for transportation in our region is to improve mobility and create a user-oriented transportation system. A user-oriented system is defined as one that combines modes, routes, transfer facilities, and management into a system centered on the need for mobility. Convenience, safety, travel time, flexibility, options, and cost are key features of the user-oriented transportation system.

To accommodate the growth in population and jobs in the region, the PSRC supports the development of regional growth centers as a core component of the region's growth strategy in VISION 2040. Regional growth centers are the focal points of cultural, civic, and economic activities within urban areas and are connected to other centers by frequent and fast



high capacity transit and other transportation infrastructure. An additional 13 cities are designated as “large cities”, home to important local and regional transit stations, ferry terminals, park-and-rides, and located along regional transportation corridors. The City of Des Moines is identified as one of the “large cities.” The City’s Transportation Plan is consistent with VISION 2040, with a transportation system that provides local mobility and easy access to the regional system via transit, improved roadways, sidewalks, trails, and paths.

King County - Countywide Planning Policies

The City of Des Moines lies entirely within King County, the state’s most populous county. Under the GMA, King County has adopted Countywide Planning Policies to guide development in both incorporated and unincorporated areas of the county. These policies support county and regional goals of providing a variety of mobility options and establishing level of service standards that emphasize the movement of people and not just automobiles. The King Countywide Planning Policies are also important because they provide direction for planning and development of the potential annexation areas. In line with these policies, Des Moines must work closely with the regional planning boards and committees to ensure an adequate transportation infrastructure is provided.

THE CITY USES THE TRANSPORTATION PLAN IN MANY WAYS

One of the key responsibilities of the City is to plan for the future. The City adopts a Comprehensive Transportation Plan (CTP) to serve as the long-term planning document and a six-year Transportation Improvement Program (TIP) as the short-term planning document. The CTP identifies a transportation system to support the City’s future land use. Annual updates to the six-year TIP are a way to show both emerging needs and progress towards achieving the Comprehensive Transportation Plan over time.

NEEDS BASED ASSESSMENT

The Comprehensive Transportation Plan (CTP) is a plan for all modes of transportation – vehicles, pedestrians, bicyclists and transit. In order to plan for the future, the City needs to understand how well the existing transportation system operates. One of the first steps in the development of the plan was to complete a multi-modal needs assessment. The City completed an inventory of the existing system, examined how well it worked, and held meetings with community leaders, business groups, and other stakeholders to gather comments on the transportation system.

POLICY DEVELOPMENT

Des Moines residents value certain characteristics of their community – safe streets and sidewalks, mobility, efficient connections within and outside the City. These values are important as they help the City Council make decisions and manage the City. Values are integrated into the policies that guide decisions made by the City and help define the evaluation criteria used to prioritize transportation improvement projects.

CAPITAL IMPROVEMENT AND TRANSPORTATION IMPROVEMENT PROGRAMS

The Transportation Plan identifies improvement projects needed in both the long-term and the short-term. The Transportation Improvement Program is a six-year transportation financing plan, adopted annually by the City Council. It is used to implement the list of transportation improvement projects identified in the CTP. The Capital Improvement Plan is also a six-year financing plan and is annually adopted in a separate process. It includes all of the fiscally

constrained projects for the City, including parks, marina, the surface water management utility, and other non-transportation projects in addition to some of the transportation projects.

REGIONAL COORDINATION AND CONSISTENCY WITH OTHER PLANS

Regional coordination and consistency are integral to Des Moines' transportation program. The City is part of a larger regional transportation system. The City facilities are part of the regional network of roads, trails, transit service and other infrastructure and services. City streets carry both local and regional traffic, which can result in tension related to planning and use.

The CTP addresses transportation facilities and services that are within the City or under its control. At the same time, Des Moines is influenced by what happens beyond the City limits. Growth in adjacent cities, lack of funding for regional road capacity expansion, and competing demands for transit --- all impact transportation mobility for City residents and businesses. The City has a voice in the decision-making processes of the regional agencies through standing committees and task forces. In these challenging times, the CTP calls for even more coordination and cooperation with others to address cross-jurisdictional issues.

The Multi-Modal Transportation System

Service	Provider
Street Network	City of Des Moines WSDOT
Transit	King County Metro Sound Transit
PedBike	City of Des Moines

Elected officials and City staff are active members of regional groups such as King County Suburban Cities Association, South County Area Transportation Board, South King County Economic Development Initiative, King County Planning Directors meetings, and various special issue environmental task forces involving adjacent jurisdictions. For Des Moines to have a transportation system and vigorous community in future years, it is necessary to work within these boards and groups to secure funding for South County transportation projects.

The City has worked closely with the neighboring jurisdictions of Burien and Normandy Park through the Airport Communities Coalition to coordinate planning efforts. The City partnered with the City of Kent on the Envision Midway subarea planning project. The project considers a future for this area as it relates to bus rapid transit, light rail, land use, and economic development along Pacific Highway South and brings together a broad stakeholder committee with representatives from WSDOT, Sound Transit, Metro and PSRC. The City has also been working with the Port of Seattle to redevelop approximately 90 acres of Port-owned property in Des Moines and the related transportation system improvements. The SEPA/Environmental Review process for the update of the plan will give the City of Des Moines and its neighbors additional opportunities to coordinate planning efforts.



WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

The Washington State Department of Transportation (WSDOT) is the owner of the major highways in the state, including SR 509 (Marine View Drive in the Downtown area), SR 516 (Kent-Des Moines Road) and SR 99 (Pacific Highway South) within the City of Des Moines. Descriptions of these highways and their role in the City's street network are included in Chapter 4, the Street System and Parking.

WSDOT, as the administrator for federal and state transportation funds, works with the City to improve the transportation system locally and regionally.

THE PORT OF SEATTLE

The Port of Seattle operates Sea-Tac International Airport in the adjacent City of SeaTac. With a regional transportation focus, the Port of Seattle operations require excellent transportation connections for close access to the airport.

The City is working with the Port of Seattle on the proposed Des Moines Creek Business Park located in the northeast part of the City with close proximity to the international airport. This location is a desirable location for manufacturing, office, and logistics businesses as well as retail uses. The business park development could create between 1,200 and 2,100 direct jobs (and 2,100 to 3,500 indirect jobs), making transportation facility improvements and commute trip reduction programs a priority for this area. Frontage improvements along South 216th Street and 24th Avenue South and the main internal streets through the business park will include sidewalks and bike lanes, further enhancing connections to transit. The developer will build a trail connection from the business park to the Des Moines Creek Trail as part of this project.

SOUND TRANSIT

Sound Transit is a regional provider of high capacity transit services, for King, Snohomish, and Pierce counties, including bus, commuter rail and light rail. Sound Transit operates a network of regional express bus service that connects the park-and-ride system to employment centers and other regional transportation facilities. The nearest park-and-rides with regional Sound Transit service are the Star Lake and Kent-Des Moines lots along I-5 with connecting service on Sound Transit Route 574 from Lakewood to Tacoma and on to Sea-Tac International Airport. Transfers to Sound Transit Route 577 to Seattle and Route 565 to Overlake are available at the Federal Way Transit Center.

The nearest "Sounder" commuter rail station is at Kent Station, located in downtown Kent approximately 3 miles east of I-5. In the fall of 2008, one new peak-direction train and one new reverse-commute train was added to the run between Tacoma and Seattle, for a total of eight weekday round-trip trains in the south corridor. Two of the eight weekday round-trips are reverse commute trips.

In 2009, Sound Transit will launch light rail service between downtown Seattle and Sea-Tac International Airport. This initial light rail system will cover 15.7 miles. In the fall of 2008, residents in the region passed the Sound Transit 2 Plan, which proposes a 7-mile light rail extension from the SeaTac Airport through Des Moines and Midway to the Redondo/Star Lake Park-and-Ride at South 272nd Street. This light rail is expected to reach Midway by the year 2020 and Redondo by 2023.

KING COUNTY - METRO

King County Metro, a division of the King County Department of Transportation, provides local and regional bus service for the Des Moines area. In addition to fixed route service, Access Transportation van service¹ is available to qualified elderly and disabled passengers living within ¾ mile of fixed route local service.

In 2006, King County voters approved the *Transit Now* initiative to expand transit service with funds from a 0.1 percent sales-tax increase. *Transit Now* was designed to expand transit service by up to 20 percent over the next 10 years to keep pace with regional growth and demand. *Transit Now* includes proposed improvements to core service connections and high ridership corridors. “RapidRide” is Metro Transit’s new bus rapid transit service that will provide frequent, all-day service along five corridors. In 2010, the first RapidRide corridor put in service will be the “A Line” that runs through Des Moines from Tukwila to Federal Way on Pacific Highway South (SR 99). This service will intersect with Sound Transit’s Link Light Rail at Sea-Tac Airport at South 176th Street and in Tukwila at South 154th Street.

KING COUNTY - FERRY DISTRICT

King County formed the King County Ferry District in 2007 to support passenger only ferry service in the Sound. Des Moines is being considered as one of the locations for new ferry service under this funding. City staff are working with the County Ferry District to ensure that if a ferry route comes to the Des Moines Marina, the best interests of the residents of Des Moines will be considered.

ADJACENT CITIES

The City of Des Moines is surrounded by five cities and the Puget Sound. The cities of Kent, Federal Way, Burien, Normandy Park and SeaTac share boundaries with the City. The travel patterns of residents in these adjacent communities will continue to influence traffic on the streets in Des Moines for all trip purposes, including the commute to and from work, travel to schools and college, and business traffic throughout the day.

KENT

Des Moines has partnered with the City of Kent on Envision Midway, which is a coordinated planning effort for the Midway, Pacific Ridge and Highline neighborhoods along Pacific Highway South. A series of open houses and workshops were held in 2008 to hear what property owners, businesses, and residents think about the study. The cities are developing a vision to guide future land use and regulatory planning in anticipation of Pacific Highway South expanding as a regional transit corridor by both King County Metro and Sound Transit.

This joint planning effort will result in work programs for the cities of Des Moines and Kent that will include a subarea plan, transit oriented development (TOD) overlay(s), a regional focus on a Sound Transit light rail station to serve Des Moines and Midway, transit center location(s), economic development strategies, Planned Action Ordinances, and the designation of an Activity

1 Persons found eligible for the ADA Paratransit Program can request shared ride, curb-to-curb van rides on Access Transportation within most of King County. Enhanced service (such as door-to-door and hand-to-hand) is available for qualified applicants. Individuals may travel with one companion (more if space is available) and a Personal Care Attendant (if need is documented during eligibility process).



Center, depending on the needs of the individual jurisdiction. The work is being coordinated with residents, businesses, property owners, WSDOT, Sound Transit, King County Metro, and the Highline Community College, and other public agencies².

FEDERAL WAY

As the neighbor just south of Des Moines, Federal Way shares a common boundary in the Redondo and Woodmont areas. Redondo Beach is a popular destination in the summer, with a public boat launch, fishing pier, boardwalk, and the new Marine Science and Technology Center (MAST) facility of Highline Community College. Federal Way commuters travel on Redondo Beach Drive and traffic passes through the adjacent Woodmont neighborhood to access South 272nd Street, the Redondo Park-and-Ride and the Star Lake Park-and-Ride near I-5. Another common issue of the two cities includes the long-term adequacy of the 272nd interchange within the City of Kent with impacts on the Redondo and Woodmont neighborhoods. An area for collaboration is the revised connection of 16th Avenue South to SR 99 – to restore full access and provide for improved neighborhood connections.

SEATAC

The City shares common boundaries with SeaTac at Pacific Highway South/International Boulevard, Des Moines Memorial Drive South, South 208th Street, and 24th Avenue South. These boundaries in turn lead to common interests such as access to Pacific Highway South, the 24th Avenue South/28th Avenue South connection, the intersection of South 200th Street and Des Moines Memorial Drive South. SeaTac is a stakeholder in the development of the Des Moines Creek Business Park. The City will continue to work with SeaTac on the development of a street network to support planned development but not as a regional replacement of SR 99 or the south airport access to I-5.

NORMANDY PARK

The City shares a boundary with Normandy Park along 1st Avenue South from South 216th Street to South 192nd Street, in the North Hill neighborhood. This roadway is an important arterial portal to north Des Moines. Normandy Park plans include a 1st Avenue South enhancement multi-modal project, which was originally set up as a three phase construction project extending from South 160th Street to South 216th Street. Phase 1 construction was finalized in 2005, and the City of Normandy Park is applying for grants for the construction, as well as exploring alternate funding for other segments of the roadway. Bike and pedestrian improvements are included with the project.

BURIEN

The City of Burien shares a small boundary with residents of the North Hill neighborhood. The Burien Transit Center is a focal point for transit service serving many Des Moines residents.

2 In 2007, the cities were unsuccessful in securing grant funds from the Department of Community Trade and Economic Development's "Regional Collaboration Grant"; however there was interest and funding to complete this work during the 2008 planning horizon.

OTHER PLANS OF INFLUENCE

A number of other plans interact with the City's Comprehensive Transportation Plan. Some of the plans are described in the following section.

THE DES MOINES COMPREHENSIVE MARINA MASTER PLAN (2007)

The Des Moines Marina is one of only a few marinas offering access to the Puget Sound. Immediately adjacent to the downtown area, it gives a strong maritime character to Des Moines. The Marina is adjacent to the Des Moines Beach Park, where the City is developing a shared use path. The Marina Master Plan responds to the Marina's primary purpose and function as a boating facility and as a destination for those arriving by car, bicycle or on foot. The long term improvements call for improved pedestrian connections, pathways and bike lanes between Beach Park, Downtown Des Moines, and the Marina.

CITY OF DES MOINES MASTER PARK PLAN

The City adopted the *Parks, Recreation & Senior Services Master Plan* in 2003. The inventory of existing City parks, includes properties owned by others such as Highline and Federal Way School Districts, Highline Community College and the Washington State Parks. The City's Park Plan identifies Des Moines Creek Trail as a Class 1 trail that would connect the City of Des Moines to the City of SeaTac along Des Moines Creek. The plan also identifies the currently state-owned "historic" SR 509 right-of-way as a potential location for a shared-use path.

SALTWATER STATE PARK

Washington State owns the Saltwater State Park, an 88-acre marine camping park with 1,445 feet of saltwater shoreline on Puget Sound, in the City of Des Moines. The park is located halfway between the cities of Tacoma and Seattle. The park built by the Civilian Conservation Corp in the 1930s was dedicated in 1926.

The City and the State have had some informal discussions about transferring the park to the City. The park offers beautiful views and wildlife-watching opportunities, including an underwater, artificial reef on Puget Sound with visitors taking advantage of the location to scuba dive and fish. The campground and store are closed during the winter months, but the park remains open during the daylight hours for public use and activities.

HIGHLINE COMMUNITY COLLEGE MASTER PLAN

Highline Community College (HCC) is located along South 240th Street just west of Pacific Highway South, serving all south King County residents. It was the first community college in King County and now with over 16,000 students and 1,170 staff, it is one of the largest in the State's community college system. In addition, Central Washington University offers baccalaureate and masters degree programs at the campus. The College's Master Plan calls for changes to meet the needs of students in the next decade. HCC has one of the State's highest ratios for student FTE per campus-square foot. In order to come up to the State average, HCC would need to grow by 175,000 square feet in the next ten years. As stated in the Facilities Master Plan³, "the original buildings were designed to be as inexpensive to build as possible" and "consequently, 40 years later, the campus suffers with deteriorating, high-maintenance, spatially dysfunctional and technologically-challenged campus." The report recommends demolishing and replacing these buildings, rather than renovating them. The Plan envisions not only overall growth for the college,

³ Source: Highline Community College Facilities Master Plan; McGranahan Architects; November 21, 2007, p 5 of 8.



but the potential addition of student living near campus. The adjacent residential neighborhoods continue to be concerned about student parking, traffic, congestion and safety. Residents are concerned about the student parking and congestion as barriers for emergency services in their community.

PUBLIC SCHOOL DISTRICTS - HIGHLINE AND FEDERAL WAY SCHOOL DISTRICTS

Most students in Des Moines attend either Highline or Federal Way Public Schools. Highline School District serves students living in Des Moines, Normandy Park, SeaTac, Kent, and Tukwila; over 17,000 students in total. Elementary students living more than a mile from school, use the district school buses, which travel on the City streets, stopping frequently to pick up students. Traffic is often stopped in both directions during the morning commute hours and students are crossing busy streets and walking on sidewalks to reach bus stops. Buses travel the city's street and the district notifies the city when they have concerns. During the opening and closing of school parents often take their students resulting in episodic traffic congestion around the schools, and other roads nearby. In addition, elementary students within a mile of school walk on City sidewalks along safe walk routes identified by the schools. The schools contact the City when there are issues with the walking conditions for their students.

High school students often drive to school. During the past three years the Highline School District started a small high school program dividing each of the high schools into three or more smaller high schools. Students are currently assigned to the high school in their neighborhood, but plans include opening attendance to a choice method and at that point moderate traffic increases could be expected on city streets and around high schools as students opt for schools outside their neighborhoods.

Federal Way School District serves Des Moines students living south of Saltwater Park and west of Pacific Highway South. Many of the district schools are located just outside Des Moines city limits. For example, the Technology Access Foundation Academy is located on the Totem Middle School campus just to the east of I-5 near Star Lake Park and Ride, another junior high school, two high schools, and four elementary schools are just outside the City limits near South 304th Street and Pacific Highway South.

PROJECTS COMPLETED SINCE THE LAST PLAN

During the past 10 years, millions of dollars in transportation improvements have been completed in the City of Des Moines. These projects have provided new road capacity, improved bridge safety, improved pedestrian safety, provided better access to transit service, and provided for the preservation of the existing transportation system.

The major projects include:

- Widened Pacific Highway South (SR 99) to 7 lanes, which includes a transit/HOV lane in each direction.
- Installed a traffic signal at the intersection of South 216th Street and 24th Avenue South to address a high crash location.
- Widened 16th Avenue South from South 260th Street to South 272nd Street, with bike lanes, sidewalks and landscaped medians.
- Restriped South 260th Street to a 3-lane section with bike route.
- Reconfigured the intersection at 16th Avenue South/South 279th Street/Pacific Highway South to improve traffic safety.

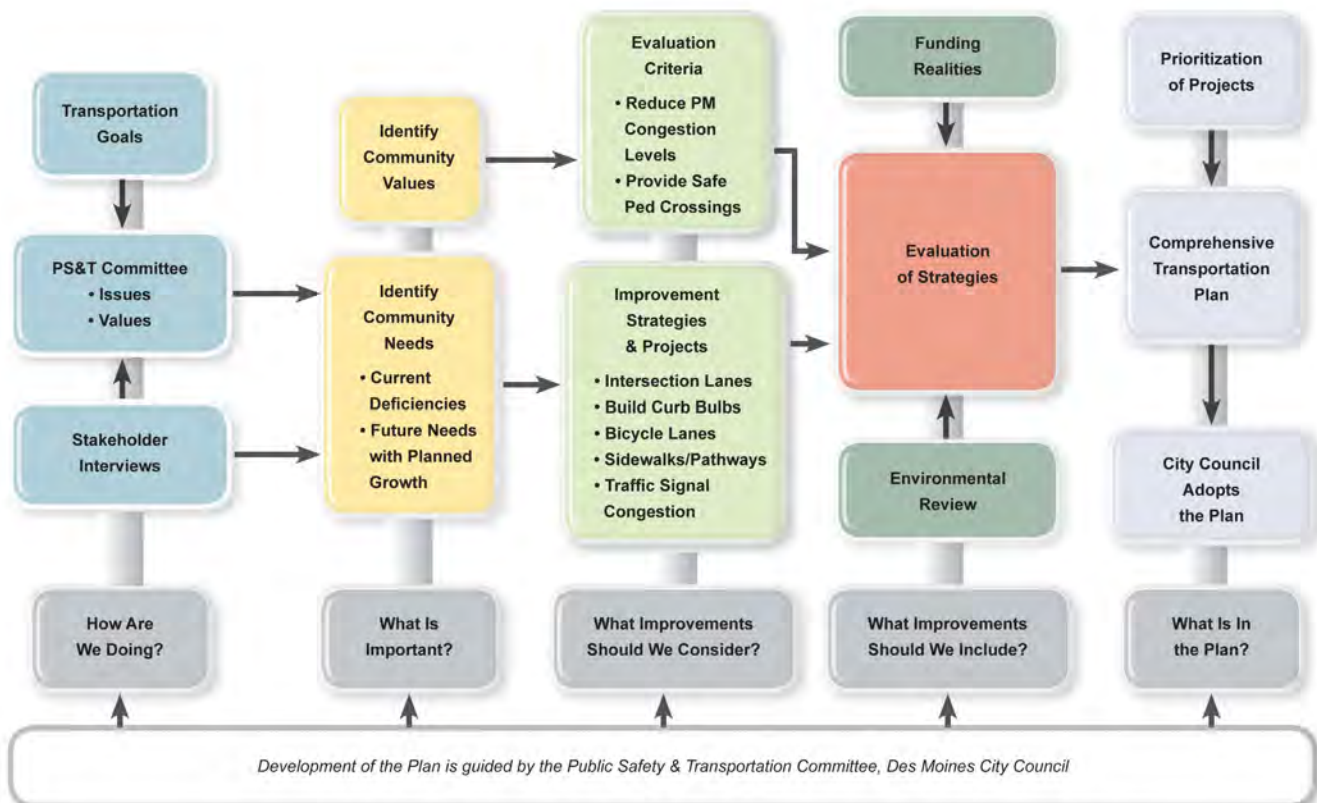
- Completed the design for the Des Moines Creek Trail – construction set for 2009
- Rebuilt the pedestrian signal on South 216th Street adjacent to Wesley Homes.
- Traffic calming installed at key locations citywide.
- Repaired landslide areas of the 2006 and 2007 heavy seasonal rains.
- Constructed the Marine View Drive Bridge over Des Moines Creek.
- Pavement Management System - Overlays.

THE PLANNING PROCESS

As shown in **Figure 1-1**, several key tasks were completed in developing the transportation plan. The Plan will guide City transportation decisions over the next 20 years. The development of the Plan was guided by the Public Safety & Transportation Committee, the City Council, and included a public outreach program. The Transportation Plan answers several essential questions:

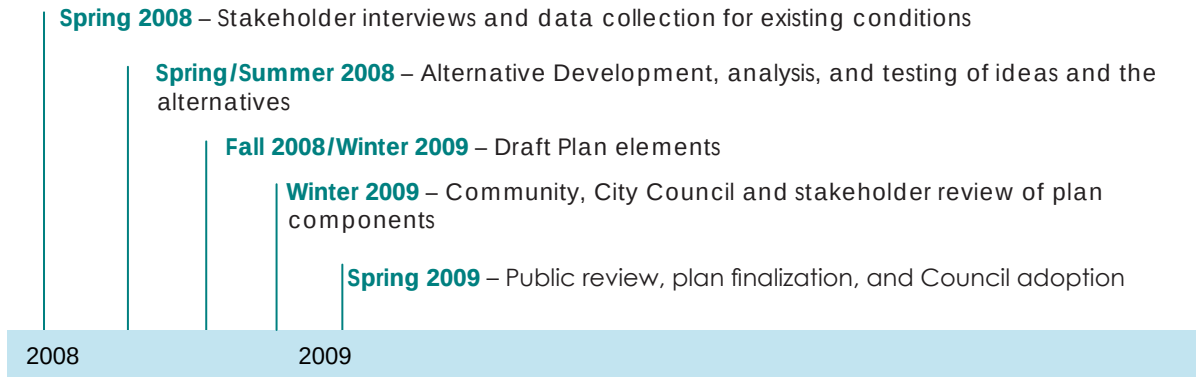
- How well is the City managing the transportation system?
- What is important to the community?
- What improvements should the City consider to the system?
- How should the City prioritize improvements?

Figure 1-1. Updating the Transportation Plan – the Steps



ADOPTION PROCESS FOR THE PLAN

Development of the CTP began in the spring of 2008. The process was coordinated with and will be implemented through the Capital Improvement Plan. The timeline of the CTP implementation and process was as follows.



WHAT IS IN THE COMPREHENSIVE TRANSPORTATION PLAN?

The remaining chapters provide answer to the key questions in **Figure 1-1** and form the core of the Comprehensive Transportation Plan for Des Moines. The chapters are organized as follows:

Chapter 1. The Planning Process

Explains what is in the Plan, why the City developed it, how the community helped to shape it, and how the City will use the Plan.

Chapter 2. Community Trends

This chapter provides background and context for the chapters that follow. Significant local and regional trends are identified, and shown how they impact transportation needs in the community.

Chapter 3. Community Outreach

This chapter summarizes the Community Outreach Program for the Plan describing the outreach activities and information gathered from the stakeholder interviews.

Chapter 4. Street System and Parking

This chapter reports on the inventory of the existing street network including parking spaces, the current operation of the system, forecasts the future operating conditions based on the City's adopted land use plans, and recommends improvements that will be needed to meet the City's level of service standard.

Chapter 5. Pedestrian and Bicycle Networks

This chapter is all about the connections, the needs, and a list of improvements to pedestrian and bicycle networks to make the overall transportation system more accessible and inviting to residents.

Chapter 6. Transit Service and Travel Demand Management

This chapter recognizes that significant changes in regional transit and access are coming to the City. RapidRide, Metro's bus rapid transit service, is coming to the City on Pacific Highway South

in 2010 and Sound Transit's Link light rail service is likely to arrive within the next five years. The areas along Pacific Highway South are envisioned to be developed into a series of transit-oriented villages – mixed use areas of employment, shopping and residential activities.

Chapter 7. Goals and Policies

This chapter sets the guidelines for the City Council and staff to use when making decisions about transportation issues.

Chapter 8. Funding and Implementation

This chapter identifies a list of transportation projects for all the modes, criteria to prioritize the improvements, examines all the potential funding resources available to the City and identifies ways to fund the preferred set of improvements. However, what happens in the future is unknown and hence regular monitoring and updates are necessary to ensure that this Plan remains current and relevant.



Chapter 2 | Community Trends

DES MOINES YESTERDAY

The City of Des Moines is one of the older cities in the area and has always been in the regional transportation network as a stop on the way from Seattle to Tacoma. Settled first by Native Americans and later by homesteaders in the late 1860s, Des Moines developed slowly until 1890 when a military road connecting Seattle and Tacoma was built.

Located on the shores of Puget Sound, the main artery along which people and goods flowed in the 1800s, either by steamer or by canoe, Des Moines built a wharf to accommodate sea vessels and ferries, which were essential to the early development of the town. Ferries were the quickest and most efficient way to travel to and from Seattle or Tacoma. At first privately run steamers ploughed the waters, but by the twentieth century, Puget Sound's "Mosquito Fleet" was the main choice for Des Moines commuters.

Des Moines was a part of the early regional road system. By 1890, a military road connecting Seattle and Tacoma passed through the area. The early version of commuter rail, the Interurban, which opened during the 1920s, ran through the adjacent Kent Valley. But in the 1930s, the completion of the Pacific Highway South (SR 99) gave Des Moines a direct route to both Tacoma and Seattle. Small farms were abundant in Des Moines during the Great Depression and the road was used to get the farmers' goods to market. Later the highway attracted new businesses that appealed to drivers – motels, service stations and restaurants.

In 1959, rather than becoming part of Kent, the residents of Des Moines voted to become a city in their own right. Self-rule was the motive. Incorporation allowed residents to exert finer control over local issues pertaining to infrastructure, development, and the intrusion of Sea-Tac Airport air traffic and noise from the north. The City had 1,987 residents in 1959.

It has nearly doubled in size since 1990 and increased over four times the population in 1980 of about 7,000. The population growth rate has slowed down over the past decade - from 134% between the years 1980 and 1990 to 69% during the 90s, and remaining at nearly the same population from 2000 to 2008.¹ Des Moines had 29,180 residents in 2008.

What is in this Chapter

- Des Moines Yesterday
- Des Moines Today
- Des Moines Tomorrow
- City's Transportation System in 2030



Early transit in 1914. Note wooden sidewalk. This is east side of 6th Avenue, between 223rd and 225th.



Road maintenance - oiling Marine View Drive to keep the dust down. (circa 1911)



The Marine View Drive years later. The road is paved and sidewalks are being added.

Photos are from Des Moines Historical Society, excerpted from the book "One Hundred Years of the WATERLAND Community"

¹ Chapter VI. King County Cities' Statistical Profiles, the 2008 King County Annual Growth Report, page 86.

DES MOINES TODAY

Des Moines has developed as a single-family residential community, with multi-family and commercial development located in the downtown/marina area, and along Pacific Highway South, Interstate-5, and arterial streets such as Kent-Des Moines Road and South 216th Street.

Since 1997, Des Moines has seen a great deal of change through annexations and demographics. Those annexations included the neighborhoods of Redondo, Woodmont and North Hill. Multi-family residential, senior housing and single-family residential development characterize the existing and designated land use adjacent to the downtown area. Other land use includes commercial and business development. Near Highline Community College, single-family residential, multi-family residential, townhouse, and highway commercial uses are designated. Today, much of peak period traffic in Des Moines is headed to and from jobs that are elsewhere--- Des Moines is along the commute for many travelers.

Places and activities beyond the City limits will impact growth and development within Des Moines. These include Sea-Tac International Airport, regional economic trends, regional transportation systems and commuting patterns, regional development plans, development within bordering jurisdictions, and state regulations.

DEMOGRAPHICS

The City of Des Moines with its housing affordability in South King County has drawn more low and moderate income residents to the City. An indicator of this is that free and reduced lunches are served to 59 percent of Highline Public School students according the District's website. From 2005-2007, Des Moines had a total of 12,000 housing units, 9 percent of which were vacant. Of the total housing units, 61 percent were single-unit structures, 35 percent multi-unit structures, and 4 percent were mobile homes. Fourteen percent of the housing units were built since 1990. The median family income was \$67,892 and the median house value was \$290,400.²

The City represents the diversity of South King County with residents of Black or African American descent (10%), Asian and Pacific Islanders (11%), Hispanic or Latinos (7%), caucasian (76%), and other nationalities (5%).

Among people at least five years old from 2005-2007, 22 percent reported a disability. The likelihood of having a disability varied by age - from 3 percent of people 5 to 15 years old, to 16 percent of people 16 to 64 years old, and to 56 percent of those 65 and older.³

The age structure of City residents is shown in **Table 2-1**. The City has nearly 33 percent more residents over 65 than the South King County average, and nearly double the percent living in nearby cities of Federal Way and Kent. Des Moines is the location of several retirement and nursing homes, currently Wesley Homes Care Center, Judson Park Retirement Home and Seatoma Convalescent Center. These retirement facilities, employing over 1300 health care providers, represent nearly a third of the total jobs in 2007. Highline Community College, Highline School District and the City's staff represent another third, with the remainder scattered into construction, retail and manufacturing.

2 & 3 American FactFinder, US Census Bureau <http://factfinder.census.gov>



Table 2-1. Share of Total Population - Children, Working Age and Seniors

Region	Children (0-15)	Working Age (16-64)	Seniors 65+
Auburn	23.91%	64.44%	11.65%
Burien	19.57%	66.61%	13.82%
Des Moines	20.53%	63.94%	15.53%
Federal Way	24.20%	67.12%	8.68%
Kent	24.83%	67.00%	8.17%
SeaTac	21.83%	67.73%	10.44%
Tukwila	21.47%	69.41%	9.13%
South County	23.19%	66.69%	10.11%
King County	19.33%	69.59%	11.08%
Washington State	20.79%	67.31%	11.90%

Source: OFM State of Washington

DES MOINES TOMORROW – 2030

Des Moines along with the rest of the region is expected to grow – in population and in employment. By 2030, employment is expected to more than double in Des Moines while households will increase by 58 percent as shown in **Table 2-2**. The City's streets are likely to be impacted by the growth.



Pacific Ridge Illustration, *Practicing Planner*, 2003

Table 2-2. Population and Employment Growth 2006 to 2030

Year	Households	Employment
2006	10,856	4,820
2030	17,192	11,236
Increase	6,336	6,416
% Increase	+ 58%	+ 133%

Source: Des Moines Model

The area along Pacific Highway South will see the greatest change during the next two decades. The Pacific Ridge Development area along Pacific Highway South shows great potential for household growth with plans for high density apartments and condos. (Please see the employment and household growth maps in Chapter 4 - Figures 4-8 and 4-9). Much of the employment growth during the next 20 years will occur north of South 216th Street in the Des Moines Creek Business

Park. This growth in jobs and population within Des Moines will help to “intercept” commuter trips, diverting traffic to Des Moines-based jobs from the current north-south flows of commuters along Pacific Highway South or Marine View Drive.

“ENVISION MIDWAY” SUBAREA PLAN

The City has been working with the City of Kent, WSDOT and others to plan for the changing land use along Pacific Highway South (SR 99). The planning effort, called “Envision Midway” is creating a vision of a new era on Pacific Highway South in Des Moines. As the “Envision Midway” redevelopment takes place, higher density housing will grow along parts of Pacific Highway South. The proximity of the higher density uses to the Highline Community College and Pacific Ridge Neighborhood will support the RapidRide route and the City goals to reduce single-occupancy trips.

Des Moines is a community where the construction of a regional transit system has a great potential to inject change, by fostering a 24-hour transit-oriented-development (TOD) village in Midway along Pacific Highway South. Bus Rapid Transit (BRT) known as RapidRide is scheduled to be implemented along Pacific Highway South (SR 99) in 2010, which will provide service from Tukwila to Federal Way with a connection to Link Light Rail at Sea-Tac Airport and the Tukwila International Boulevard Station along with frequent service to the Highline Community College.



City Planner, Denise Lathrop, explains the plans for Envision Midway Developers Forum.

The Envision Midway project was formed by the cities of Des Moines and Kent to reach out across city boundaries and work collectively toward changing the subarea along Pacific Highway South. Envision Midway is a diverse partnership comprised of private and public leaders who are local residents, businesses owners, educational institutions, neighboring cities, WSDOT, and transit agencies. In 2008, the cities held a series of meetings to discuss land use concepts for the area with the stakeholders, Developers Forum, Public Open Houses, and Workshops. The planning agencies and City Councils of both Des Moines and Kent were invited to and kept informed of these discussions.

The visioning ideas and comments collected through public meetings and the interactive website are being used to develop options for growth. Options being considered include different combinations of uses and different emphases—like recreation, entertainment, civic, commercial, office, residential—as well as a range of development intensities. Ultimately the outcome of this visioning process will be to present a concept to the planning agencies and governing bodies of the cities of Des Moines and Kent for adoption. In 2009 the Envision Midway team presented a refined scenario at a final open house with the public.

In the fall of 2008, the draft land use scenario for Envision Midway included three transit-oriented villages centered around South 216th Street in the Pacific Ridge area, Highline Community College in the Midway neighborhood, and at South 272nd Street in the Woodmont neighborhood. These are shown on the following page.

Scenario 2.0

Transit Oriented Village

- High intensity transit supportive mixed-use with residential bias
- Strongly pedestrian oriented with small walkable blocks
- 35' to 200' height limit
- Minimal parking requirement
- Uses:
 - Market rate and affordable housing
 - Office
 - Retail
 - Hotel
 - Neighborhood services
 - Civic uses
- No single use, big box, industrial, or auto-dependent uses

Mixed Use - Pacific Ridge

- Auto-accommodating community and citywide retail and services
- Pedestrian oriented
- Mixed use with office or residential
- 35' to 85' Commercial height limit
- 35' to 200' Residential height limit
- Uses:
 - Residential
 - Community, citywide and regional retail
 - Office
 - Hotel

Mixed Use - Kent Highlands

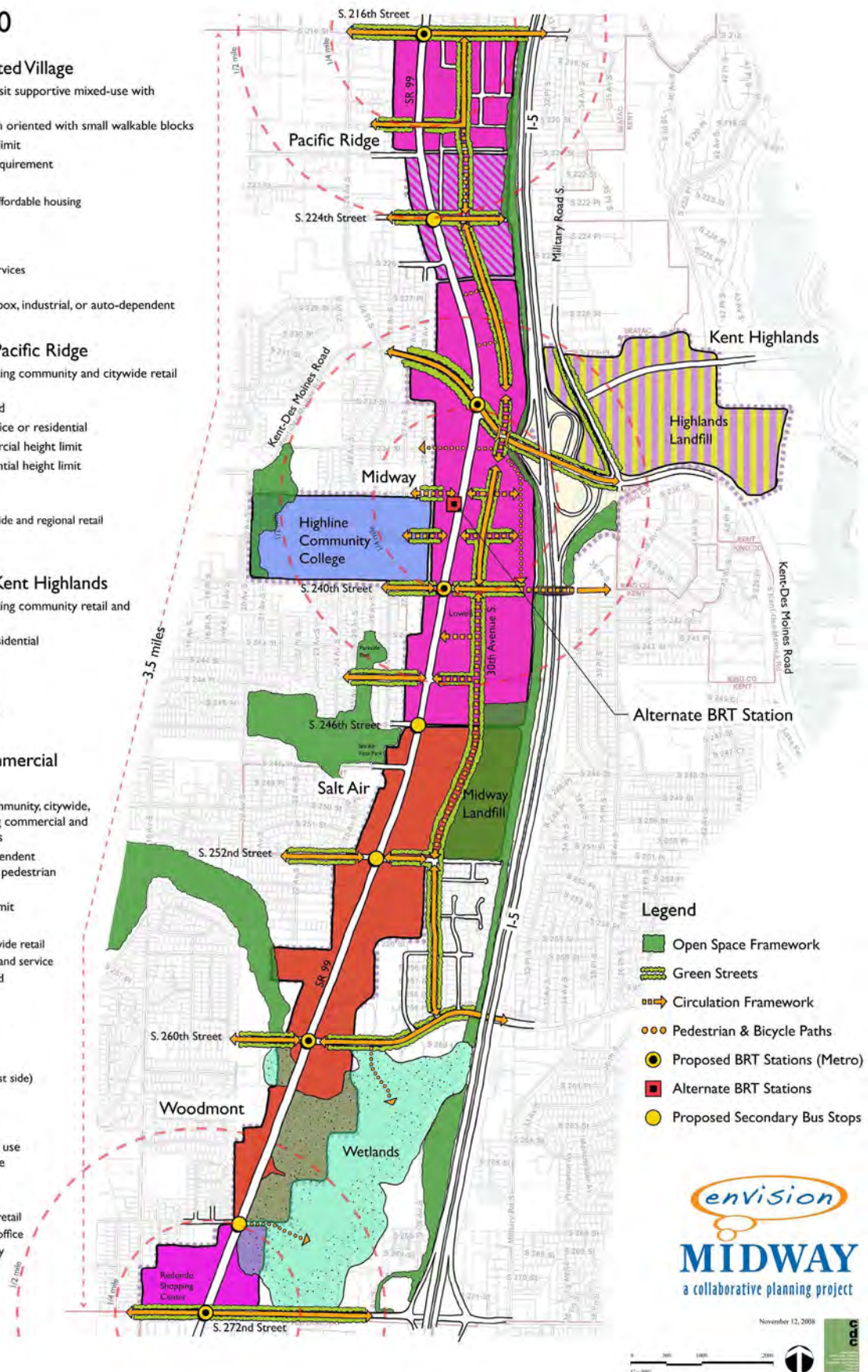
- Auto-accommodating community retail and services
- Mixed use with residential
- 200' height limit
- Uses:
 - Residential
 - Community Retail
 - Hotel

Highway Commercial Corridor

- Wide range of community, citywide, or regional serving commercial and light industrial uses
- Primarily auto-dependent uses, with minimal pedestrian orientation
- 35' to 50' height limit
- Uses:
 - Regional and citywide retail
 - Automobile sales and service
 - Light Industrial and manufacturing
 - Trucking
 - Outdoor storage
 - Office
 - Flex-tech
 - Mixed use (on west side)
 - Live-work

Institutional

- Institutional mixed use residential or office
- Uses:
 - College academic
 - College oriented retail
 - College oriented office
 - Student and faculty rental housing



These villages focus on the future RapidRide stations and the presumption that light rail will be near Midway neighborhoods, perhaps a station near HCC. Higher densities, managed parking, pedestrian-friendly environments, safety amenities, a senior-friendly community and public open spaces are components of these transit-oriented villages.

Des Moines Neighborhood Centers within Envision Midway Study Area

The Envision Midway study area is comprised of all or portions of six recognized neighborhoods, from north to south: Pacific Ridge, South Des Moines, Kent Highlands, Midway, Salt Air, and Woodmont. Three of these neighborhoods are located within the city limits of Des Moines and described in detail in the following section: Pacific Ridge, South Des Moines, and Woodmont Neighborhoods.

Pacific Ridge Neighborhood

The Pacific Ridge Neighborhood encompasses approximately 167 acres and is geographically situated along Pacific Highway South and extends from South 216th Street to Kent-Des Moines Road. The area is currently characterized by low intensity commercial development, motels and under utilized property along Pacific Highway South and a mix of residential uses and densities.

Pacific Ridge will be a new urban community. The expected transformation includes:

- Replacing lower-scale, existing buildings with new structures that will dramatically enhance the appearance, character, economics and safety of the area
- Buildings and open spaces focused on pedestrian uses.
- Design features that make the neighborhood inviting to residents and businesses, complement other areas of Des Moines, and foster community pride.

To date, Des Moines has invested \$21 million in regional transportation improvements along Pacific Highway South that focused on regional transportation and pedestrian access. Improvements include north-south HOV lanes and pedestrian amenities. These improvements have added value to the surrounding properties, making redevelopment of the area more feasible and inviting. One of the proposed new developments is Waterview Crossing – a mixed-use development that will include 1,600 residential units, retail and office space, and a hotel on an 11-acre site.

Midway Neighborhood

The area commonly referred to as “Midway” extends along Pacific Highway South (SR 99) from Kent-Des Moines Road to South 244th Street. Although the majority of this area falls within the City of Kent, it also includes small areas within the Des Moines planning area.

The area includes Highline Community College, which recently initiated a master planning process for the expansion of its facilities and eventually student housing.

Woodmont Neighborhood

The Woodmont area extends south from South 252nd Street to South 272nd Street and is approximately 165 acres. The area to the west of Pacific Highway South encompasses portions of the Woodmont Neighborhood in Des Moines and properties east of Pacific Highway South area in the City of Kent. The Woodmont area also includes a 115-acre wetland located east of the highway. This wetland is the headwaters for McSorley Creek, which flows westerly through Des Moines to the Saltwater State Park, and into the Puget Sound.



HIGHLINE COMMUNITY COLLEGE

Changes are coming to Highline Community College (HCC). Highline Community College was the first community college in King County. With over 16,000 students and 1,170 staff, HCC is now one of the larger colleges in the State's community college system. In addition, Central Washington University offers baccalaureate and master's degree programs at the HCC campus. Over 40 percent of the students at HCC are enrolled in college preparatory and transfer programs, over 1,000 are Running Start students, and over 500 are foreign students. HCC is one of the most diverse community colleges in the State, with more than 27 percent of the student population speaking English as a second language. Currently, 50 percent of the student population is age 23 or older; 61 percent are female, 45 percent work at least part time, and 64 percent are Hispanics, Asian/Pacific Islander, African American, Native American and other nationalities.

In addition to the main campus located above Puget Sound along Pacific Highway South, there are several off-site facilities including the Puget Sound Early College located in Federal Way; the Center for Extended Learning located in a leased facility on Pacific Highway South; and the Marine Science and Technology Center (MAST) located at Redondo Beach. The MAST facility is expanding knowledge about Puget Sound and the surrounding environment.

The two entrances to the main campus are on SR 99 and South 240th Street. The college has expressed concerns about the efficiency and safety of these entrances. The HCC Facilities Master Plan seeks a new entry from Pacific Highway South that would be coordinated with a new Transit Center, potentially easing the demands on vehicle and bus traffic on South 240th Street.

In the summer of 2005, there were 2,279 parking spaces on campus with plans to add 120 spaces at the entrance area from South 240th Street. HCC is trying to promote carpool/vanpools with free parking; however, the carpool parking is located along the perimeter of the campus, which has not been much of an incentive for potential riders. On a weekday the parking lot is over capacity by 10 AM and clears out by 4 PM. Most students work part-time and rely heavily on private vehicles. HCC reports that because of the lack of available parking on campus some students park at local businesses and in adjacent neighborhoods.

THE TRANSPORTATION SYSTEM NEEDED TO SUPPORT PLANNED LAND USE IN 2030

The City of Des Moines should be prepared to see rapid change. Growth along the Pacific Highway South corridor, the Des Moines Creek Business Park development and expansion of the Highline Community College are just a few of the planned activities within the City that will provide new opportunities for housing and employment.

The City and the Region are expected to grow, after the economy recovers. Population and employment growth will add vehicle, transit, and personal trips to the transportation network within the City. Understanding the future nature and volume of traffic in the study area makes it possible to identify transportation issues and to suggest appropriate facility improvements to meet the demands.

The Comprehensive Transportation Plan has been developed with intent to preserve the quality of life for residents and to support a viable economic future for the City. The City Council will use the Plan to make decisions regarding future transportation investments.

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Chapter 3 | Community Outreach

The Comprehensive Transportation Plan was created in collaboration with the Plan stakeholders and the general community. The community outreach program provided a variety of forums for stakeholders to learn about the Plan and provide feedback to the City. This chapter describes those many ways that the community was involved in the planning effort.

PURPOSE OF THE COMMUNITY OUTREACH PROGRAM

The community outreach was designed to encourage interested groups and individuals to participate in the development of the CTP. The City wants stakeholders to understand the planning process. Stakeholders want to know that their comments were heard and that their input was used to develop the recommendations and the final plan. The community outreach activities:

- Gather community perspectives on transportation issues.
- Inform City staff and Council members about the preferences of the community with regard to transportation and Des Moines issues.
- Share project information with interested groups and individuals and encourage people to offer comments during the planning process.

Each community has a set of values – specific community characteristics that they intrinsically value. These values are rarely written down but they are reflected by the people who are elected to represent the community and by the city's adopted goals and policies. For the City, planning for the future involves understanding what is likely to happen and identifying ways to manage that change.

The community values – such as mobility, safe streets and neighborhoods, frequent transit service, convenient parking – are reflected in the City's overarching vision for the transportation system and their goals. Chapter 7 includes the goals and policy statements that will ensure that the transportation vision happens.

COMMUNITY OUTREACH ACTIVITIES

The City wanted to involve the community in a number of ways that would be easy for the community to participate. The following guidelines were used to select community outreach activities:

- Inform the general public and special interest stakeholders about the need for the CTP and the potential benefits of the project.
- Create a variety of outreach activities.
- Solicit ideas throughout the planning process.
- Provide clear, concise information about the project, its goals and the process to determine recommendations.
- Maintain open lines of communication with other agencies to improve coordination efforts and build interagency cooperation.

What is in this Chapter

- Purpose of community outreach program
- Stakeholders
- Outreach activities: stakeholder interviews, open houses, website, newsletter articles,
- What we heard
- How comments were incorporated into the Plan

When selecting the outreach methods, the City opted to select methods that were broad-reaching, and yet cost-effective. These methods are described in the remainder of this chapter:

- Interviews with the Plan Stakeholders
- Reports and workshops with the Public Safety & Transportation Committee
- City Council Briefings
- Articles in the City's newsletter "The City Currents"
- Open Houses
- Project Website
- Public Hearings

In addition to the community outreach efforts described in this report, the City of Des Moines Transportation Division coordinated with other agencies and responded to any public requests via phone or email, or in person at City Hall.

STAKEHOLDER INTERVIEWS

Community leaders, business groups, and other stakeholders were interviewed to gather comments on the City's transportation system.

The City can evaluate how well the existing transportation system operates by conducting a needs assessment. Des Moines' transportation system includes local streets, sidewalks, bicycle paths, state highways, and public transit. There are multiple viewpoints throughout the community about how well those transportation systems are currently working.

In the Spring of 2008 we talked with Community Stakeholders— including:

Small businesses owners
Highline Community College
Highline Public School District
Seniors
Developers
Destination Des Moines
EMS providers
Fire & Police officers
City staff of neighboring cities
King County Metro Transit
Sound Transit
Port of Seattle
Des Moines City Council Members
Des Moines Marina
Des Moines Parks
Des Moines Senior Services

The City began by identifying Plan stakeholders and associations that could be valuable in the CTP process. Individual interviews and group meetings were organized to gather information regarding the community's perceived transportation issues, needs, and what types of solutions might be effective.

The City held individual interviews with representatives who are recognized leaders in the community, such as City Council members, Highline Community College, public school transportation staff, Destination Des Moines, senior center leaders, and others, including the City staff and the South King Fire and Rescue staff. Transit agencies such King County Metro and Sound Transit, as well as WSDOT, the Port of Seattle and adjacent City leaders were included. Through this process over 20 stakeholders were identified and interviewed.

A set of common questions and a standard summary form was developed to ensure consistency across interviews, and to identify common major themes. These forms are held in confidence to ensure that those interviewed felt able to express themselves freely. However, the information gathered is summarized under community outreach results in this chapter.



MEETING WITH THE PUBLIC SAFETY AND TRANSPORTATION COMMITTEE AND THE CITY COUNCIL

During the development of the Plan, the consultant team gave regular reports to the City Council and the Public Safety and Transportation Committee.

Public Safety & Transportation Committee

The Public Safety and Transportation (PS&T) Committee guided development of the Comprehensive Transportation Plan. Throughout the project, the committee provided input and feedback used to develop solutions reflecting community values and to prioritize projects included in the TIP.

The PS&T Committee met seven times during the process to discuss and guide the CTP. The topics and results of these meeting are summarized below.

Meeting #1 (March 20, 2008). The purpose of the first meeting was for members to understand the planning process for the CTP; to identify the members concerns about transportation in the City, to explain the 2030 forecast and traffic model; and to identify the key milestones for the CTP Update.

Meeting # 2 (May 8, 2008). At this meeting an overview of the existing conditions inventory was presented and highlights from the stakeholder interviews reviewed. Level of Service (LOS) standards – the City’s current policy and options for the LOS standard were considered. At this meeting the existing transportation policies were discussed along with the need to revisit them for needed updates.

Meeting # 3 (May 29, 2008). At this meeting staff presented a review of the planned growth in residents and future jobs for Des Moines, with a specific focus on areas of growth. To accommodate that growth, the PS&T Committee confirmed a reasonable future network of streets and a list of projects to achieve that network. This was the foundation of the review of future operations for the Plan development.

Meeting # 4 (June 12, 2008). Jason Sullivan met with PS&T committee to give an overview of the planned growth in housing and jobs for Des Moines through 2030.

Meeting # 5 (October 2, 2008). Reviewed the material presented to the full council on July 3, 2008. This included the 2030 planned growth and confirmed the locations of this growth: Downtown area, Pacific Ridge, and a Business Park in the northeast area of the City. The assumptions for the Baseline in 2030 were discussed and approved with no SR 509. The planned network for the LOS evaluation in 2030 was presented along with LOS standards. The PS & T committee was asked to provide guidance on the capacity needs list for Des Moines.

Meeting # 6 (February 5, 2009). The committee was asked to review the transportation goals and policies. What is the transportation vision for 2030 and what is the network of streets, bicycle and pedestrian facilities, and transit network needed to support that vision? What projects are needed to serve the City’s planned growth for 2030 and meet the operational standards? These are key questions that the Comprehensive Transportation Plan must address. The recommended plans for the street system, the pedestrian and bicycle systems, and the recommendations for transit service were presented. Along with the plans, the group was given the list of improvement projects needed to build these plans.

PS&T Committee

David Kaplan, Chair
Position #5 Council Member

Dan Sherman, Mayor Pro Tem
Position #2 Council Member

Ed Pina
Position #1 Council Member

Tony Piasecki
City Manager

Grant Fredricks, Director
Planning, Building and Public Works

Dan Brewer, Assistant Director
Transportation Manager

Meeting # 7 (March 5, 2009) Dan Brewer and Denise Lathrop met with PS&T to review the potential light rail alignments in the Midway planning area of Des Moines and Kent, with follow-on briefing to the full Council on Envision Midway planning process, receiving Council direction on the light rail alignment and potential locations for light rail stations and stops.

Des Moines City Council

The consultant and city staff met with the City Council on June 5, July 3, October 23, 2008 and February 5, 2009 to review the work on the Plan process, progress and to seek direction through the Plan development. A public hearing was held on May 14, 2009 for adoption of the Plan. The final adoption of the Plan is scheduled for June 11, 2009.

Des Moines Planning Agency

The consultant and city staff met with the Planning Agency on May 4, 2009 to review the Plan and seek direction. The Planning Agency recommended adoption of the Plan and supports a program to monitor Plan progress.

NEWSLETTER ARTICLES IN DES MOINES CITY CURRENTS

The City publishes a newsletter that is sent to all residents and businesses in Des Moines. Prior to each Open House, a summary of the progress on the CTP was published and an invitation offered to all for the upcoming public meeting. Staff also circulated flyers to local businesses.

OPEN HOUSES

The City held two open houses to explain the CTP Plan and offer an opportunity for public feedback. One of the open houses was held June 10, 2008; the other was held on March 31, 2009 from 6 to 8 PM at City Hall. At each event, stations were set up to present information on the existing and future conditions for each mode. The first open house explained the current conditions, showed the growth that is expected by 2030, and the impact of that growth on the transportation system. For example, stations offered information on the existing sidewalks, streets, transit, bicycle facilities and level of service. During the development of the CTP, the City identified several projects that are needed to accommodate growth; these were included in the Open Houses as part of a station featuring the Transportation Improvement Program.

Members of the City's Public Works Transportation Division and Council Members from the PS&T Committee staffed the open houses. As a result, residents had the chance to not only share their ideas and concerns, but also to discuss those concerns with the staff directly involved in implementing solutions to address those concerns. During these face-to-face opportunities issues discussed included traffic signals, safer school bus routes, and other traffic issues. In addition to the opportunity to talk with Des Moines staff, comment cards were also provided to be completed at the meeting or to be returned by mail.

PROJECT WEBSITE

The purpose of the website was not only to serve as an independent source of information, but to serve as a support tool to all other CTP outreach activities. The website initially identified the CTP update and provided regular updates as needed. When the current newsletter was mailed to residents with information on the Open Houses, the website was a source of additional information. The City posted the draft and final Comprehensive Transportation Plan on the website for residents to easily access, along with copies placed at the Woodmont and Des Moines Libraries and City Hall.



COMMUNITY OUTREACH RESULTS

The community outreach offered several avenues for public input, including stakeholder interviews, open house direct discussion and comment cards, and a transportation information line, email address and telephone number. As a result of these opportunities, the CTP planners received additional evidence to support the recommendations of the plan.

Most of the community's transportation concerns relate to congestion, safety, connectivity, community livability, the desire for more frequent transit service, as well as an interest in more connected pedestrian and bicycle facilities. We heard that congestion and bottlenecks result in delays at traffic signals affecting the travel time; that residents want better pedestrian and bicycle facilities, and that more transit service is essential for everyone including the youngest and oldest in the city.

Residents value certain characteristics of the community – safe streets and sidewalks, mobility, efficient connections within and outside the City. These values were heard during the interviews with stakeholders and identified by the Council members. The values are integrated into the policies that guide the City and the evaluation criteria that are used to prioritize transportation improvement projects.

From the 20 interviews and group meetings conducted with community and business representatives, the themes heard most often were about congestion, transit, pedestrian, bicycle, street maintenance and parking.

The Comprehensive Transportation Plan answers several essential questions:

1. How well is the City managing the transportation system?
2. What is important to the Community?
3. What improvements should the City consider to the system?
4. How should the City prioritize improvements?

STREETS

Community interview discussions encompassed everything from arterials to neighborhood streets. Comments heard include:

- Fix the broken regional transportation system – reduce spillover and cut through traffic.
- Add sidewalks and bike lanes to Kent-Des Moines Road.
- Improve the sight distance at intersections throughout the City.
- Reduce the long summer queues on Redondo Beach Drive.
- Improve streets and access at the entrance to Highline Community College.
- Fix bridges that are vulnerable to landslides and earthquakes and remove weight restrictions.
- Provide better access to I-5 from Downtown Des Moines.
- Provide better Fire and EMS access near HCC in the neighborhoods to the north ---- roadway widths and student parking block access.
- Need travel time and reliable east/west and north/south routes through town to ensure emergency vehicle mobility.
- Improve turns onto MVD; often both right and left turns are sight restricted.

- Improve signal coordination along Pacific Highway South/SR 99.
- Add red light cameras to enhance safety at Marine View Drive and 227th, and Kent Des Moines Road and Pacific Highway South.
- Address congestion issues on Marine View Drive.
- What could be done with the “historic” SR 509 right-of-way property?

PEDESTRIANS AND BICYCLISTS

Some of those interviewed focused on pedestrian needs for seniors and transit users. More discussed pedestrian issues than bicycle issues. Comments heard include:

- Make the Downtown area more pedestrian-friendly.
- Make the pedestrian crossings across Pacific Highway South safer.
- Tie City facilities to the regional Trail System – north/south and east/west.
- Provide better pedestrian facilities and crossings for senior residents in the downtown area and near senior homes.
- Increase bicycle access to Highline Community College campus.
- Extend Des Moines Creek Trail to the Marina.
- Consider lowering speed limit on Marine View Drive to 30 mph.
- Improve pedestrian conditions for downtown special events.
- Provide adequate bike lanes or shoulders on all major east-west routes.
- Include sidewalks for all new roadwork projects.
- Add pedestrian improvements on both sides of 16th Avenue South.

TRANSIT

Transit issues were identified by many of those interviewed, including those who must use transit because they have no car available, schools, employers and commuters. Comments heard include:

- If Sound Transit Link light rail service will be at the Sea-Tac airport in 2009 – should light rail be extended to Des Moines?
- Need more direct bus service to downtown Seattle and Tacoma.
- Add incremental all day service to nearby cities: Burien, Kent, Federal Way, SeaTac.
- Add a KC Metro circulator bus around Des Moines to provide connections to destinations and regional bus service.
- Need transit service south of South 240th Street.
- Need evening or weekend senior shuttle buses.
- Need direct transit service to the Airport from downtown Des Moines.



PARKING

Parking issues were mentioned, specifically in regard to parking downtown and near Highline Community College. Comments heard include:

- Need more downtown parking - should the City have a parking structure?
- Stop the HCC spillover parking in the adjacent neighborhoods.
- Need on-street or parking facilities for passenger-only ferry.
- Need wider sidewalk space for pedestrians to walk on 6th Avenue South and downtown side streets.
- Relocate Downtown parking - it is not at the right locations.
- Address parking issues in Downtown and the Redondo area.

HOW WERE THESE COMMENTS INCORPORATED IN THE COMPREHENSIVE TRANSPORTATION PLAN?

The City is committed to providing a transportation system that serves Des Moines residents and businesses. The final recommendations in the Plan consider the stakeholder comments and other issues raised from the public meetings.

Some issues are very expensive, some will require close coordination with other agencies and cities, and some will require action by another agency or city. The City strives to address issues in a timely manner. The Plan stakeholders need to remain involved to monitor the Plan as it is implemented. The City provides many opportunities and ways to participate - special task forces, standing council committees, and comments directed to Council members and City staff.



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Chapter 4 | Street System and Parking

The street system in Des Moines serves all the all modes of transportation. Everyone in the community uses the streets – commuters and residents getting to and from work or school; for shopping and deliveries; fire fighters, police and EMS providers; transit and school buses; bicyclists; pedestrians – seniors, students, children and their parents.

STREET SYSTEM INFRASTRUCTURE

The City's street network includes State highways and streets ranging in size from local streets to principal arterials linking neighborhoods and business areas to each other and the region. The following section describes the existing conditions of the street system in the year 2008.

STATE HIGHWAYS

State highways are owned by the State and managed by WSDOT. These highways connect communities to one another throughout the Puget Sound Region. To serve traffic at higher speeds and meet mobility and safety goals, access to these streets is restricted and regulated in accordance with RCW 47.05. The State highways that are within or adjacent to Des Moines are designated into two categories, depending on their role in the regional network: Highways of Statewide Significance (HSS) or Highways of Regional Significance (Non-HSS). In addition, the State identifies highways that are part of the Washington State Freight and Goods Transportation System (RCW 47.06A.020).

Highways of Statewide Significance (HSS)

Highways of Statewide Significance include interstate highways and other State routes needed to connect major communities in the state. The State uses the designation to allocate and direct funding. The HSS system was mandated by the 1998 legislature through enactment of House Bill 1487 and codified into RCW 47.06.140. The State routes near Des Moines that are classified as HSS include I-5 and SR 99.

Interstate 5 (I-5) lies just to the east of the city limits and serves as the primary north-south facility throughout the Puget Sound region. In the vicinity of Des Moines, I-5 has four general-purpose lanes and a high occupancy vehicle (HOV) lane adjacent to the median in each direction. The City of Des Moines is directly served by an interchange at Kent-Des Moines Road (SR 516). Other interchanges serving the area are located at South 200th Street in the City of SeaTac and South 272nd Street at the border between the cities of Kent and Federal Way.

SR 99 (Pacific Highway South, International Boulevard) is the primary north-south roadway in the City of Des Moines. It connects south to the cities of Kent, Federal Way and Tacoma, and north to Sea-Tac International Airport and the cities of SeaTac, Tukwila and Seattle. SR 99 is named International

What is in this Chapter

- Existing Street System Facilities
 - State Highways
 - Local Streets | Classifications
 - Speed Limits
 - Traffic Signals
- Existing Street System Operations
 - Traffic Volumes
 - Level of Service Standards
 - Intersection LOS
- What Does the Future Bring?
 - Increase in Households
 - Increase in Employment
- 2030 Street System Operations
 - Existing Street Network
 - 2030 Baseline Network
 - Recommended Network
- Safety & Emergency Response
- Traffic Management & Operations
- Parking
- Recommended Projects

Boulevard north of Des Moines and Pacific Highway South through the City limits. Pacific Highway South (SR 99) has two general purpose travel lanes and an HOV lane in each direction with additional turn lanes at key intersections.

Highways of Regional Significance (Non HSS)

The Puget Sound Regional Council (PSRC) has identified facilities and adopted level of service (LOS) standards for regionally significant state highways in the central Puget Sound region. Regionally significant state highways are those highways not designated as being of statewide significance (HSS highways), but are key regional links. The PSRC took this action to comply with 1998 amendments to the Growth Management Act.¹ The regionally significant highways in the City include SR 516 and SR 509.

SR 516 (Kent-Des Moines Road) is the primary east/west corridor in the city. Kent-Des Moines Road (SR 516) is a 2-lane roadway that connects the city center with I-5 and Pacific Highway South. This highway also provides primary access to the Kent Valley east of I-5.

SR 509 (Marine View Drive) has an existing alignment which is a circuitous route that mixes portions of high-speed freeway with arterial streets. The current alignment is made up of two main sections – one to the north and one south of the City. To the north of Des Moines it is a 4-lane limited access highway extending from the 1st Avenue Bridge in Seattle to South 188th Street in SeaTac. To the south in Federal Way, it extends from SW Dash Point Road to the Port of Tacoma. Within the City of Des Moines, SR 509 is known as Marine View Drive from the intersection of 1st Avenue South and Des Moines Memorial Drive to the junction with Kent-Des Moines Road (SR 516).

An earlier alignment, historic SR 509, would have connected South 188th Street in the City of SeaTac to the north end of 16th Avenue South within Des Moines. The right-of-way of the former route remains under WSDOT ownership. The current plan for SR 509 favored by WSDOT (currently unfunded) would build a new connection between South 188th Street and I-5 providing an alternate expressway route for traffic between the southern portion of King County and the City of Seattle. This would also provide a south access to Sea-Tac International Airport, with a new interchange in the vicinity of 24th/28th Avenue South and South 200th Street.

CITY STREET FUNCTIONAL CLASSIFICATION SYSTEM

The City street network provides facilities for a wide variety of modal users. For vehicles, it is a network whose efficiency depends upon how well the streets move traffic through the system. The City classifies streets according to a hierarchy of function, from most intensive use to least intensive. Functional classification, as this is called, groups streets and highways into classes according to their role in the network. The functional classification of each roadway determines its roadway design and ultimate cross section for reconstruction. Classification is important to the City because it helps ensure that the needed capacity will be available and that street improvements will balance the differing needs of vehicles and non-motorized travelers. The City defines the specific standards for streets in Des Moines in the *Draft Street Design & Construction Standards* (March 2008).

Figure 4-1 shows the existing functional classification of the streets within Des Moines. There are five main classes of streets in Des Moines: Principal Arterials, Minor Arterials, Collector Arterials, Neighborhood Collectors, and Local Streets. A list of streets by their existing classification is included in **Table 4-1**.

1 HB 1487, the “Level of Service Bill”, Washington State Legislature 1998. Adoption of LOS standards for regionally significant state highways followed a year-long process involving WSDOT and the region’s cities and counties.



Principal Arterials

Urban principal arterials, also called Major Arterials, provide for movement across and between large sub-areas of an urban region. Principal arterials serve predominantly “through traffic”, carry the highest traffic volumes, serve major centers of activity, and are fed by other arterials and local access streets. Principal arterials are expected to provide a high degree of mobility. Therefore, access to abutting properties should be very restricted. Spacing between parallel principals is generally two miles or greater. ADT is typically over 10,000 vehicles per day. Examples of principal arterials in Des Moines are *Pacific Highway South (SR 99), Des Moines Memorial Drive, Marine View Drive (SR 509), Kent-Des Moines Road (SR 516), and 16th Avenue South.*

Minor Arterials

Urban minor arterials interconnect with, and augment, the principal arterial system. Minor arterials provide intra-community continuity connecting community centers and facilities. A minor arterial may also serve “through traffic.” Access is partially restricted. Spacing between parallel minor arterials is generally less than two miles. ADT is typically between 4,000 and 12,000 vehicles per day. Examples of minor arterials are *South 216th Street, 7th Avenue South, South 240th Street east of 16th Avenue South, and South 260th Street.*

Collector Arterials

Collector arterials typically are intra-community roadways connecting residential neighborhoods with community centers and facilities. They accumulate traffic from local roadways and distribute that traffic to roadways that are higher in the hierarchy of functional classification. Access is partially restricted. Spacing between collector arterials is generally a mile or less. ADT is typically between 1,000 and 5,000 vehicles per day. Examples of collector arterials in Des Moines are *24th Avenue South, South 224th Street, South 223rd Street, Marine View Drive (south of SR 516), Woodmont Drive South, Redondo Beach Drive South, and Redondo Way South.*



Table 4-1. Existing Street Functional Classification

Street Classification	Limits	
Principal Arterials		
16th Avenue South	Kent-Des Moines Road	Pacific Highway South
Des Moines Memorial Drive South	South 208th Street (City Limits)	Marine View Drive South
Kent-Des Moines Road	Marine View Drive South	30th Avenue South (City Limits)
Marine View Drive South	Des Moines Memorial Drive South	Kent-Des Moines Road
Pacific Highway South	South 216th Street	Kent-Des Moines Road
South 272nd Street	16th Avenue South	Pacific Highway South
Minor Arterial		
7th Avenue South	Marine View Drive South	South 227th Street
7th Place South	Marine View Drive South	South 216th Street
South 199th Street	1st Avenue South	5th Avenue South
South 200th Street	5th Avenue South	Des Moines Memorial Drive South
South 216th Street	7th Place South	20th Avenue South
South 216th Street	20th Avenue South	East City Limits
South 240th Street	16th Avenue South	27th Avenue South (City Limits)
South 260th Street	16th Avenue South	Pacific Highway South
Collector Arterials		
1st Avenue South	Redondo Beach Drive	City Limits
8th Avenue South	South 194th Street (City Limits)	South 200th Street
10th Avenue South	Marine View Drive South	South 281st Street
12th Avenue South	Marine View Drive	South 272nd Street
20th Avenue South	Kent-Des Moines Road	South 240th Street
24th Avenue South	South 216th Street	Kent-Des Moines Road
Marine View Drive South	Kent-Des Moines Road	Woodmont Drive South
Marine View Drive South	12th Avenue South	10th Avenue South
Redondo Beach Drive	1st Avenue South	South 281st Street
Redondo Way South	Redondo Beach Drive South	City Limits
South 223rd Street	Marine View Drive South	24th Avenue South
South 224th Street	24th Avenue South	Pacific Highway South
South 240th Street	Marine View Drive South	16th Avenue South
South 272nd Street	16th Avenue South	12th Avenue South



Table 4-1. Continued

Street Classification	Limits	
South 281st Street	10th Avenue South	Redondo Beach Drive South
Woodmont Drive South	Marine View Drive South	16th Avenue South
Neighborhood Collector		
4th Avenue South	South 199th Street	South 216th Street
5th Avenue South	South 222nd Street	Cliff Avenue South
6th Avenue South	South 220th Street	South 227th Street
8th Avenue South	South 200th Street	South 208th Street
9th Avenue South	South 220th Street	South 223rd Street
10th Avenue South	South 220th Street	South 232nd Street
11th Avenue South	South 216th Street	South 220th Street
14th Avenue South	South 232nd Street	South 234th Street
14th Avenue South	South 234th Street	South 240th Street
14th Place South	South 258th Street	16th Avenue South
16th Avenue South	South 220th Street	Kent-Des Moines Road
18th Avenue South	South 234th Street	Kent-Des Moines Road
19th Avenue South	South 220th Street	South 234th Street
20th Avenue South	South 243rd Street	South 252nd Street
24th Avenue South	South 208th Street	South 216th Street
25th Avenue South	Kent-Des Moines Road	South 232nd Street
30th Avenue South	South 224th Street	Kent-Des Moines Road
30th Avenue South	South 216th Street	South 220th Street
Cliff Avenue South	South 223rd Street	Marina/Park
South 208th Street	1st Avenue South	Des Moines Memorial Drive South
South 216th Street	1st Avenue South	4th Avenue South
South 220th Street	6th Avenue South	Marine View Drive South
South 220th Street	9th Avenue South	19th Avenue South
South 220th Street	24th Avenue South	30th Avenue South
South 222nd Street	5th Avenue South	24th Avenue South
South 222nd Street	24th Avenue South	Pacific Highway South
South 223rd Street	Marine View Drive South	Cliff Avenue South
South 224th Street	Pacific Highway South	30th Avenue South

Table 4-1. Continued

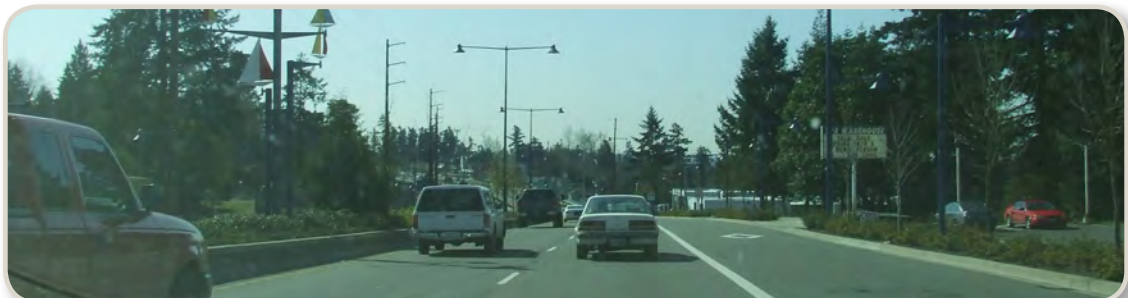
Street Classification	Limits	
South 225th Street	6th Avenue South	Marine View Drive South
South 226th Street	6th Avenue South	Marine View Drive South
South 227th Street	Marine View Drive South	Marina
South 232nd Street	10th Avenue South	14th Avenue South
South 234th Street	19th Avenue South	18th Avenue South
South 250th Street	South 251st Street	20th Avenue South
South 251st Street	Marine View Drive South	13th Ave South
South 252nd Street	20th Avenue South	City Limits
South 258th Street	14th Place South	Marine View Drive South
South 268th Street	16th Avenue South	Pacific Highway South
Woodmont Beach Drive	Woodmont Drive South	South 270th Place

Neighborhood Collectors

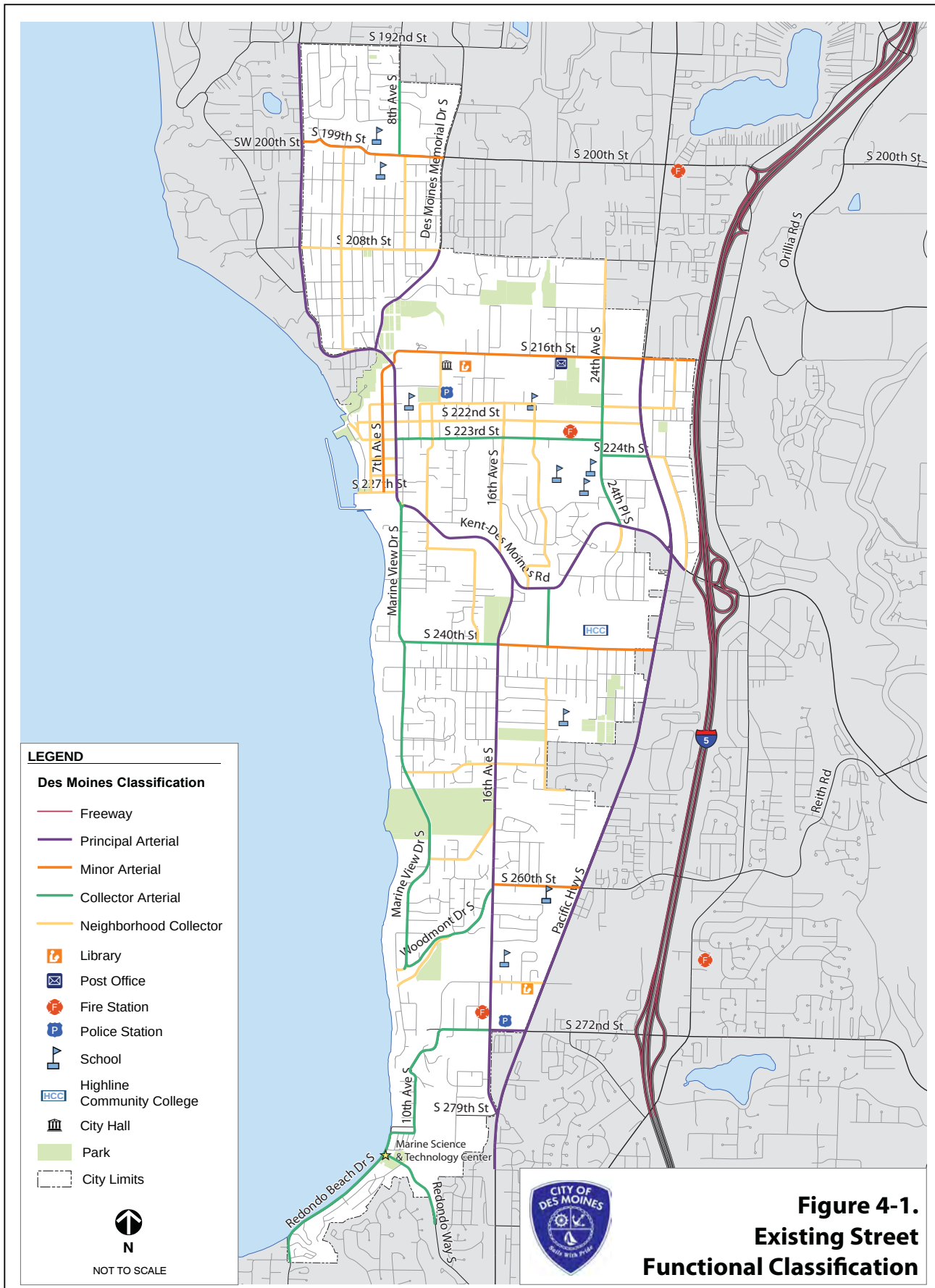
Neighborhood collectors connect two or more neighborhoods and typically connect to arterials or other neighborhood collectors. Although direct driveway access is typically allowed on neighborhood collectors, there are some project-related exceptions. Spacing is generally a half-mile or less. ADT is typically between 1,000 and 3,000 vehicles per day. Examples of neighborhood collectors include: *4th Avenue South, 6th Avenue South, 10th Avenue South, South 222nd Street, South 220th Street, 30th Avenue South, South 251st Street-South 250th Place, South 258th Street-14th Place South and Woodmont Beach Road.*

Local Streets

Local streets are a permanent cul-de-sac or short loop street with low traffic volumes that provide circulation and access to off-street parking within a residential development boundary. Local streets are not supportive of through traffic. Access is generally not limited. Spacing is as needed to access properties. ADT is typically less than 1,000 vehicles per day. Examples include *9th Avenue South, 4th Place South, South 242nd Street, South 243rd Street and 13th Place South.*



Street System and Parking



SPEED LIMITS

The City designates speed limits as a means of managing traffic at safe and appropriate travel speeds for a particular corridor segment. **Figure 4-2** shows the existing speed limits within the City. It is important to establish realistic speed zones that create uniform travel speeds and reduce the conflicts between faster and slower drivers. Realistic speed zones provide law enforcement with an effective enforcement tool by distinctly separating violators from the general flow of traffic. In addition, citizens are more supportive of the enforcement of reasonable regulations. State law establishes general guidelines for the maximum roadway speeds. RCW 46.61.400 sets the maximum speed limit for city streets at 25 mph and for state highways at 50 mph. RCW 46.61.415 provides jurisdictions the authority and circumstances under which cities may adjust speed limits to reflect local conditions.

Most arterial streets in the City have posted speed limits of 35 mph or higher with the highest speed limit (45 mph) found on Pacific Highway South. Most collector streets are posted at 30 mph and local streets are generally designated at 25 mph. The City monitors corridors to ensure appropriate speed limits are in place. Legal speeds are located in *Chapter 10.20, Des Moines Municipal Code* and are clearly signed on the streets, which was recently updated on January 15, 2008 by Ordinance No. 1455.

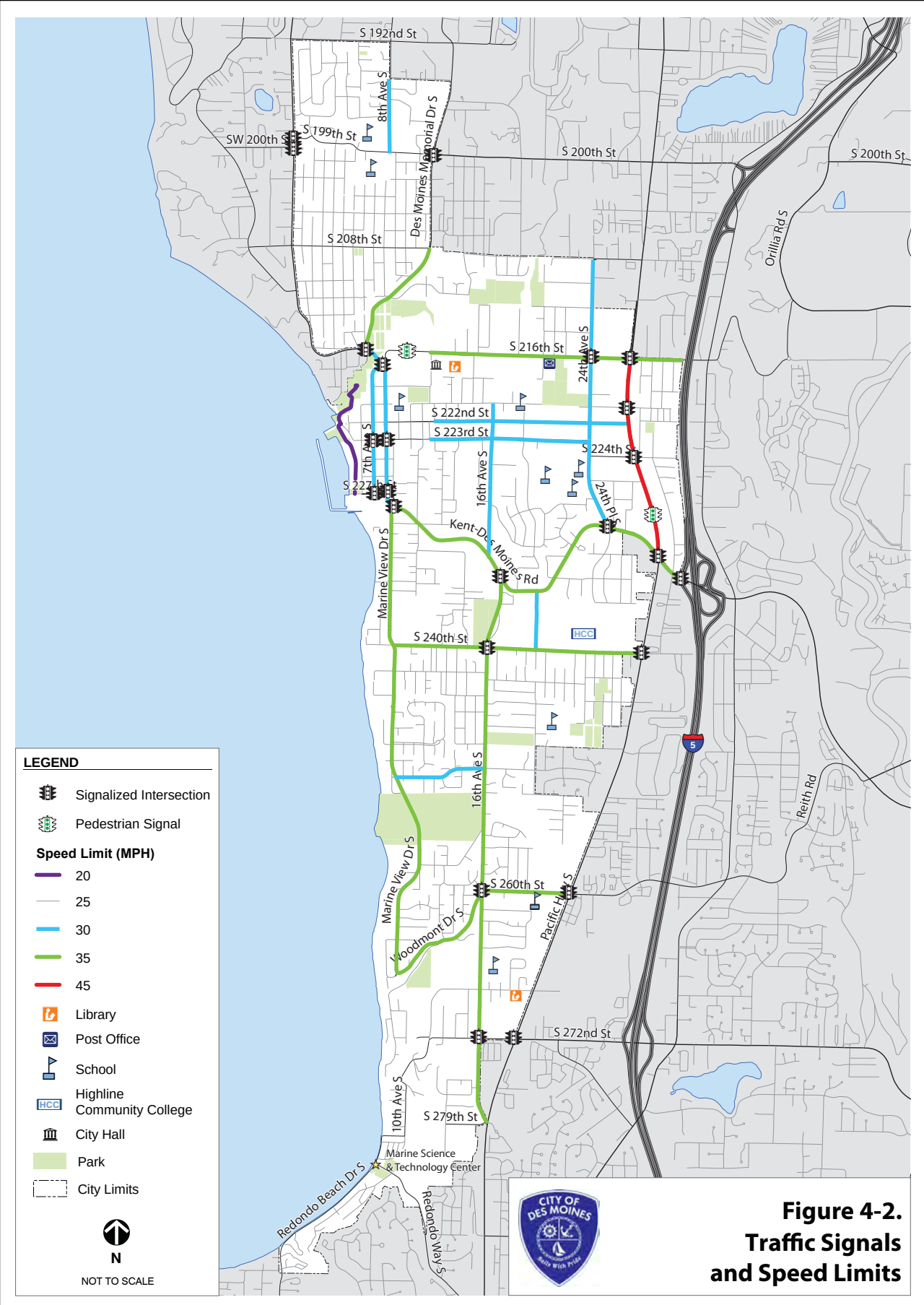
First and foremost, speed limits are set based on roadway geometry, sight distance, roadway use factors, and speed limit consistency. If these factors are not limiting, the 85th percentile speed is used to set the speed limit. The 85th percentile speed is the speed at which 85 percent of the vehicles are traveling at or under. It is generally accepted that this speed is considered reasonable for the roadway unless superseded by the factors listed above.

The State also sets the speed limit for school zones. The school zone speeding law of 20 mph in school zones (RCW 46.61.440 (1)) is based on the fact that a child hit by a vehicle has an 80 percent chance of surviving the collision if the vehicle was traveling slower than 20 mph, but an 80 percent likelihood of a fatality if the vehicle were traveling faster than 20 mph.² The City has a policy of reserving 20 mph speed zones for school zones, the Marina roadway and the Beach Park roadway. RCW 46.61.415(c) allows the local authority to determine and declare a reasonable and safe maximum limit, but not less than 20 mph.



2 School Administrator's Guide to School Walk Routes and Student Pedestrian Safety, WSDOT and Washington Traffic Safety Commission, July 2003, p 12.

Street System and Parking



TRAFFIC SIGNALS AND SIGNS

The City uses traffic signals, signs and pavement markings to move and control traffic efficiently and safely. Stop signs serve a critical function of establishing which approach has the right-of-way. Typically traffic signals are found at the junction of two higher volume streets where traffic volumes necessitate a signal to control the safe and efficient movement of the traffic flows. **Figure 4-2** also shows the locations of traffic signals in the City. Guidelines and warrants for the use and installation of traffic signs, markings, and traffic signals are found in the Manual on Uniform Traffic Control Devices (MUTCD).

EXISTING STREET NETWORK OPERATIONS

The efficiency of the street system is typically measured through the traffic volumes, the level of service, and crash trends. When traffic flows smoothly congestion is minimal and trips are predictable and efficient. However, when the streets are crowded and congested, travelers can get frustrated as the travel time increases and travel becomes unpredictable. The following section examines the existing (2008) and 2030 traffic volumes and intersection levels of service in the City.

The intersection geometry, signal phasing and timing information was obtained from the City of Des Moines, the Washington State Department of Transportation (WSDOT) and from field observations.

TRAFFIC VOLUMES

Traffic volumes provide information about how much of the road capacity is being used and shows the patterns of traffic. The City examined traffic volumes on City arterials at three different times during the day. In the spring of 2008, the City collected traffic counts throughout the City and supplemented them with WSDOT counts on Pacific Highway South. Counts were taken for the weekday, the AM and PM peak hour time periods. The time of day when the maximum amount of traffic generally occurs is called the peak period, which can last for two or three hours. The peak hour is that hour when the maximum demand occurs within the peak period.

Weekday Volumes

Average weekday traffic volumes within the City for 2008 are shown in **Figure 4-3**. The highest weekday traffic volumes occur on I-5 and Pacific Highway South (SR 99), the primary north/south corridors. These streets not only carry large amounts of traffic on a daily basis, but are affected by the high level of congestion during the AM and PM peak periods on I-5. The section of I-5 adjacent to the City carries in excess of 200,000 weekday trips and is often congested. The parallel section on Pacific Highway South, north of Kent-Des Moines Road (SR 516) carries 30,500 weekday trips, 16 percent of the volume on I-5. Another north/south corridor that moves substantial traffic is Marine View Drive South, which carries 18,700 weekday trips south of South 216th Street, and 6,500 weekday trips south of South 240th Street.

East/west corridors in the City act as key distribution points between I-5 and Pacific Highway South and the surrounding areas to the west. Kent-Des Moines Road carries the highest east/west volumes with 11,400 weekday trips east of Marine View Drive and 16,800 weekday trips west of Pacific Highway South. South 216th Street carries 13,000 weekday trips and another parallel roadway, South 240th Street carries 11,400 weekday trips west of Pacific Highway South (SR 99).

Within the past decade, based on historic and existing weekday traffic volumes, traffic volumes on many City arterials have remained relatively constant. For example, over the past ten years the section of Pacific Highway South north of Kent-Des Moines Road, that carried 29,000 weekday trips in 1998, had an additional 1,500 weekday trips in 2008. However, on Marine View Drive



South, south of South 216th Street, there were 2,300 fewer weekday trips in 2008, from the 21,000 trips in 1998. This decrease may represent the effect of regional and area-wide transportation improvements or changes in regional land uses and travel patterns. The City regularly monitors daily traffic counts and updates this information on the City's website.

AM Peak Hour Volumes

Traffic volumes in the AM peak hour are generally lower than those in the PM peak hour. The AM analysis was only done for select locations. During the morning commute the peak direction is northbound, as confirmed by the traffic flows on I-5, Pacific Highway South and other main north/south streets. Pacific Highway South south of Kent-Des Moines Road has morning traffic strongly oriented to the north, with 1220 trips northbound and 510 trips southbound during the AM peak hour. Similarly, Marine View Drive south of South 216th Street carries 910 trips northbound and 480 trips southbound.

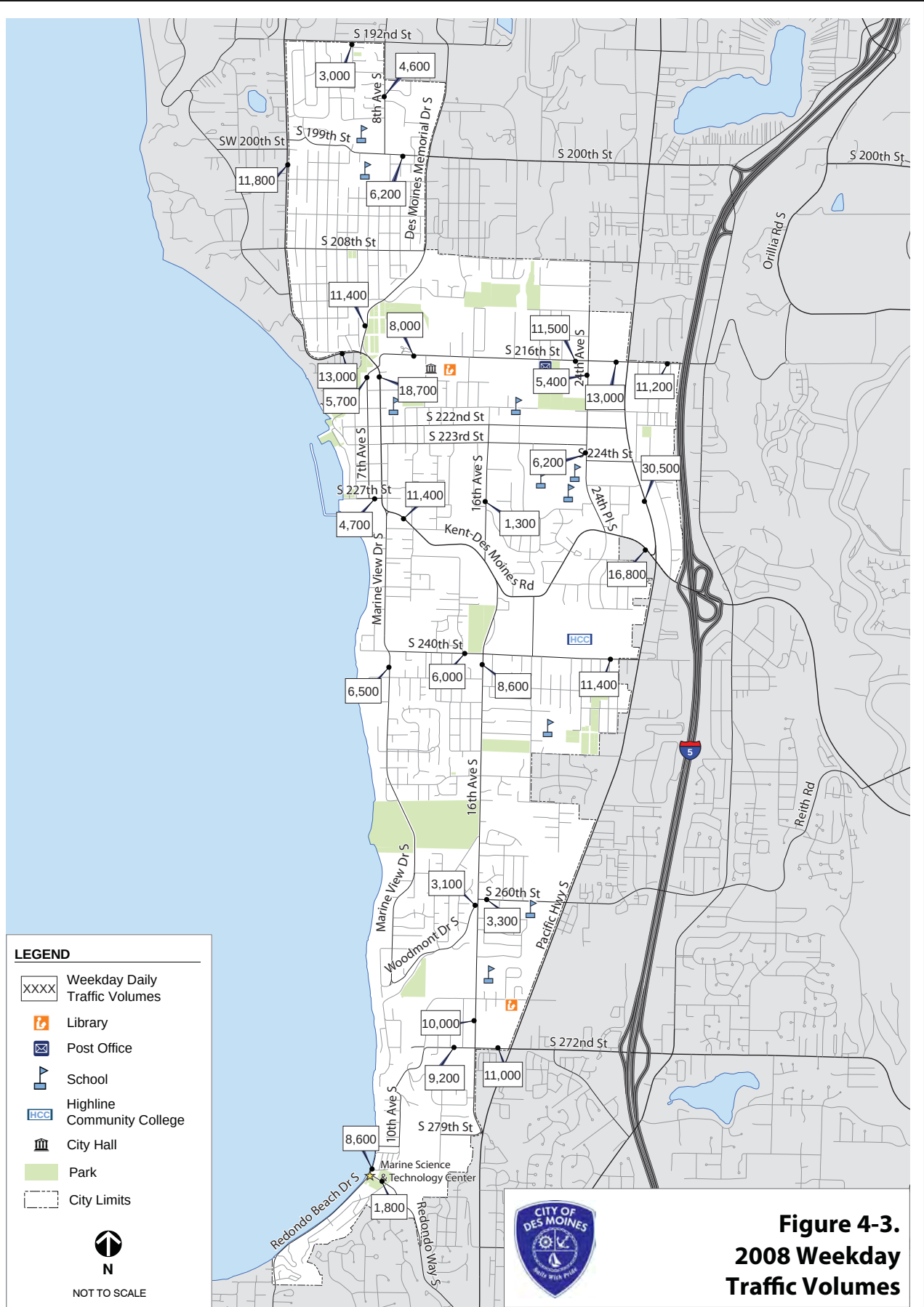
East/west traffic in the City is more balanced, with similar volumes in both directions during the morning commute. For example, South 216th Street west of Pacific Highway South has 430 trips eastbound and 370 trips in the westbound direction. **Figure 4-4** shows the 2008 AM peak hour volumes at select locations in the City.

PM Peak Hour Volumes

The PM peak hour represents the highest traffic volumes in the City of Des Moines. The predominant direction of travel during the PM peak hour is southbound. Pacific Highway South (SR 99) south of Kent-Des Moines Road carries 1,640 trips southbound and 810 trips in the northbound direction during the evening commute. Marine View Drive south of South 216th Street has 1,010 trips southbound and 550 trips northbound during the PM peak hour.

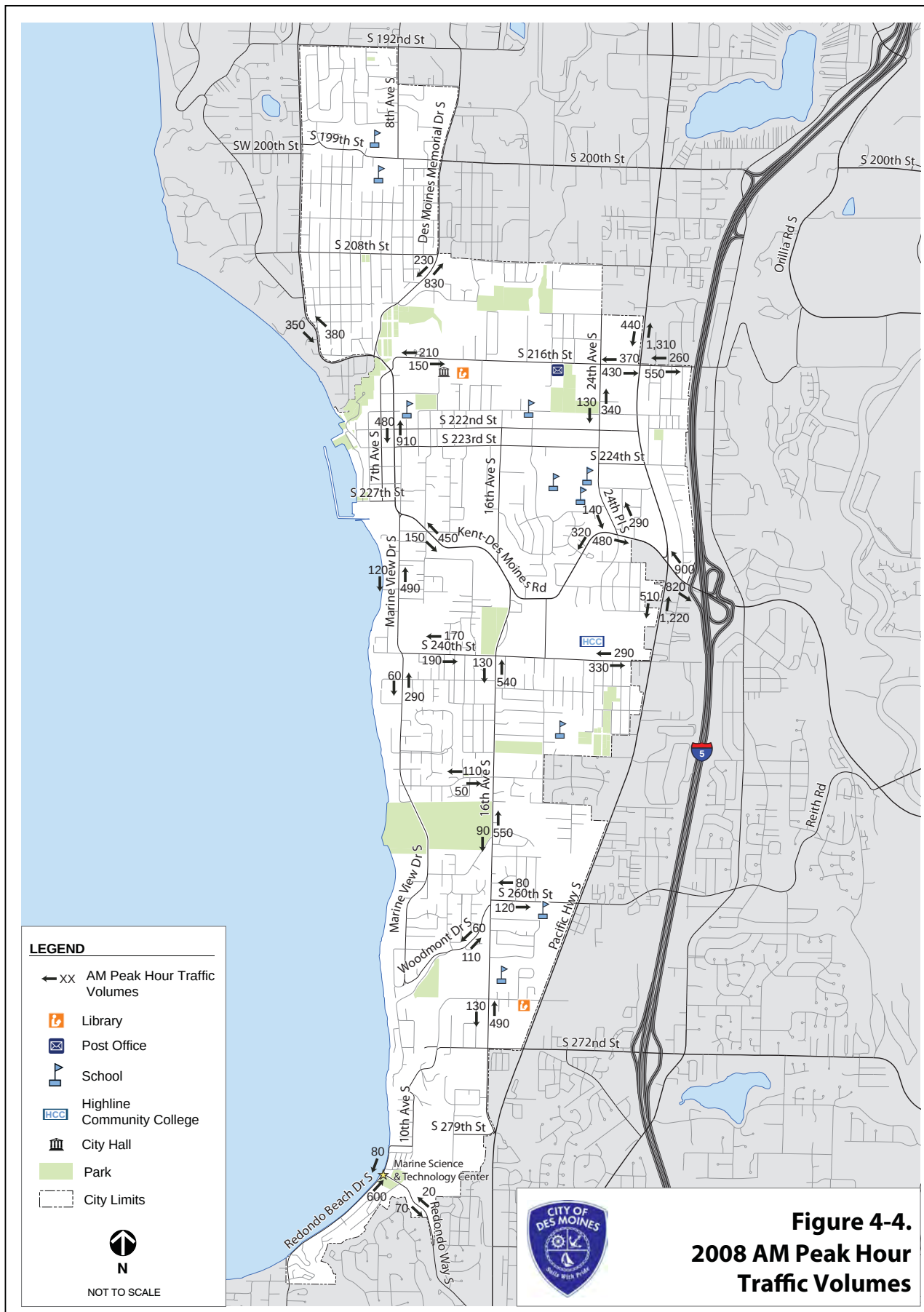
As in the AM peak hour, the flow of east/west traffic in the City is balanced with similar volumes in both directions. During the PM peak hour, South 216th Street west of Pacific Highway South (SR 99) carries 480 trips eastbound and 610 trips westbound. South 240th Street west of Pacific Highway South carries 410 trips eastbound and 390 trips in the westbound direction. **Figure 4-5** shows the 2008 PM peak hour volumes at select locations in the City.

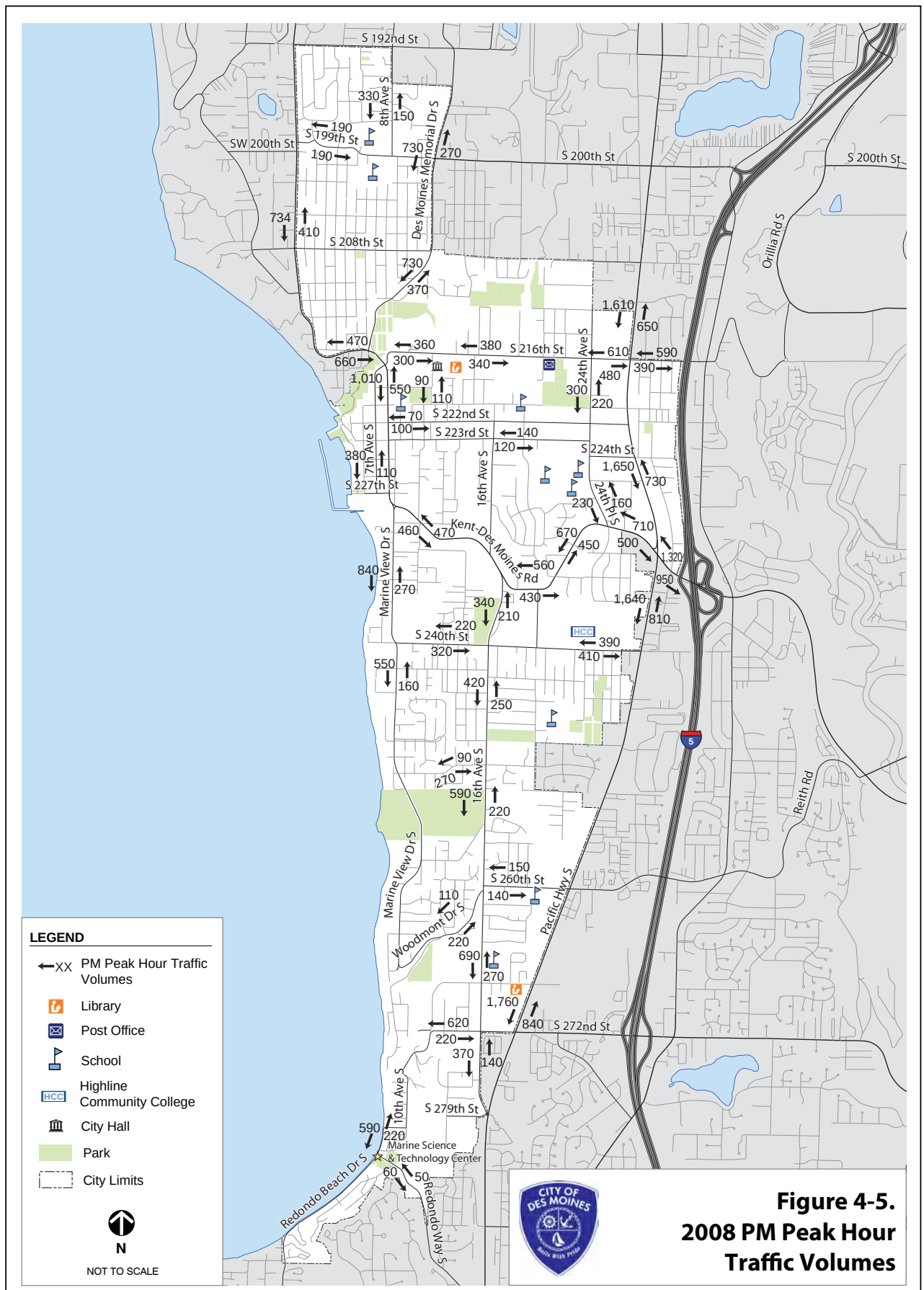




**Figure 4-3.
2008 Weekday
Traffic Volumes**

Street System and Parking





STREET STANDARDS AND LEVEL OF SERVICE

The GMA requires the City to establish service levels for the street network and to provide a means for correcting current deficiencies and meeting future needs. Transportation planners and engineers use the term “level of service” (LOS) to measure the operational performance of a transportation facility, such as a street corridor or intersection. LOS considers the perception by motorists in terms of speed, travel time, freedom to maneuver, traffic interruptions and delays, comfort and convenience.

CITY LOS STANDARDS

Intersection level of service is a measurement of the quality of traffic flow or traffic congestion at an intersection. The City of Des Moines currently defines level of service (LOS) by the intersection delay per vehicle. The intersection delay for a signalized intersection takes into account the delay caused by the signal control and the queue delay caused by spillover from adjacent intersections in the network. **Table 4-2** shows the level of service criteria for signalized and unsignalized intersections. The level of service grading ranges from A to F, with level of service A assigned when minimal delays are present and level of service F when lengthy delays occur.

Table 4-2. Level of Service Criteria for Intersections

LOS	Signalized Average Delay per Vehicle (seconds)	Unsignalized Average Delay per Vehicle (seconds)	Description
A	0 - 10	0 - 10	little or no delay
B	10 - 20	10 - 15	short delays
C	20 - 35	15 - 25	moderate delays
D	35 - 55	25 - 35	long delays
E	55 - 80	35 - 55	very long delays
F	>80	>55	failure - extreme congestion

Source: Highway Capacity Manual, 2000

To enforce the concurrency requirements of the GMA, it is necessary to define a LOS standard for transportation facilities in the City of Des Moines. The GMA requires that if development causes the service level of a facility to fall below a defined LOS standard, the state’s concurrency rule requires that deficiencies caused by development be mitigated or the permit for that development be denied. The City applies the designated LOS standard to measure traffic during the AM and PM peak hours of the commute, generally the worst traffic conditions during a typical day.

Recommended Intersection LOS Standard for Des Moines

The current intersection LOS standard (based on the AM or PM peak hour) is LOS D, with exceptions for selected intersections along major arterials and in Downtown Des Moines, which may operate at LOS E or F. Intersections with a LOS F standard include South 216th Street/Pacific Highway South, Kent-Des Moines Road/Pacific Highway South and Redondo Way/Redondo Beach Drive. Intersections with a LOS E standard include the Downtown intersections along 7th Avenue South and along Marine View Drive between Des Moines Memorial Drive and Kent-Des Moines Road and the SR 99 intersections of South 220th Street/Pacific Highway South and South 224th Street/Pacific Highway.

An additional standard has been added as part of this plan. This standard uses the existing intersection LOS standard and adds a new measure of capacity to ensure that acceptable intersection operation. The new standard requires that all signalized must not exceed a X_c of 1.0 (using a 120 second cycle length) to meet the City's standard. The intersection of Kent-Des Moines Road/Pacific Highway South may operate at an X_c equal to 1.2 using a 150 second cycle length. The Highway Capacity Manual contains the definition and methodology for calculating the X_c at an intersection.

Traffic volumes from the AM and PM peak periods were used to measure key intersection LOS and delay in the City. The intersection levels of service were analyzed with the Synchro 6 software. The main inputs to the Synchro model are lane geometry, vehicle volumes, signal phasing, and timing information.

AM Peak Hour Intersection LOS

Table 4-3 shows the 2008 AM peak hour intersection LOS for 7 signalized and 2 unsignalized stop-controlled intersections selected by the City for the AM peak hour analysis. All of these intersections performed well in the morning, with limited congestion occurring in the City.

All the signalized intersections in Des Moines meet LOS standards in the morning peak hour. No intersection operated at LOS E or F and only one intersection operated at LOS D. The signalized intersection of Pacific Highway South / Kent-Des Moines Road operated at LOS D due to high north/south and east/west traffic volumes competing for the limited green time of the traffic signal. The remaining intersections operated at LOS C or better during the AM peak hour. All intersections meet the recommended standard for the AM peak hour. Therefore, there are no existing deficiencies in the AM peak hour.

What is X_c

X_c is a measure of the critical volume to capacity (v/c) ratio for the approach lane groups that have the highest flow ratio (v/s) for a given phase. For example, with a two-phase signal, opposing lane groups move during the same green time. Generally, one of these two lane groups will require more green time than the other (i.e. it will have a higher flow ratio). This would be the critical lane group for that signal phase. Each signal phase will have a critical lane group that determines the green-time requirements for the phase. X_c is v/c for critical movements, assuming green time allocated proportionately to v/s values.

(Source: Highway Capacity Manual 2000, chapter 16 - Signalized Intersections, Methodology)



Table 4-3. AM Peak Hour Intersection LOS – Existing 2008

Signal Controlled Intersections	LOS Standard	LOS 2008	Xc
S 216th St/SR 99 (Pacific Highway S)	F (1.0)	C	0.63
SR 516 (Kent-Des Moines Rd)/Pacific Highway S (SR 99)	F (1.2)	D	0.58
S 216th St/24th Ave S	D (1.0)	B	0.51
SR 516 (Kent-Des Moines Rd)/24th Ave S	D (1.0)	A	0.45
Marine View Dr /Des Moines Memorial Dr	E (1.0)	A	0.54
Marine View Dr (SR 509)/Kent-Des Moines Road	E (1.0)	C	0.63
7th Ave S/Marine View Dr (SR 509)	E (1.0)	C	0.77
Stop Controlled Intersections	LOS Standard	LOS 2008	Delay
S 222nd St/24th Ave S (all-way stop)	D	B	11.4
S 250th St/16th Ave (all-way stop)	D	C	15.9

PM Peak Hour Intersection LOS

Table 4-4 shows the 2008 PM peak hour intersection LOS for the 36 study intersections. For the PM peak hour, the City selected 23 signalized and 13 unsignalized stop-controlled intersections of arterial streets for the analysis in the City and nearby study influence area. Included are intersections in neighboring jurisdictions that share a border with the City. Of the 39 study intersections, one intersection operates at LOS F and 3 signalized and 3 unsignalized intersections performed at LOS E. These intersections are listed below.

- SR 516 Kent-Des Moines Road/Pacific Highway South (SR 99) – LOS E
- South 272nd Street/Pacific Highway South (SR 99) – LOS E (Kent)
- South 240th Street/Pacific Highway South (SR 99) – LOS E (Kent)
- South 220th Street/Marine View Drive (SR 509) – LOS F (minor street stop)
- South 222nd Street/Marine View Drive (SR 509) – LOS E (minor street stop)
- South 240th Street/Marine View Drive – LOS E
- Redondo Way/Redondo Beach Drive – LOS E (all-way stop control)

Most of the poorly operating intersections are in corridors with high traffic volumes. The intersection of Des Moines Memorial Drive/Marine View Drive (SR 509) operates at LOS D with a Xc of 1.03; but the intersection does not meet the standard because it exceeds the capacity standard (Xc). Except for the unsignalized intersections of South 220th Street/Marine View Drive and South 240th Street/Marine View Drive, all intersections meet the City LOS standards. The development of the future street system will include actions to address these existing LOS deficiencies.

Figures 4-6 and **4-7** show the AM and PM peak hour intersection LOS for key intersections in the City.

Table 4-4. PM Peak Hour Intersection LOS – Existing 2008

	Intersection	LOS Standard	LOS 2008	Xc
Signal Controlled Intersections	S 216th St/Pacific Highway S (SR 99)	F (1.0)	D	0.91
	S 220th St/Pacific Highway S (SR 99)	E (1.0)	B	0.58
	S 224th St/Pacific Highway S (SR 99)	E (1.0)	C	0.62
	SR 516 (Kent-Des Moines Rd)/Pacific Highway S (SR 99)	F (1.2)	E	0.79
	S 216th St/24th Ave S	D (1.0)	B	0.80
	SR 516 (Kent-Des Moines Rd)/24th Ave S	D (1.0)	B	0.66
	SR 509 (Marine View Drive)/Des Moines Memorial Drive	E (1.0)	D	1.03
	S 223rd St/7th Ave S	E (1.0)	A	0.53
	S 227th St/7th Ave S	E (1.0)	A	0.45
	7th Ave S/Marine View Dr (SR 509)	E (1.0)	C	0.80
	S 223rd St/Marine View Dr (SR 509)	E (1.0)	B	0.61
	S 227th St/Marine View Dr (SR 509)	E (1.0)	C	0.61
	Marine View Dr (SR 509)/Kent-Des Moines Rd (SR 516)	E (1.0)	B	0.60
	SR 516 (Kent-Des Moines Rd)/16th Ave	D (1.0)	A	0.40
	S 240th St/16th Ave S	D (1.0)	B	0.39
	S 260th St/16th Ave S	D (1.0)	C	0.60
	S 272nd St/16th Ave S	D (1.0)	B	0.61
	S 272nd St/Pacific Highway S (SR 99) [Kent]	--	E	0.89
	S 200th St/Des Moines Memorial Dr [SeaTac]*	--	C	0.89
	S 200th St/1st Ave S [Normandy Park]	--	C	0.59
	SW 199th St/1st Ave S [Normandy Park]	--	B	0.52
	S 240th St/Pacific Highway S (SR 99) [Kent]	--	E	0.78
	S 260th St/Pacific Highway S (SR 99) [Kent]	--	D	0.86

* West leg is in Des Moines

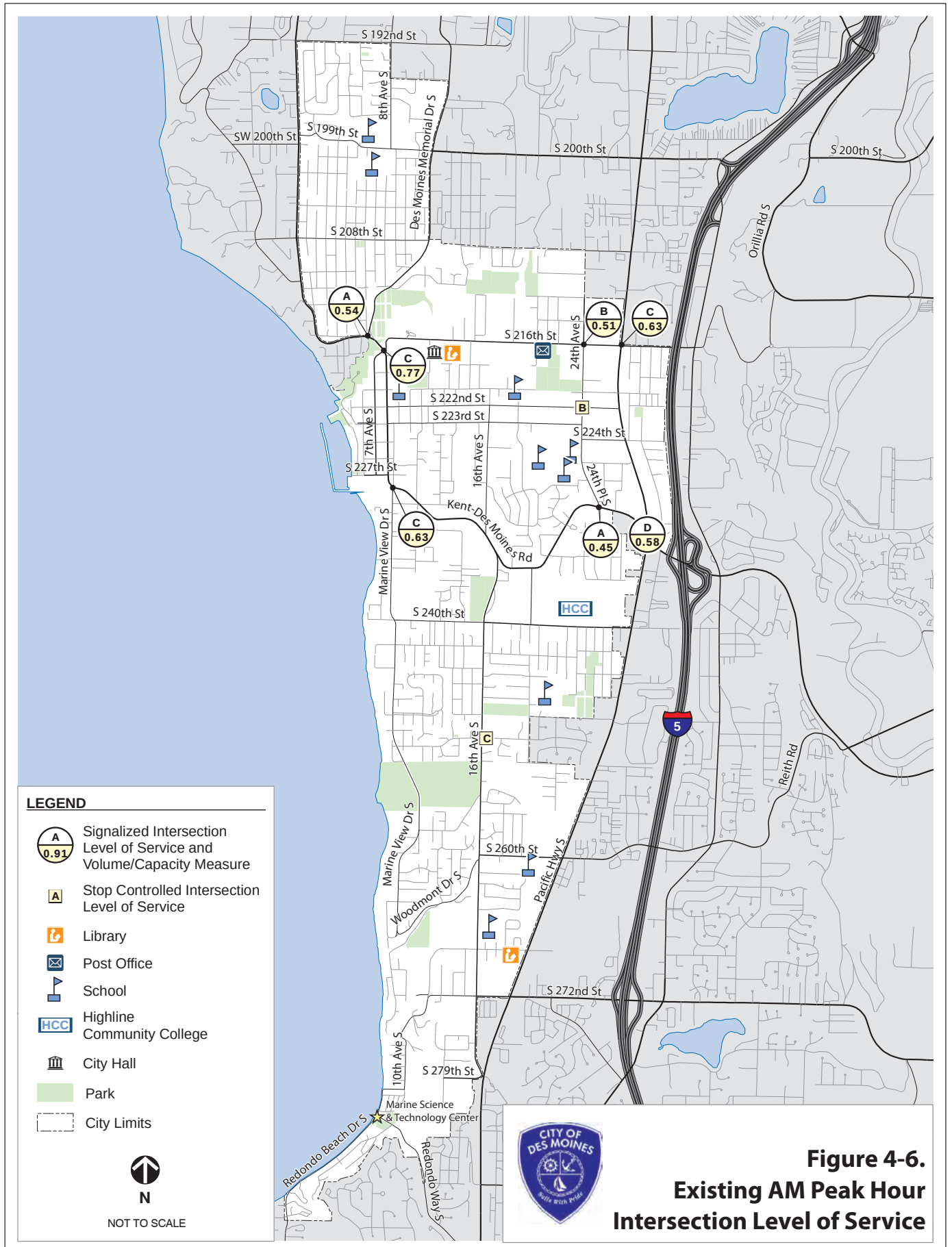


Table 4-4 continued

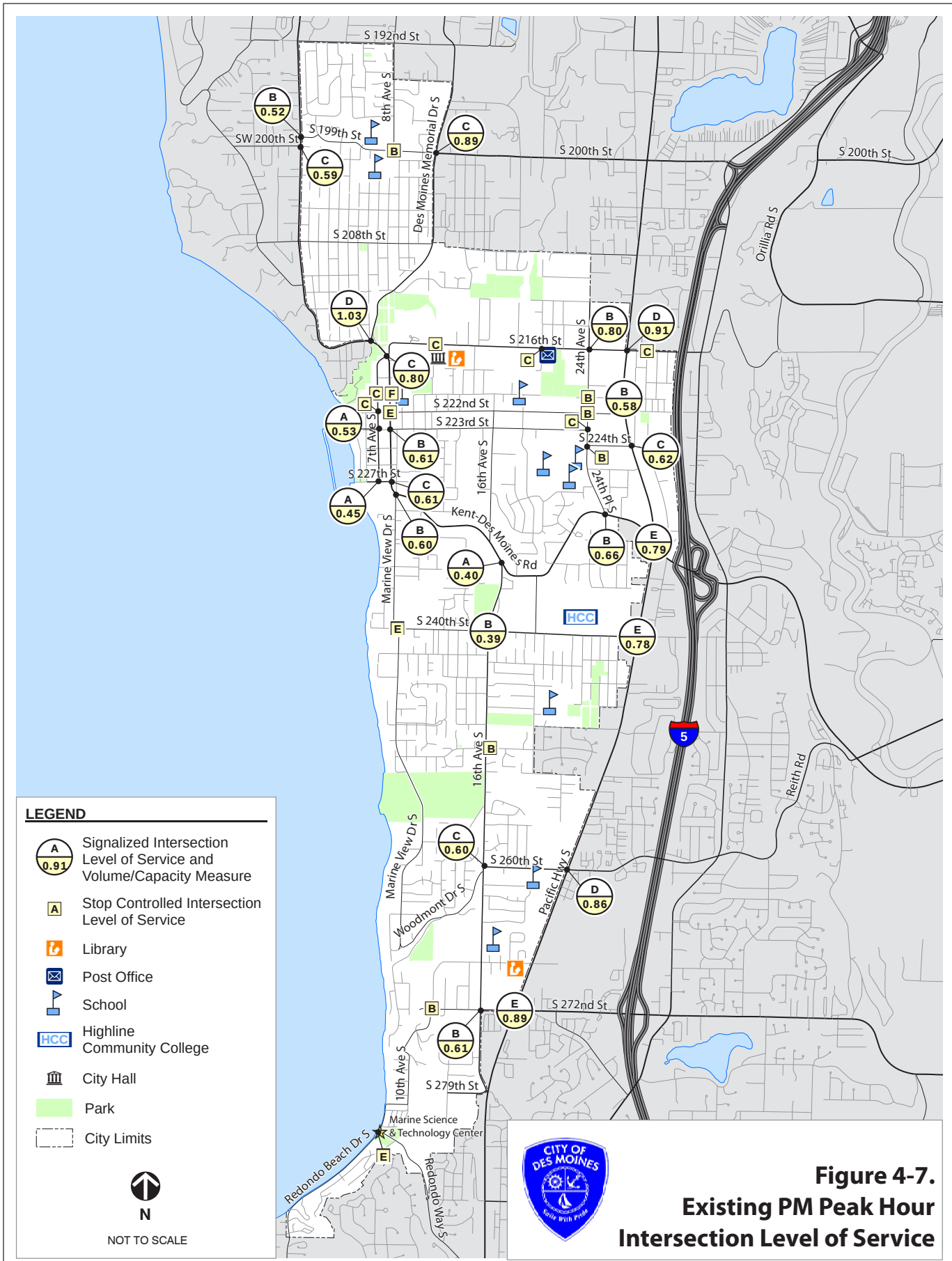
	Intersection	LOS Standard	LOS 2008	Delay
Stop Controlled Intersections	S 220th St/24th Ave S (minor street stop)	D	B	13.5
	S 222nd St/24th Ave S (all-way stop)	D	B	10.1
	S 223rd St/24th Ave S (minor street stop)	D	C	15.9
	S 224th St/24th Ave S (minor street stop)	D	B	11.3
	S 220th St/7th Ave S (minor street stop)	E	C	15.3
	S 222nd St/7th Ave S (minor street stop)	E	C	15.8
	S 220th St/Marine View Dr (SR 509) (minor street stop)	E	F	#
	S 222nd St/Marine View Dr (SR 509) (minor street stop)	E	E	49.4
	S 240th St/Marine View Dr (minor street stop)	D	E	49.0
	Redondo Wy/Redondo Beach Dr (all-way stop)	F	E	35.6
	S 250th St/16th Ave S (all-way stop)	D	B	14.8
	S 272nd St/12th Ave S (minor street stop)	D	B	14.8
	S 200th St/8th Ave S (all-way stop)	D	B	11.0

Note: Blue text means intersection is in another City.
 # – Delay exceeds model parameters.





Street System and Parking



STATE HIGHWAYS - LEVEL OF SERVICE

The State and the PSRC have set LOS standards for the statewide and regionally significant highways in or near Des Moines. These standards are explained in the following section.

Highways of Statewide Significance (HSS)

The goal of WSDOT is to maintain the acceptable operation of its key system corridors designated as “Highways of Statewide Significance” (HSS). The two HSS facilities that travel through or are adjacent to the City limits, SR 99 and I-5, are defined as being within an urban area.

WSDOT analyzes “screen lines” for deficiencies along state routes using a standard of 70% of the posted speed. This screen line analysis allows WSDOT to identify the “most congested” locations along the HSS facilities. A speed of approximately 70% of the posted speed equates to conditions where a highway achieves the maximum throughput of vehicles. The State’s 2007-2026 *Highway System Plan* (Figure 46) indicates that SR 99 and I-5 are expected to operate below the 70% speed threshold (termed “operating less than efficiently”) during peak hours in 2030. WSDOT uses the LOS standard to trigger a capacity deficiency analysis for the State Highway System Plan, a plan that evaluates and recommends strategies for the State highway network.

For planning purposes and development review, the State adopted LOS standard D for intersections and ramp intersections on HSS facilities within urban areas (RCW 47.06.140). Based on the 2008 count data, the following intersections on Pacific Highway South currently operate below the State’s adopted standard during the PM peak hour:

- Kent-Des Moines Road/Pacific Highway South
- South 272nd Street/Pacific Highway South - Kent
- South 240th Street/Pacific Highway South - Kent



Regional Significant State Highways LOS (Non-HSS)

The PSRC has established a LOS standard for those regionally significant State highways not identified as HSS facilities. The LOS standard uses three levels (tiers) based on the function and location of the roadway. Kent-Des Moines Road (SR 516) and Marine View Drive-1st Avenue South (SR 509) are non-HSS highways within the City limits and are designated as Tier 1 facilities. Tier 1 facilities are located in the “inner” urban area defined as a 3-mile buffer around a major freeway. The LOS standard for a Tier 1 route is LOS “E/mitigated”, meaning that congestion should be mitigated when the PM peak hour LOS falls below LOS E.

Based on the 2008 count data, only the intersection of South 220th Street/Marine View Drive operates below the LOS E standard during the PM peak hour, for the stop-controlled side street approach.

FUTURE STREET NETWORK OPERATIONS

The City of Des Moines is poised to see rapid change. Anticipated growth along the Pacific Highway South corridor, the Des Moines Creek Business Park development, and expansion of the Highline Community College are just a few of the development activities planned within the City and providing new opportunities for housing and employment. Understanding the future nature and volume of traffic in the study area makes it possible to identify transportation issues and to suggest appropriate facility improvements.

TRAVEL FORECAST METHODOLOGY

In transportation planning, models are commonly used to replicate the travel patterns of people and/or goods so that they can be studied. Travel demand models are based upon the practical relationships between socio-economic characteristics, land uses and travel patterns. By approximating future travel patterns, models make it possible to assess the implications of growth, to compare alternative transportation solutions and to test policies.

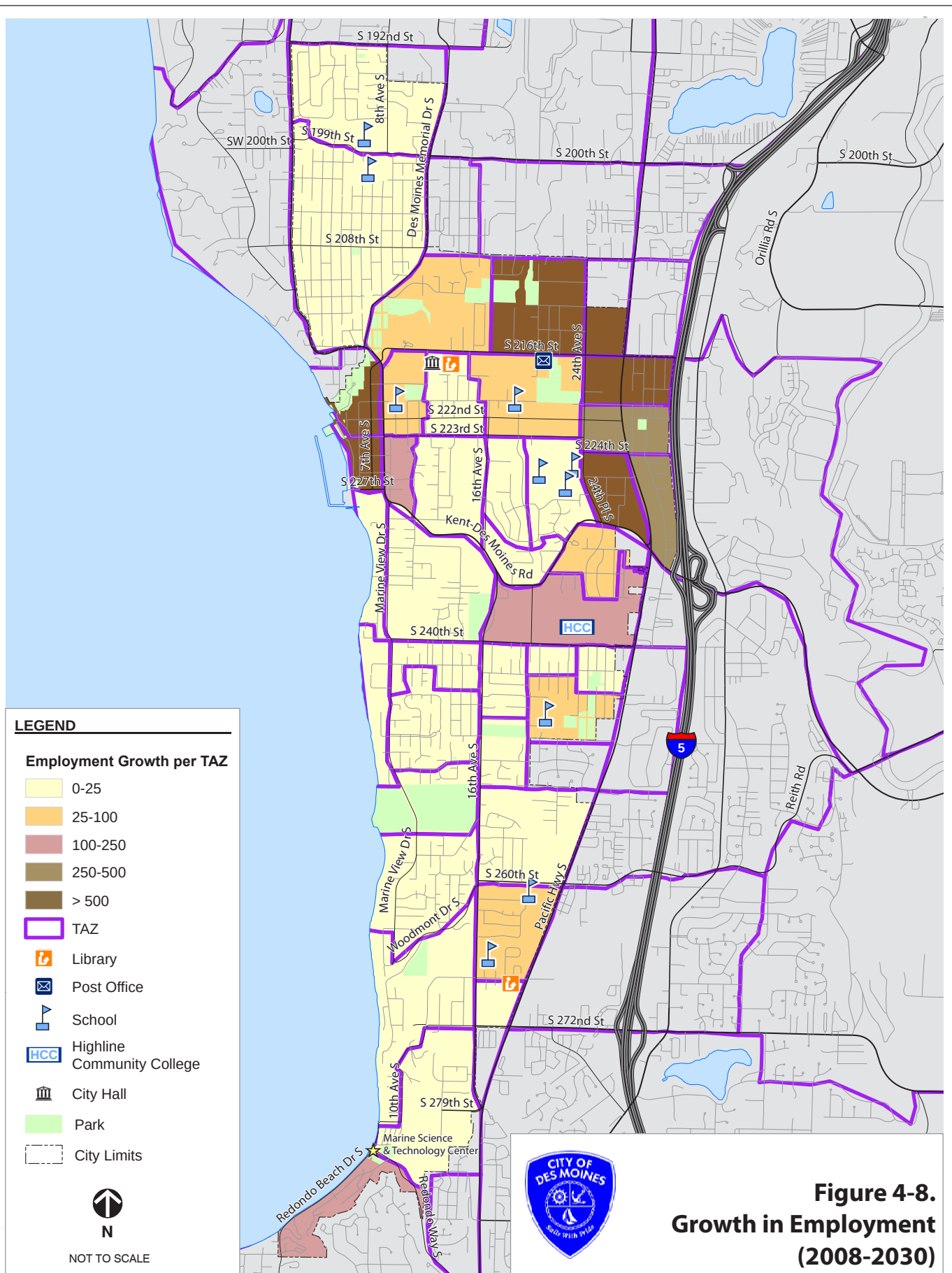
Starting with the Puget Sound Regional Travel Demand Model, the model for Des Moines was refined by enhancing the roadway network and identifying specific levels of land use development within the study area. This resulting model was used to forecast the future traffic volumes on area streets and to test alternative roadway network scenarios, such as the traffic effect on City streets and intersections with and without WSDOT's proposed *I-5/SR 509 Corridor Completion and Freight Improvement Project*. A detailed description of the development of the Des Moines model is included in **Appendix A**.

Household and Employment Growth

A key step in the development of the travel demand model was to forecast households and employment based on the City's planned land use for 2030. **Figure 4-8** shows the 2008-2030 growth in employment and **Figure 4-9** shows the 2008-2030 growth in households within the City of Des Moines. Much of the employment growth during the next 20 years will occur north of South 216th Street in the Des Moines Creek Business Park. Along Pacific Highway South, the Pacific Ridge Neighborhood, with its potential for high density apartments and condos, shows the greatest potential for household growth. Based on the formulas established by the 2001-2005 *King County Buildable Lands* analysis and the current trends for mixed-use development, the downtown area has the capacity to accommodate an additional 510 housing units and 720 jobs. Residential growth outside the City limits to the south is also likely to add traffic to the City's street network.

Network Alternatives

The travel forecasting model was used to test with and without the State's proposed SR 509 project, which would connect SR-509 to Interstate 5 and provide new network improvements such as the 24th/28th Avenue South connection. This proposed improvement would redistribute area traffic potentially reducing volumes on SR 99, Des Moines Memorial Drive and Marine View Drive, while potentially increasing traffic on roadways that support the SR 509 corridor such as 24th Avenue South. The project currently has been designed, and may be completed in phases depending of available funds. The 2030 travel forecasting model's network was modified to assess the impact of this major project on the City's street system.



Street System and Parking

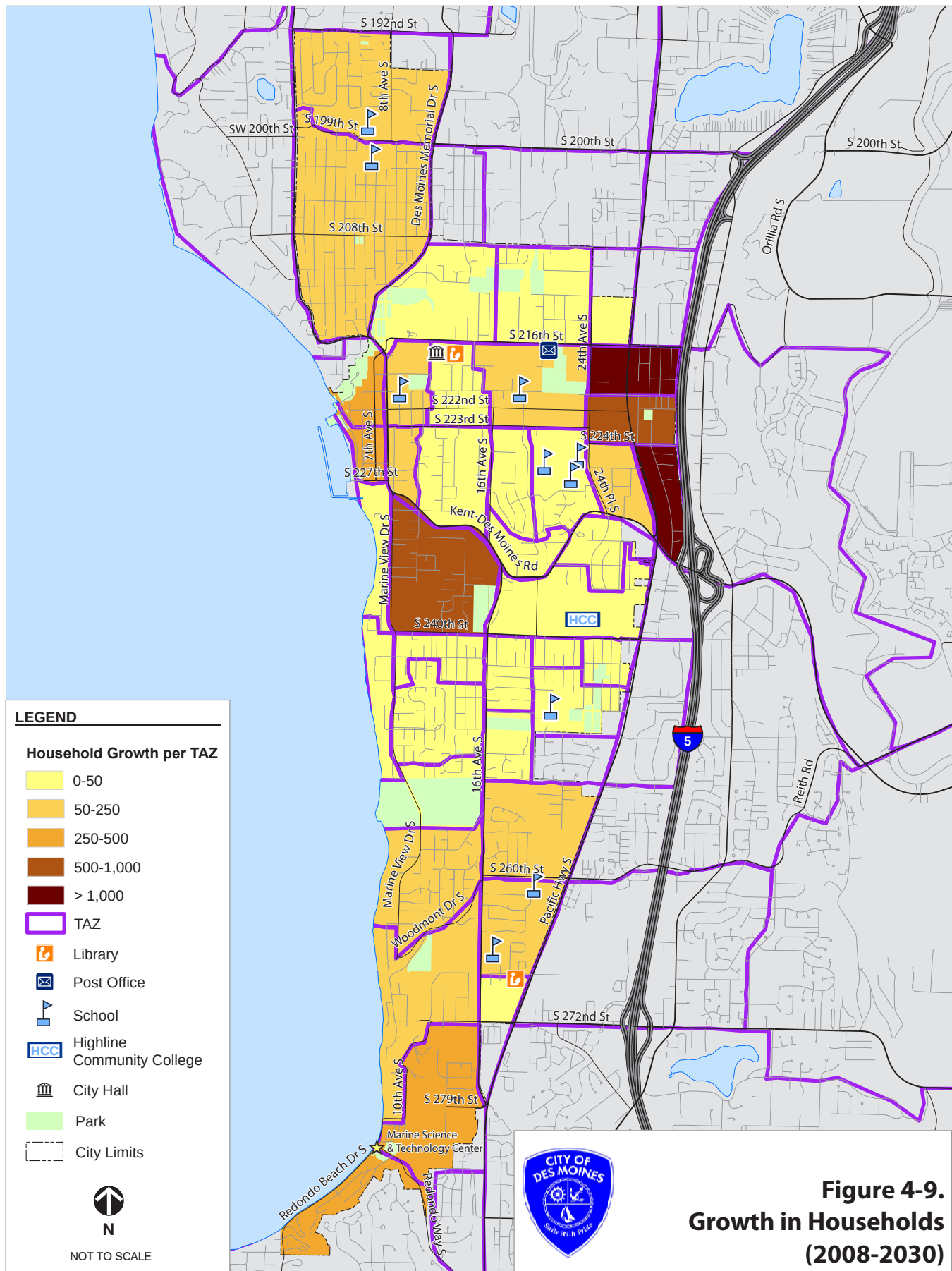


Figure 4-9.
Growth in Households
(2008-2030)

TRAFFIC VOLUME GROWTH

As new jobs and residents come to Des Moines, traffic growth is likely to follow. A post-processing program adjusted the raw model results using the existing PM peak hour traffic counts and travel patterns. The 2030 volumes were used to identify high growth traffic corridors and to estimate future turning movement volumes for the analysis of individual intersections. **Figure 4-10** compares the existing and future PM peak hour traffic demand on key Des Moines streets.

RECOMMENDED STREET NETWORK FOR DES MOINES

Changes to the transportation system will be needed to maintain traffic flow, provide for transit users, pedestrians and bicyclists and accommodate growth in travel demand. For future conditions, the analysis started with a set of transportation improvements for the baseline network and added an expanded set of improvements to address congested locations and improve system operations.

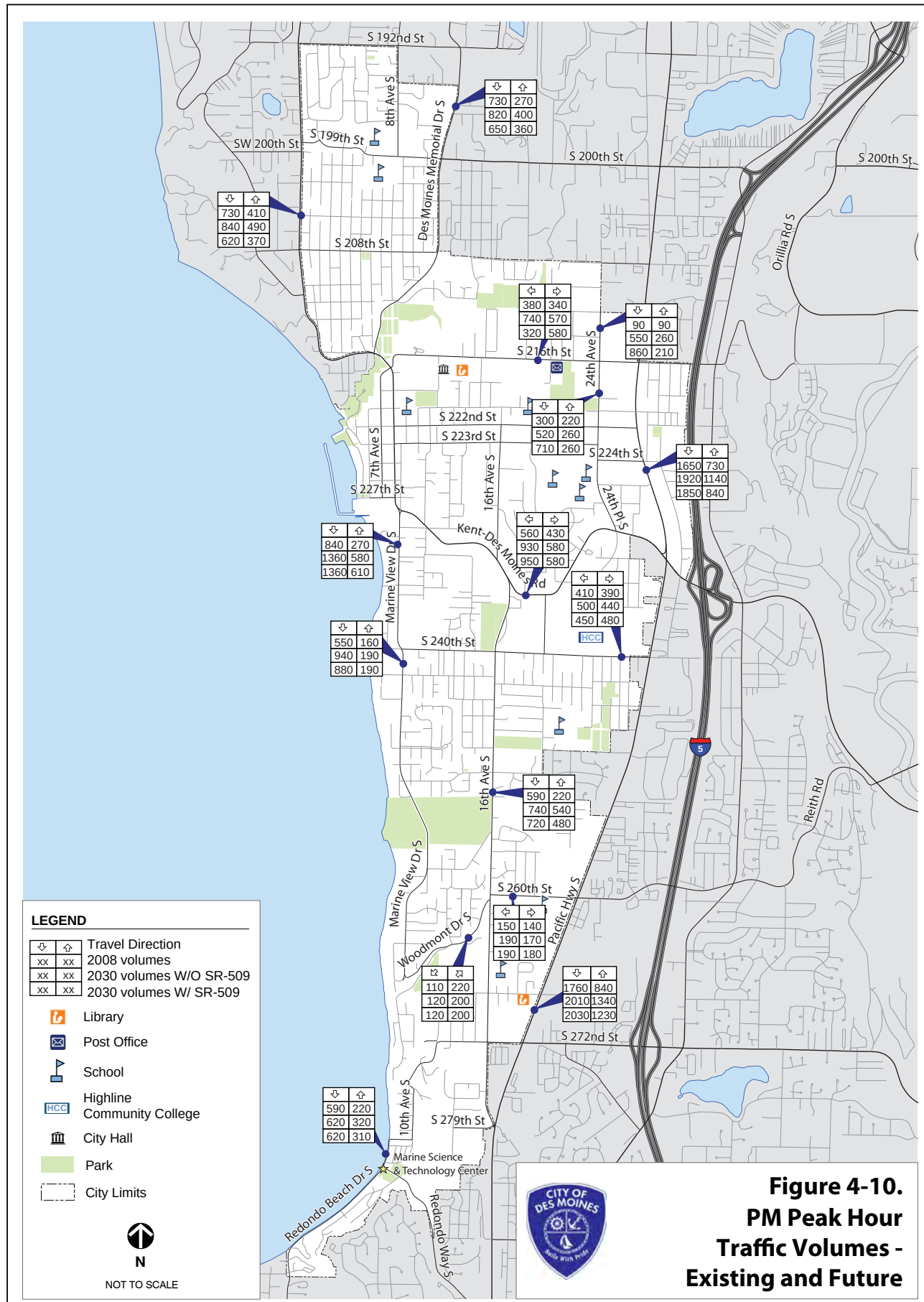
Baseline Street Network

The baseline network represents the improvements identified in the Des Moines' 2009-2014 *Transportation Improvement Program*. These transportation improvements were identified by the City as those needed to accommodate future development and meet the City's vision for the transportation system. The projects include:

- South 216th Street (Pacific Highway South to I-5) – Widen to 5 lanes.
- South 216th Street (24th Avenue to South Pacific Highway South) – Widen from 3 to 5 lanes.
- South 216th Street (19th Avenue South to 24th Avenue South) – Widen from 2 to 5 lanes.
- South 216th Street (11th Avenue South to 20th Avenue South) – Widen from 2 to 3 lanes.
- South 216th Street (Marine View Drive to 11th Avenue South) – Widen from 2 to 3 lanes.
- 24th Avenue South (South 208th Street to South 216th Street) – Widen from 2 to 5 lanes.
- 24th Avenue South (South 216th St to Kent-Des Moines Road) – Widen from 2 to 2/3 lanes.
- 16th Avenue South (Kent-Des Moines Road to South 240th Street) – Widen from 2 to 3 lanes.
- 16th Avenue South (South 240th Street to South 260th Street) – Widen from 2 to 3 lanes.



Street System and Parking



- 16th Avenue South (Pacific Highway South to South 272nd Street) – Widen from 2 to 3 lanes.
- Kent-Des Moines Road Improvement (Marine View Drive to 16th Avenue South) – Widen from 2 to 3 lanes.
- Kent-Des Moines Road Improvement (16th Avenue South to 24th Avenue South) – Widen from 2 to 3 lanes.
- Kent-Des Moines Road Improvement (24th Avenue South to Pacific Highway South) – Widen from 2 to 5 lanes.

Baseline Intersection Improvements

The Recommended Network includes all of the baseline network improvements, but adds improvements that will be needed to meet the mobility, operation and safety goals for the City. These improvements are mostly focused on correcting intersection configuration and operation that could reduce the impacts of future traffic growth. These recommendations are designed to allow an intersection to meet its LOS standard. In some cases, environmental, operational, social or cost constraints could preclude a portion or the entire project from moving forward. **Table 4-5** lists the recommended improvements. Specific improvements in the recommended network include:

- Widening the intersection to accommodate additional through lanes or turn lanes.
- Modifying signal phasing, including changes for left turn operation.
- Considering a roundabout at a congested intersection.
- Restricting turn movements during peak periods.
- Lengthening turn lane storage pockets to accommodate vehicle queues.
- Constructing a traffic signal.
- Interconnecting traffic signals with adjacent intersections.
- Optimizing signal timing to allow better traffic movement along a corridor.

New Street Improvements

To improve connectivity and circulation, new street segments are included as part of the recommended network. These streets may require additional improvements such as intersection improvements or signalization if warrants are met. Table 4-5 includes the recommended improvements for several new segments.

20th Avenue South Extension – This would construct the missing segment of 20th Avenue South, connecting the neighborhood collector to Kent-Des Moines Road. Traffic signal warrants should be evaluated with project, and install a signal at South 240th Street if warranted.

16th Avenue Extension - This new connection would connect the north end of 16th Avenue South to South 216th Street following the historic SR 509 alignment. This road would be built as a collector roadway and would relieve traffic on parallel corridors such as Marine View Drive and 24th Avenue South.



Table 4-5. Baseline Recommended Network Improvements

Project Type	Location	Project Description
Streets		
Arterial Widening Projects		
South 216th Street	Marine View Drive to Interstate 5	Widen to three lanes west of 19th Avenue South, to five lanes east of 19th Avenue South. Add bicycle lane, sidewalks and landscaping. Add signals and intersection improvements as warranted by development. See South 216th Corridor Study (March 2009).
24th Avenue South	South 208th Street to South 216th Street	Widen to five lanes with bicycle lane, sidewalks and landscaping.
24th Avenue South	South 216th Street to Kent-Des Moines Road	Widen to three lanes with bicycle lanes, sidewalks and landscaping. See 24th Avenue South Corridor Study (June 2009).
16th Avenue South	Kent-Des Moines Road to South 260th Street	Widen to three lanes with bicycle lanes, sidewalks and landscaping.
Kent-Des Moines Road	Marine View Drive to Pacific Highway South (SR 99)	Widen to three lanes west of 16th Avenue South and to five lanes east to Pacific Highway South with bicycle lanes, sidewalks and landscaping.
Roadway Connections		
16th Avenue South	South 216th Street to South 220th Street	Two-lane roadway connection – collector arterial. See Highest and Best Use Analysis of Historic SR 509 Corridor Study (March 2009)."
16th Avenue South	South 276th Street to Pacific Highway South (SR 99)	Two-lane roadway connection/re-alignment – principal arterial.
20th Avenue South	South 242nd Street to South 244th Street	Two-lane roadway connection – neighborhood collector.
24th/28th Avenue South (SeaTac)	South 200th Street (SeaTac) to South 208th Street	Create a 4-lane to 5-lane connection to SeaTac. Coordinate with City of SeaTac and WSDOT as part of SR-509 project.
Intersections		
South 216th Street	Pacific Highway South	Without SR 509 project: Add one shared left-through lane and right turn pockets eastbound and westbound.
South 216th Street	Pacific Highway South	With SR 509 project: Add eastbound and westbound through lanes. Retain eastbound right turn lane. Change eastbound and westbound left turn signal phasing to protected.
South 220th Street	Pacific Highway South	Widen for left turn pockets, adjust roadway profile and approach grades, and revise signal phasing to remove split phases.
Des Moines Memorial Drive	at South 200th Street	Add left turn pockets for all approaches, modify signal. Joint project with City of SeaTac.
Des Moines Memorial Drive	at Marine View Drive and South 216th Street	Lengthen approach lanes, coordinate signal with Marine View Drive at 7th Avenue South. Also consider roundabout option.

Table 4-5. Continued

Project Type	Location	Project Description
Marine View Drive	at South 227th Street	Revise lane configuration to single eastbound right with overlap phase. Add second southbound through lane.
Marine View Drive	at Kent-Des Moines Road	Add second eastbound through lane through intersection.
Marine View Drive	at South 240th Street	Revise lane configuration, add westbound right turn pocket. Add signal or roundabout if warranted.
16th Avenue South	at South 240th Street	Add left turn pockets for all approaches.
16th Avenue South	at South 250th Street	Add eastbound right turn pocket.
24th Avenue South	at South 222nd Street	Monitor operation for future signal or other intersection treatment.

South 276th Street Connection – This connection would relieve traffic at South 272nd Street/ Pacific Highway South by creating a better connection to 16th Avenue South from Pacific Highway South and allow for left turns onto Pacific Highway South at the existing traffic signal. This would also reduce traffic on the lower portion of 16th Avenue South.

24th/28th Avenue South Connector - This connection would connect 24th Avenue South northward to 28th Avenue South in the City of SeaTac. This project should be jointly developed with the City of SeaTac.

FUTURE LEVEL OF SERVICE

As the City grows, congestion is likely to follow. The City uses the forecast traffic volumes to estimate the operation of intersections in the future and to identify needed transportation improvements. The 2030 analysis focused on the PM peak hour.

Using the 2030 forecast volumes, the analysis compared the intersection performance of the future volumes on the 2008 street network, and on the 2030 recommended street network. The analysis also compares the level of service operation with and without the SR 509 to I-5 improvement project.

Table 4-6 and **Figures 4-11** through **Figure 4-13** show the future operation and LOS on the 2008 network and on the 2030 recommended street network with and without the SR 509 to I-5 improvement.

Without network improvements (2030 volumes on 2008 network), nine of the signal-controlled and eight stop-controlled study intersections would operate below the City's LOS/Xc standard in 2030. Many of these intersections would operate poorly, with long delays and vehicle queues on intersection approaches.

With the recommended network improvements, the operation of many of the intersections would improve. For the recommended network (without the SR 509 improvement), all of the City of Des Moines signalized intersections would meet the standard. Seven of the stop-controlled intersections would not operate at the City's standard and will need additional study to determine needed capacity improvements, or turn movement restrictions. These studies and operational improvements are identified in Table 4-14 and Figures 4-18 and 4-19.



Table 4-6. PM Peak Hour LOS Standard and 2030 Levels of Service and Delay

	Intersection	LOS Standard Standard	2030 on 2008 Network		2030 Recommended Network Without SR 509 to I-5		2030 Recommended Network With SR 509 to I-5	
			LOS	Xc	LOS	Xc	LOS	Xc
Signal Controlled Intersections	S 216th St/Pacific Highway S (SR 99)	F (1.0)	F	1.46	F	0.99	E	0.88
	S 220th St/Pacific Highway S (SR 99)	E (1.0)	F	0.86	C	0.63	C	0.61
	S 224th St/Pacific Highway S (SR 99)	E (1.0)	F	0.77	D	0.78	D	0.77
	SR 516 (Kent-Des Moines Rd)/Pacific Highway S (SR 99)	F (1.2)	F	1.15	F	1.12	E	1.01
	S 216th St/24th Ave S	D (1.0)	D	0.96	D	0.85	D	0.91
	SR 516 (Kent-Des Moines Rd)/24th Ave S	D (1.0)	F	1.35	C	0.74	C	0.63
	SR 509 (S 216th St)/Des Moines Memorial Dr	E (1.0)	E	1.06	D	0.97	E	0.88
	S 223rd St/7th Ave S	E (1.0)	B	0.70	A	0.58	A	0.61
	S 227th St/7th Ave S	E (1.0)	B	0.57	B	0.49	B	0.46
	7th Ave S/Marine View Dr (SR 509)	E (1.0)	F	1.07	E	1.00	E	1.00
	S 223rd St/Marine View Dr (SR 509)	E (1.0)	B	0.80	B	0.72	B	0.72
	S 227th St/Marine View Dr (SR 509)	E (1.0)	E	1.10	C	0.79	C	0.76
	Marine View Dr (SR 509)/Kent Des Moines Road (SR 516)	E (1.0)	D	1.07	D	0.99	D	0.95
	SR 516 (Kent-Des Moines Rd)/16th Ave	D (1.0)	B	0.73	B	0.73	B	0.73
	S 240th St/16th Ave S	D (1.0)	E	1.14	D	0.90	D	0.98
	S 260th St/16th Ave S	D (1.0)	D	0.81	C	0.72	C	0.71
	S 272nd St/16th Ave S	D (1.0)	C	0.82	D	0.86	D	0.83
	S 272nd St/Pacific Highway S (SR 99) [Kent]	--	F	1.19	F	1.08	F	1.02
	S 200th St/Des Moines Memorial Dr [SeaTac]	--	F	1.18	C	0.79	C	0.89
	SW 199th St/1st Ave (Normandy Park)	--	B	0.59	B	0.59	B	0.50
	S 200th St/1st Ave S (Normandy Park)	--	D	0.66	D	0.66	C	0.48
	S 240th St/Pacific Highway S (SR 99) [Kent]	--	F	1.12	D	0.95	D	0.92
	S 260th St/Pacific Highway S (SR 99) [Kent]	--	F	1.07	E	0.97	E	0.95

Table 4-6. Continued

	Intersection	LOS Standard	2030 on 2008 Network		2030 Recommended Network Without SR 509 to I-5		2030 Recommended Network With SR 509 to I-5	
			LOS	Delay	LOS	Delay	LOS	Delay
Stop Controlled Intersections	S 216th St/11th Ave S (potential signal)	D	F	143.4	E	40.5	D	29.9
	S 220th St/24th Ave S	D	D	29.7	D	28.8	D	31
	S 222nd St/24th Ave S	D	F	98	F	60.1	E	44.1
	S 223rd St/24th Ave S	D	F	52.2	D	29.6	D	26.5
	S 224th St/24th Ave S	D	D	25.9	D	25.9	C	20.8
	S 220th St/7th Ave S	E	F	108.8	F	96.8	F	68.4
	S 222nd St/7th Ave S	E	F	69.4	F	69.4	E	45.1
	S 220th St/Marine View Dr (SR 509)	E	F*	#	F*	#	F*	#
	S 222nd St/Marine View Dr (SR 509)	E	F	#	F	#	F	#
	S 240th St/Marine View Dr	D	F*	66.3	F*	66.3	F*	59.6
	Redondo Way/Redondo Beach Drive	F	F	51.2	F	51.2	F	52.5
	S 250th St/16th Ave	D	F	67.3	F	89.1	F	99.2
	S 272nd St/12th Ave S	D	C	16.5	C	16.5	C	17.2
	S 199th St/8th Avenue S	D	B	12.5	B	12.5	B	12.9

*Minor intersection movement with <100 PM peak hour trips. All other approaches meet standard.

#– Delay falls outside of model parameters.



Street System and Parking

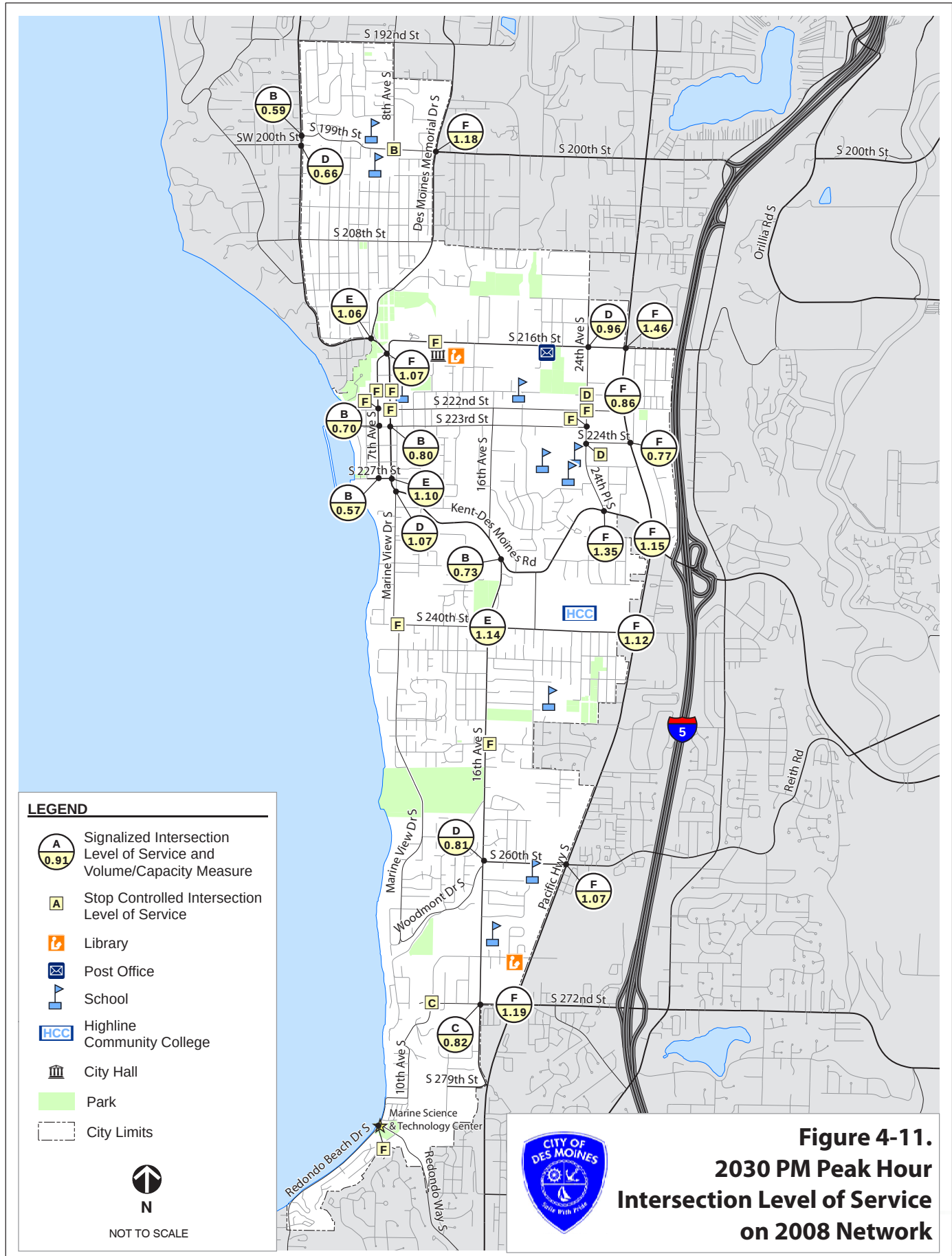
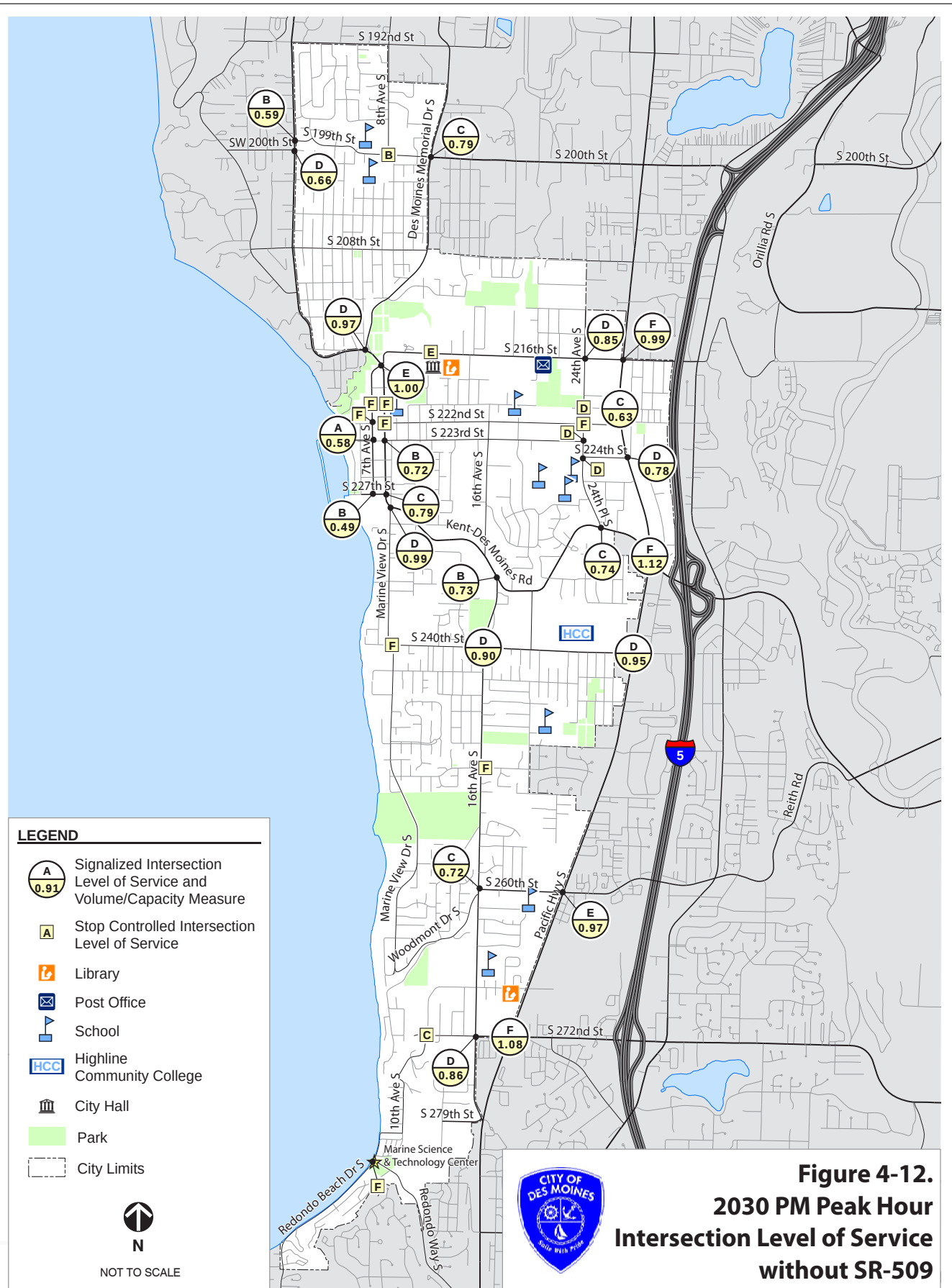
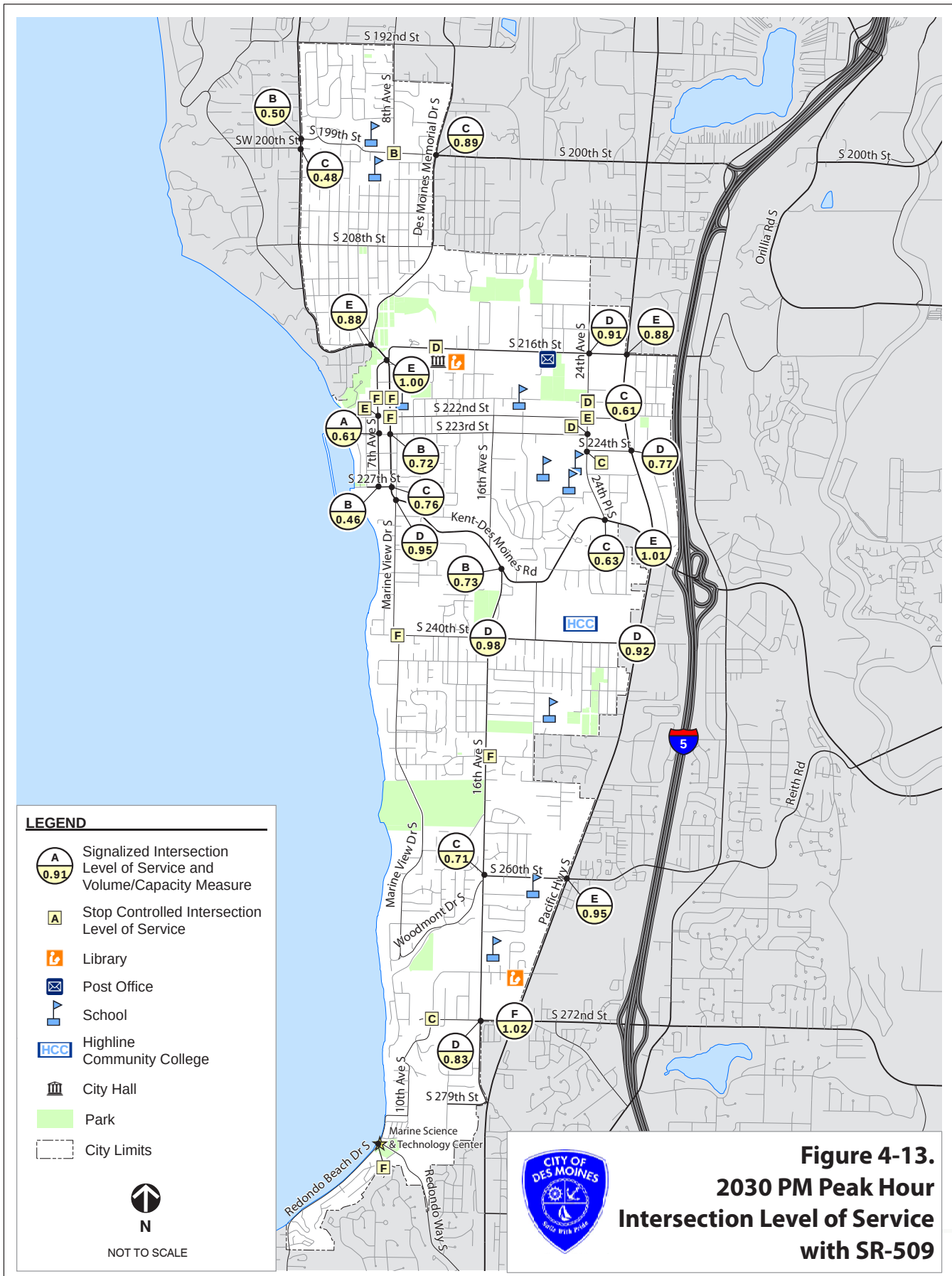


Figure 4-11.
2030 PM Peak Hour
Intersection Level of Service
on 2008 Network



Street System and Parking



RECOMMENDED FUNCTIONAL CLASSIFICATION

As the City grows, it is important to review the role of each street in the City and make appropriate changes to the functional classification. As previously described, the City of Des Moines classifies streets according to a hierarchy of function, from most intensive use (Principal Arterials) to least intensive (Local Streets). **Figure 4-14** shows the classification changes recommended to reflect the existing and expected future use of the City's streets. A resulting list of streets by their proposed classifications is included in **Appendix B**. The recommended changes include:

- South 199th/South 200th Street (1st Avenue South to 8th Avenue South) – Lower the classification from Minor Arterial to Collector Arterial.
- South 216th Street (20th Avenue South to Interstate 5) – Increase the classification from Minor Arterial to Principal Arterial.
- 24th Avenue South (South 208th Street to South 216th Street) – Increase the classification from Neighborhood Collector to Principal Arterial.
- Marine View Drive South (Kent-Des Moines Road to South 240th Street) – Increase the classification from Collector Arterial to Minor Arterial.
- South 240th Street (Marine View Drive South to 16th Avenue South) – Increase the classification from Collector Arterial to Minor Arterial.
- 16th Avenue South extension (South 216th Street to South 220th Street) – Extend 16th Avenue South to South 216th Street creating a new north-south Neighborhood Collector.
- 20th Avenue South connection (South 240th Street to South 243rd Street) – Extend 20th Avenue South to create a new Neighborhood Collector.
- South 276th Street Connection (16th Avenue South to Pacific Highway South) – Study (in conjunction with the City of Federal Way) the relocation of the Principal Arterial designated to South 276th Street between 16th Avenue South and Pacific Highway South, and redefine the south end of 16th Avenue South to be a neighborhood collector to serve local neighborhoods.
- South 227th Street (7th Avenue South to Marine View Drive) – Increase from neighborhood collector to minor arterial.

Freight and Goods Transportation System

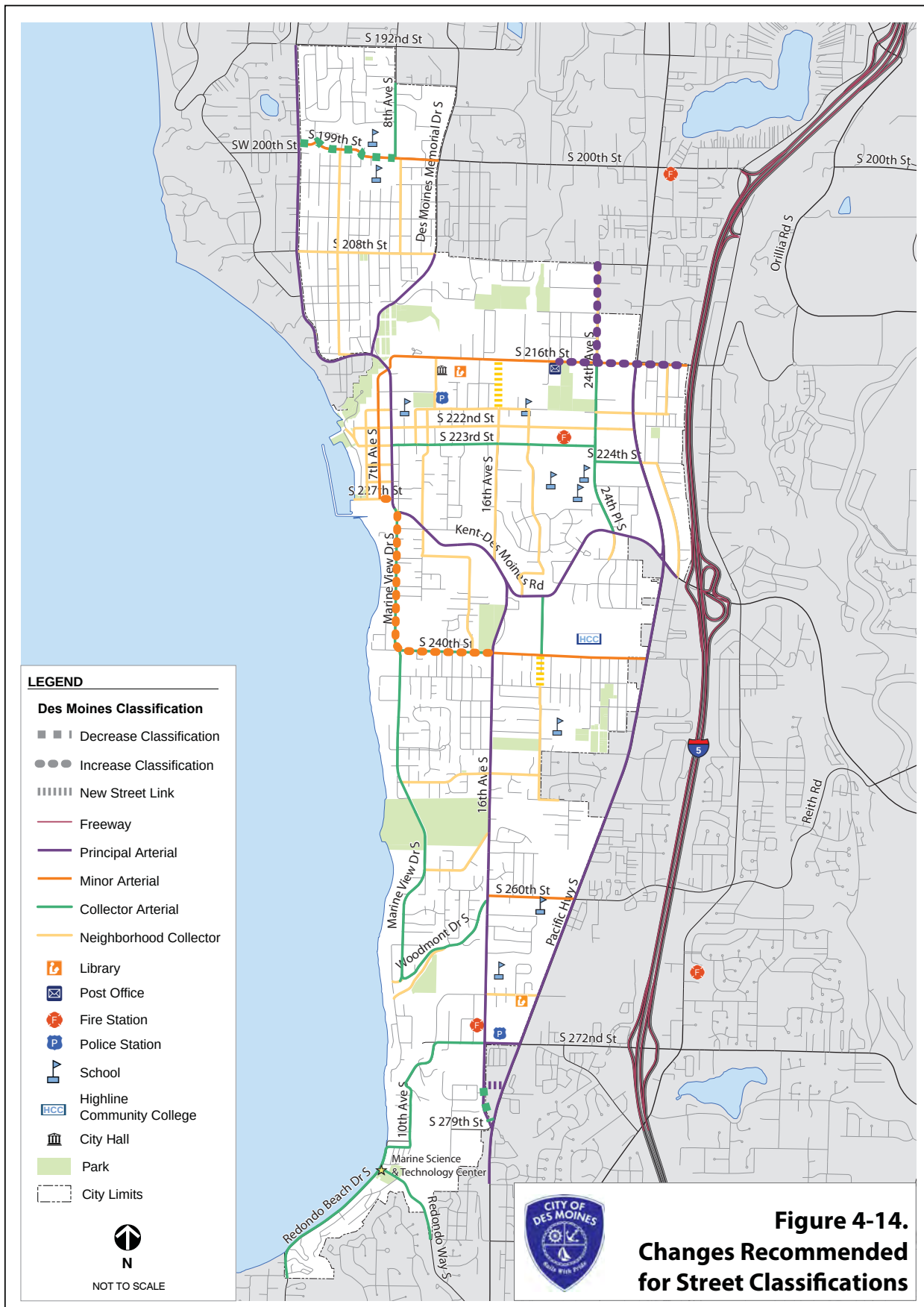
Freight truck traffic mostly uses I-5 and Pacific Highway South (SR 99) on the eastern edge of the City limits. The City has not designated any streets as truck routes, but the principal arterials act as the unofficial routes for freight trucks accessing local businesses.

SR 516 from Pacific Highway South (SR 99) east to SR 169 is included in Washington State's Freight and Goods Transportation System as a designated T-2 Freight Highway.³ Only one short portion resides within the City limits, almost all of the truck traffic on this road is destined to/from locations east of I-5 in the Kent Valley. The Kent Valley is a regional warehouse and distribution center, with more than 1700 trucks entering and leaving the City each day.

3 Washington State Freight and Goods Transportation System 2007 Update; Appendix C: 2007 FGTS State Route T-1 and T-2, Sorted by County; February 2008, p 27.



Street System and Parking



Based on traffic count data City streets with the highest truck use during the PM peak hour include Pacific Highway South, Kent-Des Moines Road, Des Moines Memorial Drive and portions of South 200th Street, South 272nd Street, and Marine View Drive, which all have a higher percentage of heavy vehicles.

Within the City's arterial street system, a truck weight restriction for the North Twin Bridge on 16th Avenue South currently restricts this corridor for heavy vehicle traffic. Future plans include bridge repairs and street improvements to restore heavy vehicle movements along this arterial. This current weight restriction also prevents articulated transit buses and some EMS equipment from operating on 16th Avenue South.

As part of the development of the Des Moines Creek Business Park, 24th Avenue South (north of South 216th Street) and South 216th Street between 24th Avenue South and Pacific Highway South are recommended as a City truck routes. To fully develop this route for heavy vehicles, consideration should be made towards providing sufficient street sub-grades, widened travel lanes and wide turning radii at intersections plus a connection north to SeaTac and the airport. These actions will enhance the safety and function of this future truck route, and direct truck traffic away from neighborhoods in Des Moines.

Recommended actions to address freight mobility needs include:

- Replace or retrofit the bridges on 16th Avenue South to eliminate weight restrictions and allow truck traffic.
- Build 24th Avenue South between the north City limits and South 216th Street to handle expected vehicle traffic and freight loads with future extension and connection to 28th Avenue South in the City of SeaTac.

SAFETY AND EMERGENCY RESPONSE

One of the City's highest priorities is to provide a reasonably safe transportation system for travelers of all modes. The City promotes road safety for the ongoing management of the street network and emergency services. Continual efforts are made to construct and maintain streets in a manner that improves safety, minimizes the likelihood of collisions, and enhances the safety for pedestrians, transit and bicyclists.

CRASH ANALYSIS

The City collects and monitors collision data to identify roadway safety concerns and seeks to enhance these locations by implementing appropriate safety measures. Many of these crashes occur at or near intersections.

Factors that can lead to crashes include:

Driver skills and behavior (driver age and aggressiveness)
Roadway configuration (turn lanes, lane widths, shoulders, sidewalks)
Roadway geometrics (sight distance, corner radii)
Weather conditions (rain, glare, ice)
Vehicle condition and maintenance (brakes, tires)
Roadway condition (potholes, loose gravel on road)
Driver inattention

The analysis reviewed the crash history of intersections and streets within the City of Des Moines. Using three years (2005-2007) of crash data from the City of Des Moines and the Washington State Department of Transportation, the City identified the locations, conditions and trends for crashes occurring on streets and intersections.

The review of crash data provides an indication of where there are potential safety concerns and can lead to design solutions that can reduce the frequency and severity of the crashes.



Crashes usually occur as a result of the interaction of one or more factors as shown in the text box. The City can identify and mitigate those factors that are under its control to attempt to enhance the safety of the roadway.

Annual Crash Trends - Intersections

Totaling the number of crashes by year shows trends and changes in the severity, number and frequency of crashes. Street improvements made over the years, such as the installation of signals, turn lanes and roadway medians, can positively or negatively affect the frequency, location and types of crashes.

Pacific Highway South (SR 99) was evaluated separately from the other intersections and streets within the City of Des Moines allowing the discussion of crash issues specific to Pacific Highway South.

There were 26 percent fewer crashes within the City in 2007 compared with 2006 and 32 percent fewer injury crashes. This may indicate the effectiveness of the street improvements along Pacific Highway South and completion of other major construction projects. For intersections, a crash rate per million entering vehicles is used to normalize the data to the volume of traffic through the intersection. In Des Moines, the average accident rate is 1.1 accidents per million entering vehicles – including the accidents along Pacific Highway South. For other Des Moines intersections, the average accident rate is lower, an average of 0.7 accidents per million entering vehicles. We can use these average rates to help prioritize City actions to mitigate the safety problems indicated by the intersection accidents, with a focus on the locations with higher than average accident rates.

Table 4-7 summarizes the crash totals and rates for intersections along Pacific Highway South. The intersections along Pacific Highway South had some of the higher crash rates in the City between 2004 and 2007. Two intersections on Pacific Highway South in Des Moines have accident rates higher than the citywide average and deserve focus for potential mitigation. The intersection of Pacific Highway South/Kent Des Moines Road has the highest crash rate on SR 99 within the City limits. The primary crash type (rear end crashes) account for more than half of the crashes. Rear end crashes are most often an indicator of intersections with high traffic volumes and high levels of congestion. Sideswipe crashes are about 20 percent of the total. Most sideswipe crashes occur in southbound and northwest bound approaches, most related to vehicles moving in the same direction going straight. The intersection of Pacific Highway South at South 216th Street is also a high accident location where high number of rear-end accidents occur, along with left-turn accidents. Changing the signal phasing to protected left-turn phasing can help address some of the accidents, along with improved signal coordination along Pacific Highway South corridor.

At other locations along Pacific Highway South, the majority of rear end crashes occur when vehicles are traveling north or south on Pacific Highway South.



Table 4-7. Summary Crash Information on Pacific Highway South Intersections

Intersection	Total Crashes (2004-2007)	Crash Rate (per million entering vehicles)
Pacific Highway S/Kent – Des Moines Road	209	2.92
Pacific Highway S/S 272nd St (Kent)	139	1.91
Pacific Highway S/S 260th St (Kent)	72	1.59
Pacific Highway S/S 240th St (Kent)	67	1.53
Pacific Highway S/ S 216th St	81	1.39
Pacific Highway S/ S 268th St (Kent)	49	1.20
Pacific Highway S/16th Ave S (Federal Way)	50	0.98
Pacific Highway S/S 288th St (Federal Way)	47	0.92
Pacific Highway S/S 252nd St (Kent)	32	0.78
Pacific Highway S/S 224th St	25	0.55
Pacific Highway S/S 226th St	22	0.52
Pacific Highway S/S 220th St	19	0.44
Source: Crash data from the City of Des Moines and WSDOT (2004-2007)		

Compared with Pacific Highway South, most intersections within the City tend to have fewer total crashes and a lower average accident rate (0.7 accidents per million entering vehicles). **Table 4-8** summarizes the major crash locations at these intersections outside of the SR 99 corridor. Note that three locations have had modifications to address safety issues during the analysis period – with a reduction in accidents.

Locations with higher than average collision rates include

- South 240th Street at 20th Avenue South (sight distance enhancements made in 2009)
- 24th Avenue South at South 216th Street (mitigated with new signal in 2006)
- 16th Avenue South at South 272nd Street (mitigated with left-turn phasing in 2007)
- Kent-Des Moines Road at 24th Avenue South
- 16th Avenue South at South 240th Street
- Kent-Des Moines Road at I-5 On-Off Ramps (WSDOT)

Potential mitigation for these safety issues are described in the following section, leading to safety recommendations for the Plan.



Table 4-8. Crash Analysis for Other Intersections within the City Limits

Intersection	Crashes (2004-2007)	Crash Rate (per million entering vehicles)
S 240th St/20th Ave S (U)	16*	1.37
24th Ave S/S 216th St **	34**	1.34
16th Ave S/S 272nd St***	35***	1.20
Kent-Des Moines Rd/24th Ave S	29	1.15
16th Ave S/S 240th St	18	0.96
Kent-Des Moines Rd/I-5 On/Off Ramps (WSDOT)	44	0.79
Kent-Des Moines Rd/Marine View Drive	24	0.68
Kent-Des Moines Rd/30th Ave S (U) ****	36****	0.65
Marine View Dr S/S 222nd St (U)	20	0.65
Marine View Dr S/S 223rd St	19	0.63
Kent-Des Moines Rd/16th Ave S	9	0.38
Marine View Dr S/Des Moines Memorial Dr S	8	0.26
Marine View Dr S/7th Ave S/7th Pl S	11	0.25
* Sight distance enhancements were made at this intersection in April 2009. ** Intersection signal completed during analysis period. *** Signal modifications to add left-turn phasing completed in 2007. **** Access management was implemented during analysis period to address safety concern. (U) = Stop-controlled intersection		

Safety Improvements - Intersections

Part of the transportation plan is to identify projects that may improve the safety of intersections within the City limits. The analysis reviewed the top nine intersection crash locations and identified the following improvements to reduce the type and frequency of the collisions as shown in **Table 4-9**.

Table 4-9. Recommended Intersection Safety Improvements

Location	Primary Collision Type(s)	Potential Countermeasures
Pacific Highway South/Kent – Des Moines Road	Rear end	Improve vehicle detection and signal timing plans. Consider implementation of Red Light Enforcement cameras.
	Sideswipe	Carry lane markings through intersection to better define channelization.
Pacific Highway South/South 260th Street (Kent)	Rear end	Monitor crash rate. Recent corridor improvements on Pacific Highway South.
Pacific Highway South/South 240th Street (Kent)	Rear end	Monitor crash rate. Recent corridor improvements on Pacific Highway South.
Pacific Highway South/ South 216th Street	Rear end	Improve vehicle detection and signal timing plans. Consider implementation of Red Light Enforcement cameras.
	Driveway	Monitor crash rate. Consider access management for driveways onto South 216th Street.
South 240th Street/20th Avenue South (U)	Right Angle	Enhance sight distance.
	Rear end	Widen to provide left turn lane at intersection.
16th Avenue South/South 272nd Street	Right Angle	Review west Safeway driveway access. Consider access management.
Kent-Des Moines Road/24th Avenue South	Right Angle	Review intersection geometrics and signal timing.
	Left turn	Add protected phase for eastbound and westbound left turns.
Pacific Highway South/16th Avenue South	Rear end	Monitor crash rate. Recent corridor improvements.
	Left turn	Reconfigure/realign 16th Avenue South to connect Pacific Highway South at South 276th Street.
16th Avenue South/South 240th Street	Left turn	Widen left turn pockets and evaluate left turn phasing.

Annual Crash Trends – Corridors

Crashes also occur along corridors, normally related to movements to and from driveways. For corridors, a rate is used that looks at the crashes per 100 million vehicle miles using the street.

Table 4-10 summarizes the crashes reported for 2004 to 2007, showing the average per year, the crash rate, and the top two types for the each of the major travel corridors in the City. Kent-Des Moines Road had the highest crash rate with 12.76 crashes per 100 million vehicle miles. Other high collision corridors include Pacific Highway South and Marine View Drive. For these corridors, rear end collisions were the most frequent type of collision, accounting for more than 45 percent of all collisions.



Table 4-10. Corridor Crash Analysis

Corridor	Total # Crashes (2004-2007)	Average Crashes per Year	Crashes Per 100 Million Vehicle Miles	1st Most Frequent Type	2nd Most Frequent Type
Kent-Des Moines Road (SR 99 to Military Rd)	300	75	12.76	Rear End	Right Angle
Pacific Highway South (South 216th Street to South 288th Street)	1085	271	7.71	Rear End	Driveway
Marine View Drive n/o Kent-Des Moines Road	176	44	7.58	Rear End	Fixed Object
Kent-Des Moines Road (Marine View Dr to SR 99)	157	39	5.36	Rear End	Fixed Object
16th Avenue South	108	27	3.06	Rear End	Fixed Object
South 216th Street	72	18	2.52	Enter at Angle	Rear End
South 272nd Street, (10th to 16th Avenue South)	55	14	2.22	Driveway related	Rear end
South 240th Street	39	10	1.80	Enter at Angle	Fixed Object
24th Avenue South	20	5	1.48	Rear End/ Fixed Object	Rear End/ Fixed Object
Marine View Drive s/o Kent-Des Moines Road	34	9	1.48	Fixed Object	Rear End
Des Moines Memorial Drive	28	7	1.03	Rear End	Fixed Object

Safety Improvements - Corridors

Safety improvements along corridors normally relate to improving or controlling minor street access that often creates issues. This can include adding turn pockets, restricting movements to right-turns only, or other actions that improve flow along the area roadways. Corridors with recent improvements should be monitored to assess the effect of actions on crash rates. **Table 4-11** shows the recommended intersection safety improvements.

Table 4-11. Recommended Intersection Safety Improvements

Corridor	Primary Crash Type	2nd Most Frequent Type	Potential Countermeasures
Kent-Des Moines Road (SR 99 to Military Rd)	Rear End	Enter at Angle	Monitor crash rate. Recent corridor improvements to limit turns at 30th
Pacific Highway South	Rear End	Driveway	Monitor crash rate. Recent corridor improvements. Install fiber optic cable for signal interconnection and coordination.
Marine View Drive n/o Kent-Des Moines Road	Rear End	Object	Restrict side street left turns during peak commute hours. Install fiber optic cable for signal interconnect and coordination.
Kent-Des Moines Road (Marine View Dr to SR 99)	Rear End	Object	Create turn pockets and median refuge lanes
16th Avenue South	Rear End	Object	Create turn pockets and median refuge lanes
South 216th Street	Right Angle	Rear End	Control access where appropriate
South 240th Street	Right Angle	Object	Create turn pockets and median refuge lanes
24th Avenue South	Rear End/Object	Rear End/Object	Create turn pockets and median refuge lanes
Marine View Drive s/o Kent-Des Moines Road	Object	Rear End	Create turn pockets and median refuge lanes
Des Moines Memorial Drive	Rear End	Fixed Object	Create turn pockets and median refuge lanes
South 272nd Street	Driveway	Rear End	Access management



EMERGENCY RESPONSE

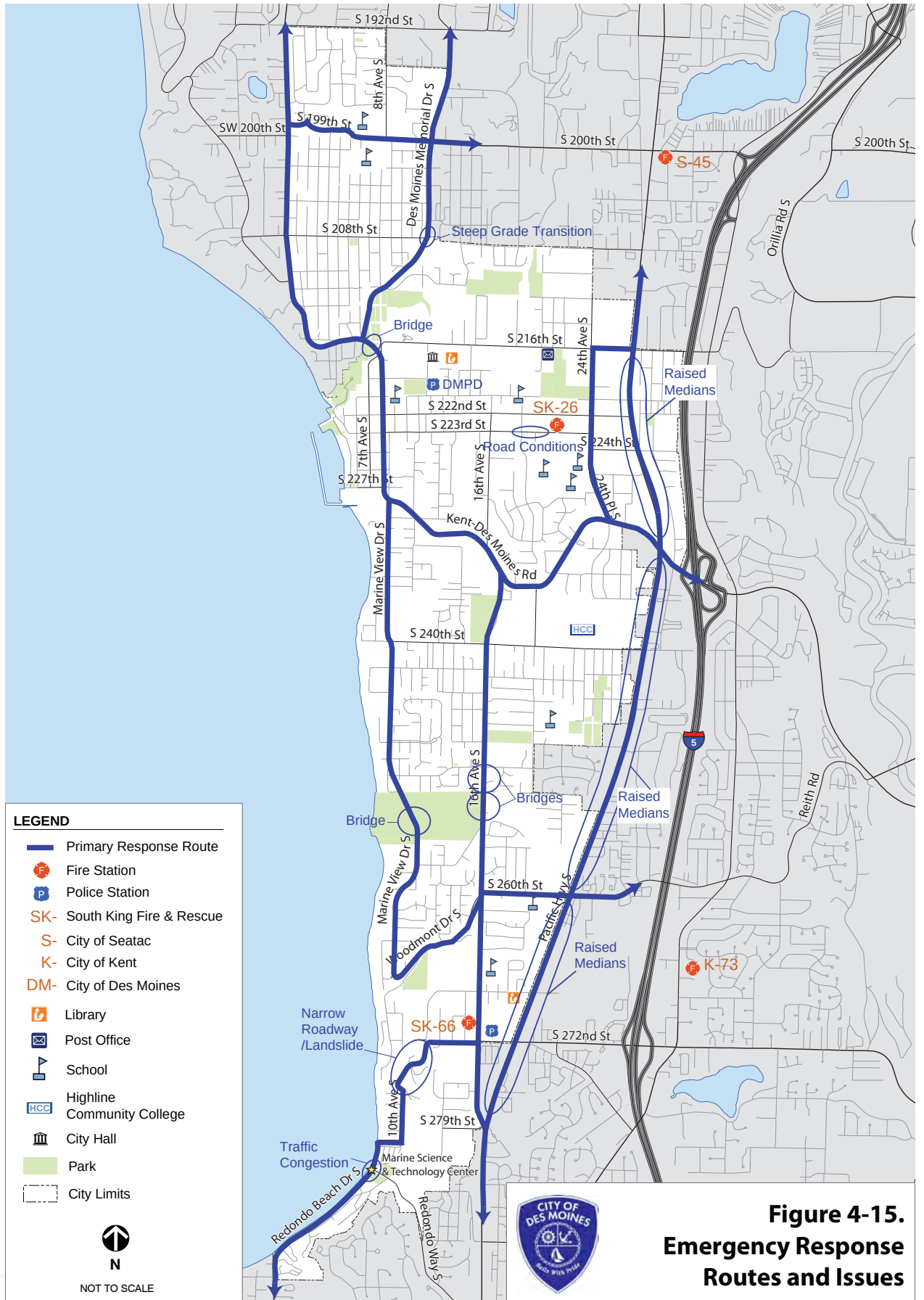
Providing a quick response to residents with emergency situations is an important function of the City. Emergency response routes require a street system and corridors where emergency vehicles can travel swiftly and safely. Most emergency response vehicles are equipped with devices that can pre-empt traffic signals enabling emergency vehicles to secure safe and rapid passage through signalized corridors. In addition, the City has mutual-aid agreements with nearby emergency response operators from other cities to ensure adequate coverage and to provide additional resources when needed.

South King Fire & Rescue (SKFR) provides service for Des Moines. The primary emergency response routes identified by SKFR generally parallel the City's arterial street system. SKFR identified locations along these routes with characteristics that may impede response times such as roadway medians, roadway width or roadway pavement conditions. **Figure 4-15** shows the station locations, primary response routes and response access issues within the City of Des Moines. Some of the key issues on emergency response routes include:

Issues	Description
Raised medians	Restricts access to property and streets and may require reroute for access. EMS vehicles lose ability to use median as a response lane.
Bridges with weight restrictions	Primary response routes need to be developed to support EMS vehicles. Until bridges are reinforced, provide secondary access.
Steep grade transitions	Large emergency vehicles may not be mobile on all routes – need to provide secondary access where possible.
Poor roadway conditions	Rough pavement can be a challenge for responders.
Narrow streets	Parking on local streets can block emergency access.
Congestion	Slows down emergency vehicles.

Recommendations for improving emergency access and mobility include:

- Improved maintenance of primary response routes.
- Replacement or retrofit of bridges on 16th Avenue South and Marine View Drive (Saltwater State Park Bridge) to bring structures up to standard.
- Study of Marine View Drive South between South 272nd Street and 10th Avenue South for widening and improved geometrics.
- Relieve congestion created by all-way stop control at Redondo Beach Drive and Redondo Way.
- Close coordination of current status of streets and traffic system between Des Moines Public Works and SKFR. Look for opportunities to jointly fund projects with common interests.



SYSTEM PRESERVATION AND MANAGEMENT

With the high levels of growth anticipated in Des Moines, at some point, the City will not be able to expand the street system because of environmental, design, or cost considerations. The preferred network reflects the buildout of the transportation system. Still traffic volumes may continue to increase requiring the City to adopt more stringent traffic management and operations strategies to: maximize the use of the arterial network; coordinate the intersection signals; protect neighborhood streets; and preserve and maintain the street network

In the fall of 2008, Des Moines City Council authorized the creation of a Transportation Benefit District within the City to help preserve and maintain the transportation network. The \$20 annual fee for each registered vehicle in the City will provide one funding source for preserving the City's Arterial Streets.

ARTERIAL MANAGEMENT

Traffic congestion is often only present during peak commute hours. It may not be feasible or desirable to widen streets at the detriment of adjacent residences and businesses or create an environment that does not adequately serve pedestrians, transit and bicycles. Arterial management is the concept of maximizing the existing street network to provide for traffic flows and strike a balance among the competing demands on the street network.

In the Downtown neighborhood, high traffic volumes during the commute on Marine View Drive South and 7th Avenue South limit the east-west access in the Downtown area, resulting in poor LOS operations for side streets such as South 220th Street and South 222nd Street. In a like manner, pedestrians crossing Marine View Drive have a challenge to find acceptable gaps in traffic to cross the street. A downtown circulation study is recommended to identify how best to maximize the multi-modal use of the streets and improve traffic operation within the corridor.

INTERSECTION COORDINATION

Intersections with signal control operate as a system within the City. If traffic signals are not adequately controlled and timed, traffic will not flow smoothly and consistently, which can result in increased and unnecessary delays for travelers. Interconnecting signals and directing signal control through a Traffic Management Center can improve traffic flows through corridors. Corridors where signal interconnection is recommended include Marine View Drive (from Des Moines Memorial Drive to Kent-Des Moines Road), Pacific Highway South from South 216th Street to South 272nd Street, and South 216th Street from Marine View Drive to Military Road.

NEIGHBORHOOD STREETS

Neighborhoods are important to the City. The City's Traffic Calming Program responds to traffic problems such as cut-through traffic and speeding. Cut-through traffic has neither its origin nor its destination within the neighborhood, but passes through the neighborhood on its local streets. Neighborhoods have the perception that many motorists, neighborhood residents, as well as cut through drivers, drive too fast on their local streets. Installing traffic calming measures to reduce speeds and traffic volumes can enhance safety and the quality of life in the neighborhood.

The City requires neighborhood consensus prior to a traffic calming project. Available traffic calming measures are listed in the Des Moines Municipal Code and in the *Draft Street Design and Construction Standards*. Typical techniques include speed humps, traffic circles, chicanes, and other

controls designed to slow traffic and reduce vehicle volumes. Small projects are typically funded through the City's Capital Improvement Program. The City of Des Moines receives numerous requests to install traffic-calming devices such as speed humps or traffic circles. The City developed the Traffic Calming Program to prioritize these requests and address neighborhood streets with the most serious speeding and safety concerns.

Recommended actions to address neighborhood needs would include continued funding of the Traffic Calming Program and installation of traffic calming devices where needed.

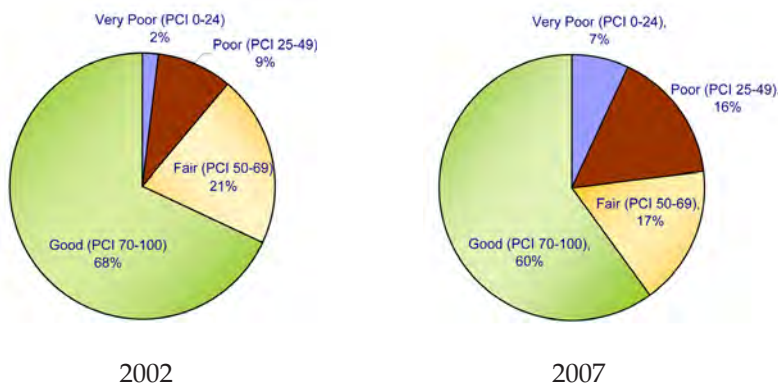
PAVEMENT MANAGEMENT PROGRAM

The street system is one of the City's most expensive assets and it needs to be properly maintained. The Pavement Management Program carries this out with pavement maintenance and rehabilitation projects. These projects are intended to protect and preserve the surface condition, help maintain structural integrity, and restore texture and skid resistance to the roadway surface. With proper maintenance, asphalt pavement will last 20 to 25 years. With approximately 100 centerline miles of roadway within the City of Des Moines, the pavement management program aims to maintain at least 4 to 5 centerline miles of roadway each year to avoid falling further behind.

All City streets are regularly rated by the engineering staff to determine the pavement condition.⁴ The Pavement Condition Index (PCI) provides a numerical ranking from 0 (failed street) to 100 (excellent street). This process provides the information needed to determine maintenance and rehabilitation requirements, conduct long-term planning and, most importantly, establish priorities that maximize the City's limited financial resources.

Figure 4-16 compares the PCI for 2002 and 2007. In 2002, 68 percent of streets had a PCI between 70 and 100 and only 2 percent of street segments had a PCI below 25. In 2007, the ranking of street segments with a PCI of 70 or higher dropped to 60 percent and the number with a PCI below 25 increased to 7 percent. This indicates that without increased funding to the Pavement Management Program this trend will continue, causing rehabilitation to be exponentially more expensive.

Figure 4-16 Pavement Condition Index 2002 and 2007



⁴ The pavement condition survey involves dividing the pavement network into logical segments, recording descriptive segment inventory data and collecting pavement performance information relating to these segments.

PARKING

Although there are some isolated parking issues throughout the City, parking concerns are primarily an issue in two areas of Des Moines – in the Downtown neighborhood and in the vicinity of Highline Community College. At times there can be some parking issues in Redondo as well, during seasonally high use of the boat launch and boardwalk areas. In these locations, parking demand exceeds the supply of convenient parking, resulting in perceived and real parking issues and concerns. As City staff looks to the future for Des Moines and the changes in land use, transportation services, and travel patterns in the City, it is important to consider the possible options for managing parking demand and parking supply to make the best use of the available resources for parking. This section reviews the current and expected conditions for parking demand and presents a menu of options for managing parking supply and demand within Des Moines.

EXISTING CONDITIONS

Existing parking issues are primarily focused around Downtown parking and neighborhoods near the Highline Community College. This section focuses on the existing issues related to these areas.

Downtown Parking

Parking in Downtown Des Moines is perceived by some as being tough – on-street parking is often tight near desired destinations and available away from primary destinations. Night-time security, lack of sidewalks, and limited lighting on connecting streets all reduce the potential for using available yet distant parking for Downtown demand. There are large parking areas at the Marina, but this parking is only convenient for Marina events.

Parking serves a variety of Downtown land uses from retail shops along Marine View Drive and 7th Avenue South to residential multi-story residential units along 6th Avenue South and Cliff Avenue. There are 587 on-street parking spaces (public) in the Downtown area between South 216th Street, South 227th Street, Marine View Drive and 6th Avenue South summarized in **Table 4-12**. The on-street parking supply is a mix of parking types that varies from the right-angle informal spaces on 6th Avenue South, to marked angle spaces on Marine View Drive and South 220th Street, to parallel spaces on 7th Avenue South. There are currently no time limits for on-street parking, nor are there designated ADA accessible on-street parking or loading zones. Driveway curb cuts and alleyways which provide off-street access to property reduce the number of on-street spaces. **Table 4-12** summarizes the available on-street parking within Downtown.

Table 4-12. Inventory of Downtown On-Street Parking by Street

Street Name	Parking Spaces by Side of Street
Marine View Drive	11 east, 31 west
7th Avenue South	68 east, 59 west
6th Avenue South	109 east, 67 west
S 219th Street	22 north, 8 south
S 220th Street	23 north, 26 south
S 222nd Street	49 north, 19 south
S 223rd Street	12 north, 22 south
S 225th Street	20 north, 10 south
S 226th Street	19 north, 12 south
Total On Street Parking	587 spaces

Private parking lots are generally tied to individual developments and sharing of parking areas between property owners is not a common practice. The Storefront Studio planning effort between City of Des Moines and the University of Washington College of Architecture and Urban Planning, looked at the extent and supply of both on-street and on-site parking in the Downtown area during a 2008 study. **Figure 4-17** shows a visual result of the UW Storefront Studio analysis. Review of this effort concludes that 30 to 50 percent of land area within downtown (not including the Marina) could be used for auto parking. Most of the parking supply is reserved parking for private businesses and public parking is limited mainly to on-street spaces.

A City analysis shows that there is probably enough parking in the Downtown area, but that some of the parking is private and available parking may not be in convenient locations.

Highline Community College

The Highline Community College campus currently encompasses the area north of South 240th Street, west of SR 99 Pacific Highway South, east of 20th Avenue South and south of the South 236th Street alignment. Highline Community College has nearly 15,000 enrolled students and only 2,125 on-campus parking spaces. The college is expected to continue to grow over the next 20 years and along with it, the demand for more parking, despite that transit is likely to be providing more service to a greater share of the future students.

The residential neighborhoods to the north and south of the campus are currently affected by spill-over student parking. There are signs prohibiting student parking, but policing and enforcement by the City is currently difficult. The parking along the narrow streets and cul-de-sacs near the college also cause concern for emergency access, resulting in calls to the City for enforcement and additional controls.





Figure 4-17.
Downtown Parking

FUTURE CONDITIONS

In the future, parking issues will continue to be focused around Downtown and the Highline Community College. The addition of planned transit facilities, the RapidRide, Link light rail and potential passenger-only ferry service will create new parking issues and challenges near their stations. This section focuses on the future issues related to these areas.

Downtown Parking

Changes are envisioned for the Des Moines Downtown neighborhood with an increased mix of retail, business and residential land uses through redevelopment and infill. The City fully supports continued economic development in Downtown that is complementary to the refined vision of the Des Moines Marina, as outlined in the *Marina Master Plan*.

On January 8, 2009, the City Council passed a moratorium through 2009 on parking requirements associated with new development in the Downtown area – based on the existing supply of on-street and private parking in the neighborhood. The Downtown is a convergence of mobility needs for vehicles, deliveries, pedestrians, bicyclists and transit with a City goal for improving access to Downtown as a destination for both business and residents. As the Downtown continues to develop parking demand will grow as the businesses, retail, and residences increase, leading to more competition for the limited supply of on-street parking. Parking management techniques will be needed to balance the employee, customer, visitor, and residential demand for the same on-street parking.

Highline Community College

HCC is in the process of completing a Campus Master Plan that expands the college facilities, with very limited additional parking. A key aspect is the role that future housing and high capacity transit will play in reducing the demand for parking. The Pacific Ridge and Midway neighborhoods will provide new opportunities for student, staff and faculty to live within walking distance of the campus, and the planned RapidRide and Link light rail services will increase the opportunities for non-auto trips to campus. Highline Community College is one of the two current employment sites with a Commute Trip Reduction plan, as mandated by State law. The City will continue to monitor progress toward commuter goals and increased mode split at the college.

Additional strategies for parking management both on campus and in the surrounding neighborhoods is needed to better control the parking impacts and to effectively use the available parking supply, and encourage the use of alternative transportation modes.

New Transit Facilities

The development of new high capacity transit facilities such as the Rapid Ride and Link Light Rail along Pacific Highway South and the potential for passenger-only ferry service at the Downtown Marina, will create additional parking issues. Near stations, transit and ferry passengers are likely to park in adjacent neighborhoods to avoid pay parking or because of a lack of parking availability. However, new housing opportunities and new employment centers within Downtown and Pacific Ridge may create an improved environment that will enhance transit ridership, encourage bicycle and pedestrian trips and in turn, reduce the demand for parking. This will need to be closely monitored by the City in the coming years. Parking management strategies will need to be applied in the areas surrounding these new transit activity centers to control potential impacts from user parking.



PARKING MANAGEMENT STRATEGIES

The purpose of parking management is to effectively balance the demand for parking and the supply. This section provides a menu of options that can be applied to the specific parking issues. The strategies represent a toolbox of the best practices in parking management.

Parking management needs to be incorporated into many of the aspects of the City from new development programs to the enforcement of parking regulations. Many actions will require the development of new programs that will need funding and follow-up. Some actions will require periodic data collection and assessment in order to measure progress and to make appropriate adjustments.

As the complexity of the actions are considered, a detailed parking management planning process may be required to analyze the best actions for the community and as a means for on-going review and adjustment.

Table 4-13 identifies a list of the parking management strategies that are most appropriate to the Des Moines parking issues.



Table 4-13. Parking Management Strategies

Strategy	Purpose	Requirements
Residential Parking Zones.	Manages spillover parking.	Program development, funding, and enforcement.
Develop a special event parking and traffic management team - Public Works, Police, Downtown/Parks/Marina.	Minimizes parking impact and anticipates potential issues.	Development of team and funding of activities.
Traffic Engineer sets & adjusts parking rates, hours and time limits as needed to achieve 85% occupancy parking supply.	Creates better balance between demand and supply of parking.	On-going analysis of parking demand and supply. Use technical expertise.
Customer parking tokens, for pay parking.	Allows promotional action to off-set parking fees.	Program development, funding, and enforcement.
Downtown bike lanes - 7th Avenue South, Dock Street, and South 227th Street.	Encourages bicycle activity.	Investment in facilities, promotion, and education.
Enhance east-west crossing and access to parking along Marine View Drive.	Encourages pedestrian activity.	Investment in facilities, promotion, and education.
Street lighting and pedestrian amenities for safety and security to parking.	Encourages pedestrian activity.	Investment in facilities, promotion, and education.
Establish Downtown TMA to encourage alternative travel modes to downtown.	Provides means for education and promotion.	Volunteer effort and organization.
Valet parking for peak parking periods.	Maximizes use of available parking.	Education and promotion. Program development and funding (insurance, staffing).
Shuttle to park and ride for special events.	Reduces need for auto travel/ parking.	Program development and funding.
Passenger-Only Ferry shuttle to downtown, park and ride, to transit hub, to Rapid Ride.	Reduces need for auto travel/ parking.	Program development and funding.
Designate parking area for Passenger-Only Ferry patrons, pay stations.	Reserves parking for intended use.	Monitoring and enforcement of non-users.
Enhance walking access to the Marina via existing and new access points.	Taps into available parking supply.	Investment in facilities, promotion and enforcement/patrol.
Shared parking agreements.	Allows adjacent properties to jointly share parking.	Education and promotion including discussion of insurance and liability.
Public parking lots.	Provides additional parking. Can be used of offset parking requirements.	Program development and funding. Changes to city development code.
Wayfinding to alternate/lightly used parking areas.	Allows better use of all available parking resources.	Development of program and routes. Funding of signage and promotion.
Continue to encourage use of alleys for loading & deliveries.	Keeps more on-street parking spaces available.	Investment in signing and enforcing.
Designate Disabled Parking spaces on Downtown Streets.	Provide on-street parking for the disabled.	Investments in signing and enforcing.

FUTURE STREET SYSTEM RECOMMENDATIONS

The future City street system will require a series of projects to complete the envisioned transportation system. This section summarizes the recommended actions over the next 20 years for the City of Des Moines. Projects are grouped by project category reflecting the purpose and type of improvement. **Table 4-14** summarizes the improvements by project category. **Figures 4-18** and **4-19** show these improvements. See Appendix B for the details by street segment of the number of travel lanes and pedestrian and bicycle features of the planned future street system.

Projects and Connections in Neighboring Cities and Agencies

Traffic growth in Des Moines is a result of development both in the City and in neighboring cities. Similarly, traffic operation and traffic flows on the Des Moines street network are influenced by the street network and connections in neighboring cities. Support for arterial improvements, network connections and continuous bicycle facilities across City boundaries is an important aspect of the Comprehensive Transportation Plan. Des Moines supports the development of the following projects and programs in and with neighboring cities and agencies.

City of Kent

- Envision Midway visioning process
- Pedestrian crossing on Pacific Highway South near South 264th - 268th Street in conjunction with the RapidRide BRT project.
- South 240th Street extension over I-5 for all modes⁵
- 30th Avenue South grade separation over Kent-Des Moines Road for connection between Pacific Ridge and Midway neighborhoods⁵

City of SeaTac

- Completion of the Des Moines Creek Trail and future extension north
- 24th/28th Avenue South extension to South 200th Street
- South 200th Street at Des Moines Memorial Drive intersection improvements
- Des Moines Memorial Drive bike lanes and sidewalks
- South 208th Street improvements between 24th Avenue South and Pacific Highway South
- South 216th Street widening, I-5 to Military Road⁶

City of Normandy Park

- 1st Avenue South (SR 509) arterial project to add sidewalks, bike lanes and turn lanes

City of Federal Way

- Joint project on South 276th Street/16th Avenue South to extend to Pacific Highway South and reroute connection at Pacific Highway South and restore community access west of 16th Avenue South
- Redondo Way South bike lanes and trail system

⁵ Project identified to enhance multimodal connections. This project was not identified in the City of Kent's Transportation Master Plan or as a capacity project in the City of Des Moines Transportation Model.

⁶ This project is not currently identified in the City of SeaTac TIP.

Table 4-14. Recommended Street System Improvements

Project Type	Location	Project Description	Capacity	Safety	Operations	Development
Streets						
Arterial Widening Projects						
South 216th Street	Marine View Drive to Interstate 5	Widen to three lanes west of 19th Avenue South, to five lanes east of 19th Avenue South. Add bicycle lane, sidewalks and landscaping. Add signals and intersection improvements as warranted by development. See South 216th Corridor Study (March 2009).	X	X	X	X
24th Avenue South	South 208th Street to South 216th Street	Widen to five lanes with bicycle lane, sidewalks and landscaping.	X			X
24th Avenue South	South 216th Street to Kent-Des Moines Road	Widen to three lanes with bicycle lanes, sidewalks and landscaping. See 24th Avenue South Corridor Study (June 2009).	X	X		X
16th Avenue South	Kent-Des Moines Road to South 260th Street	Widen to three lanes with bicycle lanes, sidewalks and landscaping.	X	X	X	X
Kent-Des Moines Road	Marine View Drive to Pacific Highway South (SR 99)	Widen to three lanes west of 16th Avenue South and to five lanes east to Pacific Highway South with bicycle lanes, sidewalks and landscaping.	X	X	X	
Roadway Connections						
16th Avenue South	South 216th Street to South 220th Street	Two-lane roadway connection – collector arterial. See Highest and Best Use Analysis of Historic SR 509 Corridor Study (March 2009).			X	X
16th Avenue South	South 276th Street to Pacific Highway South (SR 99)	Two-lane roadway connection/re-alignment – principal arterial.			X	X
20th Avenue South	South 242nd Street to South 244th Street	Two-lane roadway connection – neighborhood collector.			X	X
24th/28th Avenue South (SeaTac)	South 200th Street (SeaTac) to South 208th Street	Create a 4-lane to 5-lane connection to SeaTac. Coordinate with City of SeaTac and WSDOT as part of SR-509 project.	X		X	X



Table 4-14. Continued

Project Type	Location	Project Description	Capacity	Safety	Operations	Development
Intersections						
South 216th Street	Pacific Highway South	<u>Without SR 509 project:</u> Add one shared left-through lane and right turn pockets eastbound and westbound.	X		X	X
South 216th Street	Pacific Highway South	<u>With SR 509 project:</u> Add eastbound and westbound through lanes. Retain eastbound right turn lane. Change eastbound and westbound left turn signal phasing to protected.	X		X	X
South 220th Street	Pacific Highway South	Widen for left turn pockets, adjust roadway profile and approach grades, and revise signal phasing to remove split phases.	X		X	X
Des Moines Memorial Drive	at South 200th Street	Add left turn pockets for all approaches, modify signal. Joint project with City of SeaTac.	X	X	X	
Des Moines Memorial Drive	at Marine View Drive and South 216th Street	Lengthen approach lanes, coordinate signal with Marine View Drive at 7th Avenue South. Also consider roundabout option.	X		X	
Marine View Drive	at South 227th Street	Revise lane configuration to single eastbound right with overlap phase. Add second southbound through lane.	X	X	X	
Marine View Drive	at Kent-Des Moines Road	Add second eastbound through lane through intersection.	X		X	
Marine View Drive	at South 240th Street	Revise lane configuration, add westbound right turn pocket. Add signal or roundabout if warranted.	X		X	
16th Avenue South	at South 240th Street	Add left turn pockets for all approaches.	X	X	X	
16th Avenue South	at South 250th Street	Add eastbound right turn pocket.	X		X	
24th Avenue South	at South 222nd Street	Monitor operation for future signal or other intersection treatment.	X		X	

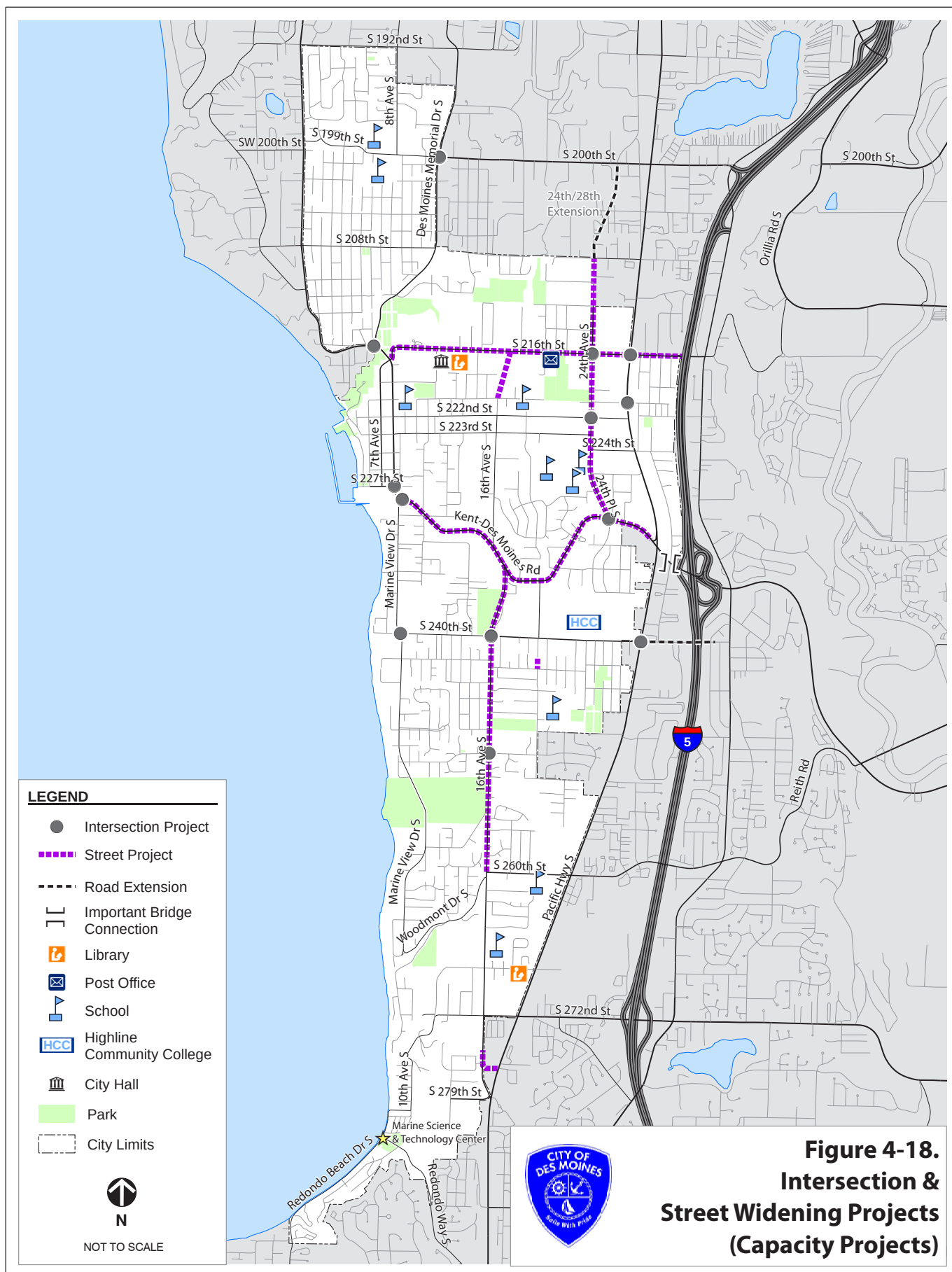
Table 4-14. Continued

Project Type	Location	Project Description	Capacity	Safety	Operations	Development
Safety & Operations						
8th Avenue South	at South 200th Street	Monitor operation for possible future signal or other treatment.		X	X	
Des Moines Memorial Drive South	at South 208th Street	Add left turn pockets.		X	X	
Des Moines Memorial Drive South	at South 212th Street	Add left turn pockets.		X	X	
Marine View Drive/7th Avenue South	at South 216th Street	Optimize signal timing and coordinate with Des Moines Memorial Drive/Marine View Drive Intersection.		X		
South 216th Street	at Pacific Highway South	Add red light camera enforcement.		X		
Pacific Highway South	at South 224th Street	Change westbound left turn phasing to protected/permitted.		X		
South 240th Street	at 20th Avenue South	Widen to provide two-way left-turn lane/ refuge pocket along segment. Widen to provide left turn lane at intersection. Improve sight distance at intersection. Install traffic signal if warranted.		X	X	
South 240th Street (Kent)	at Pacific Highway South	Add dual left turn for eastbound approach, revise signal phasing. Coordinate with City of Kent.	X		X	X
South 260th Street (Kent)	at Pacific Highway South	Monitor safety and coordinate with City of Kent.		X		
South 272nd Street	east of 16th Avenue South	Implement access control at development driveway access.		X	X	X
Kent-Des Moines Road	at Pacific Highway South	Improve vehicle detection and signal timing. Carry lane markings through intersection to better define channelization. Add red light camera enforcement.		X	X	
Redondo Beach Drive South	at RedondoWay South	Monitor operation for possible future signal or other treatment.		X	X	

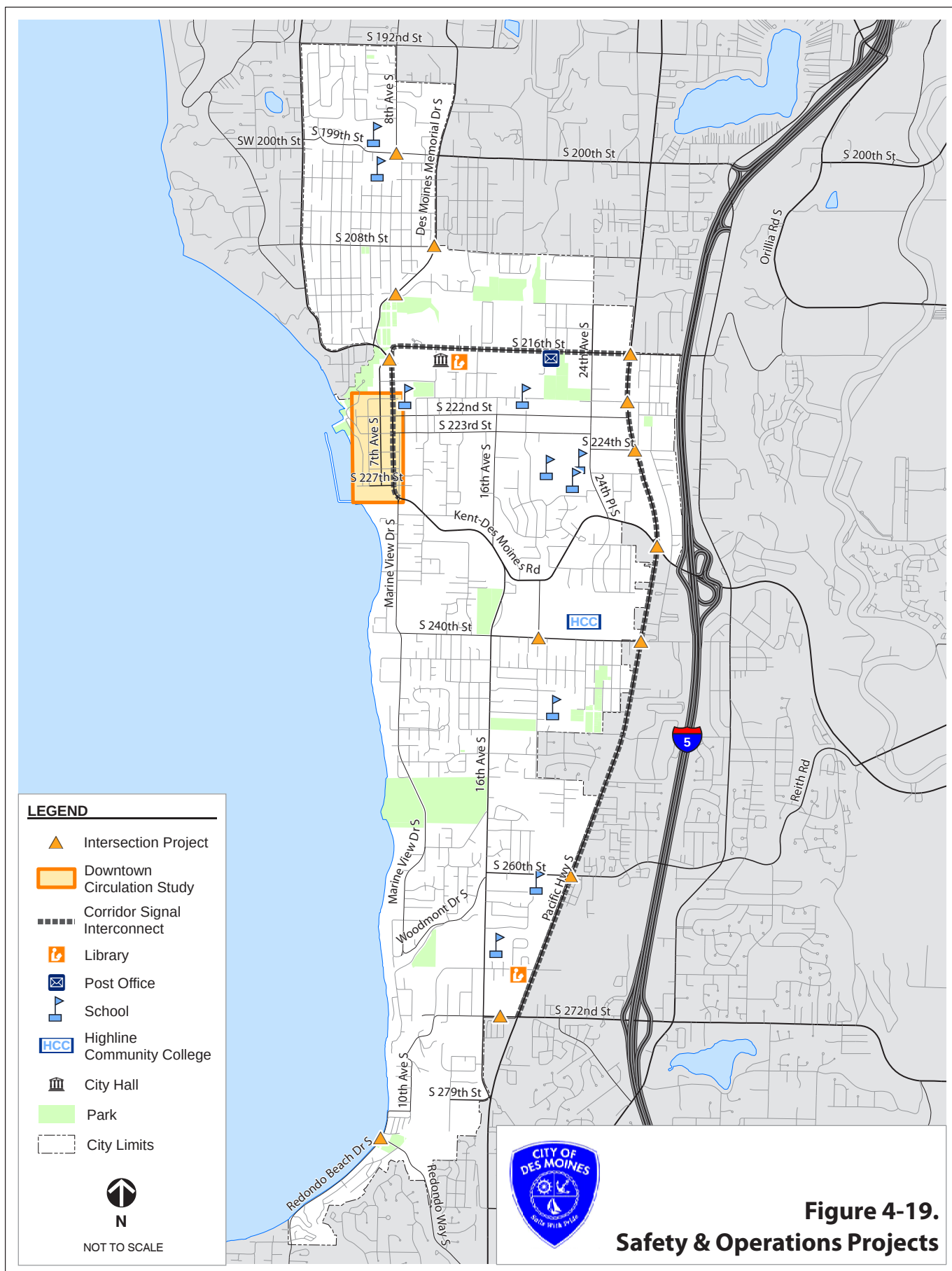


Table 4-14. Continued

Project Type	Location	Project Description	Capacity	Safety	Operations	Development
System Preservation and Management						
Downtown Circulation Study	Downtown	Develop plan to maximize multi-modal use, pedestrian access and traffic operations.	X	X	X	
Pacific Highway South	South 216th Street to South 272nd Street	Fiber optic signal interconnect.	X		X	
Marine View Drive South	Des Moines Memorial Drive to Kent-Des Moines Road	Fiber optic signal interconnect.	X		X	
South 216th Street	Marine View Drive to Pacific Highway South	Fiber optic signal interconnect.	X		X	
16th Avenue South	North Twin Bridge	Replace or retrofit bridge to standard.		X	X	
Marine View Drive	Bridge at Salt Water State Park	Replace or retrofit bridge to standard.		X	X	
Pavement Management Program	Citywide	Increase funding program for improvements.		X	X	
Traffic Management Center	Public Works	Communication and coordination with WSDOT and King County Traffic Management Centers.	X	X	X	
Traffic Calming Program	Citywide	Fund annual program for improvements.		X	X	
Parking Management Plan	Downtown and HCC areas	Develop parking management strategy and apply program and actions.		X	X	
ITS Plan	Arterial Streets	Develop and implement an ITS Plan for City arterials.			X	
Sign and Signal Upgrades	Citywide	Continue to improve signs and traffic signals to meet MUTCD standards.	X	X	X	



Street System and Parking



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Chapter 5 | Pedestrian and Bike Networks

The City is committed to providing the opportunity to walk and bicycle to all residents by supporting safe, efficient, desirable, and accessible pedestrian and bicycle travel. This Chapter presents the existing conditions for bicyclists and pedestrians as well as the vision for a future network of trails, sidewalks, bicycle lanes, and other improvements that will benefit all roadway users and the environment.

The Washington State Legislature passed a bill in 2005 that amends the Growth Management Act to require consideration of physical activity and non-motorized transportation. Sections of the bill state:

“Whenever possible, the land use element should consider using urban planning approaches that promote physical activity.

Pedestrian and bicycle component to include collaborative efforts to identify and designate planned improvements for pedestrian and bicycle facilities and corridors that address and encourage enhanced community access and promote healthy lifestyles.”

PEDESTRIANS

The vision for the pedestrian network in Des Moines is that all streets offer a comfortable place to walk and that certain streets are enhanced with sidewalks, pedestrian lighting, and wayfinding signage. The City plans to improve its pedestrian network, focusing first on basic provisions at locations of critical need, with longer term plans to construct additional pedestrian amenities.

Pedestrian-friendly neighborhood street design improves the safety of the walking environment, fosters trips made on foot, and facilitates better access to transit service. The provision of a space to walk is the most basic pedestrian accommodation, and sidewalks play a key role in improving pedestrian safety in urban areas. Walkways take a wide variety of forms. They range from a graded shoulder at the most basic level to a sidewalk with a landscaped buffer. Studies have shown that in residential and mixed residential areas, crashes involving pedestrians were more than twice as likely to occur at locations without sidewalks as would be expected based on exposure¹. Additionally, the absence of sidewalks or a wide, grassy walking area increases the likelihood that a “walking along roadway” pedestrian collision will occur.² In fact, the presence of a sidewalk is associated with an 88 percent reduction in the likelihood of a site being a pedestrian “walking along roadway” crash site, compared to having no sidewalk or walkway.³ The City’s long-term goal is to provide sidewalks and to take advantage of opportunities to provide interim walkways wherever possible.

What is in this Chapter

- Pedestrian Network
- Existing Facilities
- High Priority Network
- Sidewalk Improvement Projects
- Curb Ramps
- Other Items Recommended
- Bicycle Network
- User Groups
- Types of Bikeways
- Recommended Bikeway Network
- Other Items Recommended

- 1 Knobloch, R.L. et al. Investigation of Exposure Based Pedestrian Accident Areas: Crosswalks, Sidewalks, Local Streets, and Major Arterials. Federal Highway Administration, 1987. Washington, D.C.
- 2 McMahon, Patrick et al. *Analysis of Factors Contributing to ‘Walking along Roadway’ Crashes*. Transportation Research Record No. 1674, Paper No. 99-1203.
- 3 Same as reference cited in footnote 2.

EXISTING PEDESTRIAN FACILITIES AND PROGRAMS

The City inventoried the existing sidewalks and curbs in the spring of 2008 and catalogued the data in the City's geographic information system (GIS). **Figures 5-1 and 5-1a** show the existing sidewalk inventory. There are over 46 miles of sidewalks within the City. Slightly more than 75 percent of the City streets are missing sidewalks on one or both sides of the street. Many of these streets provide access to schools, parks, transit routes, and other land uses likely to generate pedestrian trips.

The City's sidewalk inventory identified missing or incomplete sidewalks. Key roadways lacking sidewalks include "portions" of:

- The downtown commercial neighborhood
- South 199th/200th Street
- South 222nd Street, South 223rd Street
- 24th Avenue South
- South 216th Street
- 16th Avenue South
- Marine View Drive South
- Kent-Des Moines Road
- Des Moines Memorial Drive
- Several streets around Highline Community College

Walkability

Walkability measures the overall walking conditions in an area. Locations are considered walkable when they have a good mix of destinations, sidewalks, frequent street crossings, and good buffering from traffic. Elements affecting pedestrian comfort include the number of lanes, amount of traffic, posted speed, and frequency of crossing opportunities.



The initial step in developing a pedestrian plan for Des Moines was to identify a network of streets that would establish a Priority Pedestrian network. These are streets that serve a high number of destinations. They are most likely to be arterials or collectors where the need for a separate walkway is more desirable. The following section describes the steps taken to identify this network.

The City has several opportunities to create a great pedestrian environment through the construction of sidewalks and other streetscape enhancements, such as curb extensions and frequent crossing opportunities. The pedestrian network should serve important existing destinations including:

- Public buildings, such as City Hall and the Libraries
- Elementary, Middle Schools, and the High School
- Highline Community College
- The Downtown commercial district
- City parks including Saltwater State Park and the Marina
- The regional trail system

- Senior housing
- Transit stops
- The new RapidRide transit corridor along Pacific Highway South

HIGH PRIORITY NETWORK PROCESS

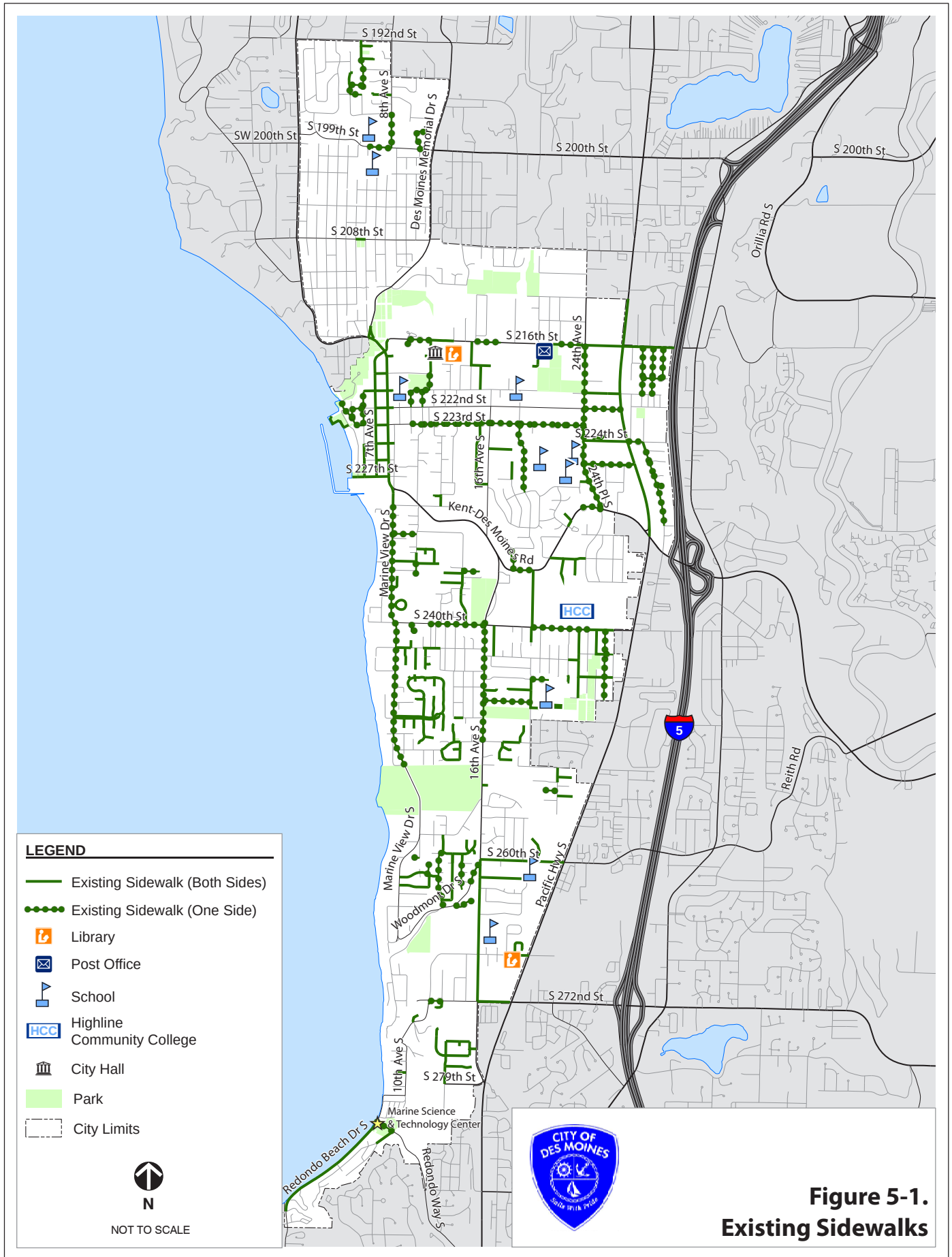
The steps described below were used to identify and address the locations with the greatest need for pedestrian enhancements.

- The City identified important walking destinations throughout Des Moines. These destinations included land uses and facilities that serve sensitive populations, such as schools, senior centers, and care centers, as well as land uses with high numbers of pedestrians, such as the Downtown neighborhood, Highline Community College, libraries, trails, and parks.
- Applied a ¼ mile radius around each of these locations, which is the industry standard for a reasonable distance for walking trips.
- Promoted all arterial and collector streets to the top of the list. Arterial streets tend to have higher average daily traffic volumes and higher posted speeds, and pedestrians need better separation from traffic at these locations than along lower speed, lower volume streets. These streets are also more likely to have transit service, and pedestrian connections to transit are essential to enhance and promote ridership.
- Consolidated these streets into a cohesive network which comprises the Priority Pedestrian Network (Figure 5-2).
- Determined where sidewalks were missing in the network (Figure 5-3) and grouped them into a project list. Identified the ones that would be constructed as part of roadway capacity projects or redevelopment efforts (such as Pacific Ridge).
- Selected a smaller number of projects for the sidewalk Capital Improvement Program. These projects were selected based on need, constructability, and cost. They are purely sidewalk projects and not part of another planned street improvement.

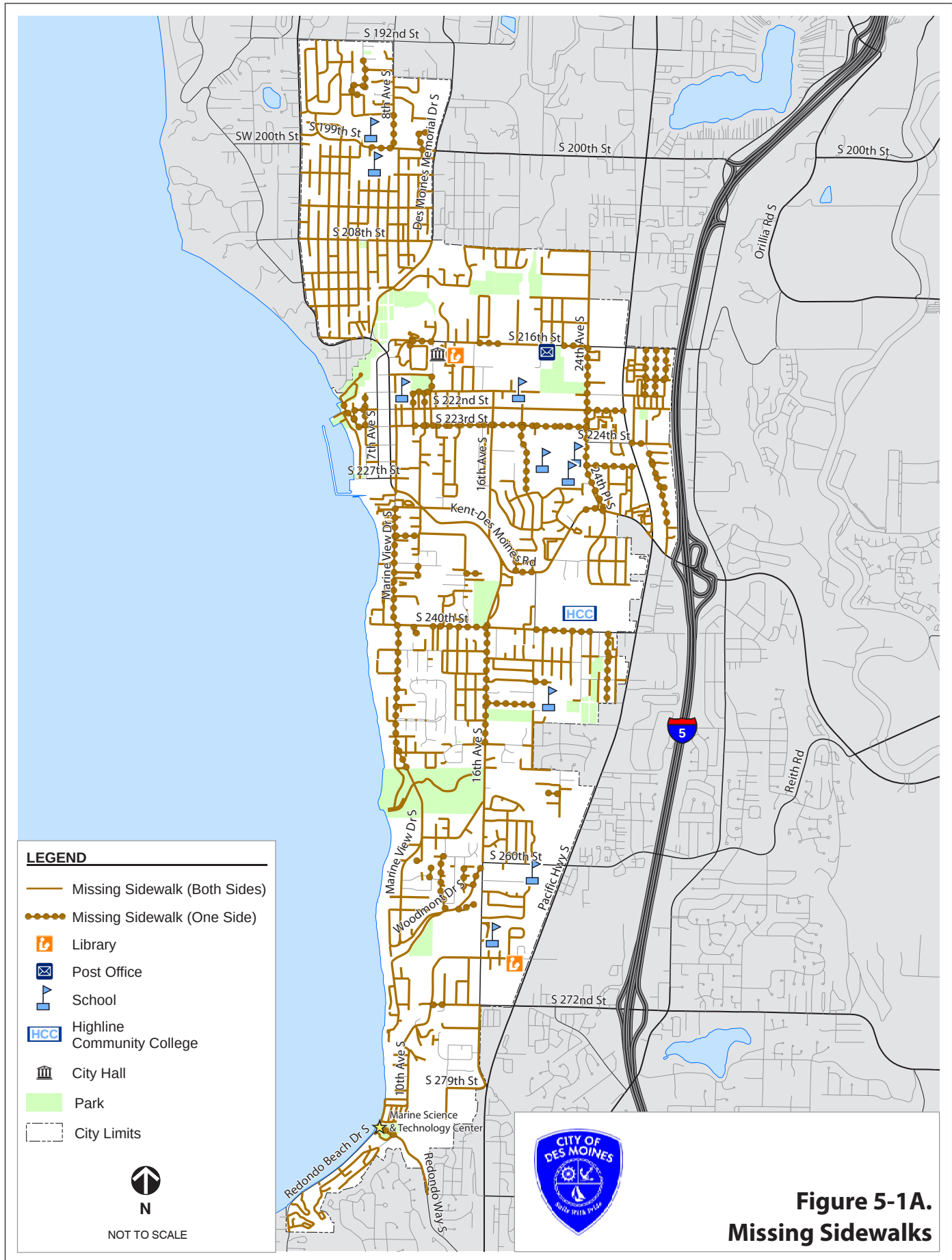
Figures 5-1 and 5-1a show the Citywide network of existing and missing sidewalks; **Figure 5-2** shows the Priority Pedestrian Network; and **Figure 5-3** illustrates the missing sidewalk segments within the priority pedestrian network.

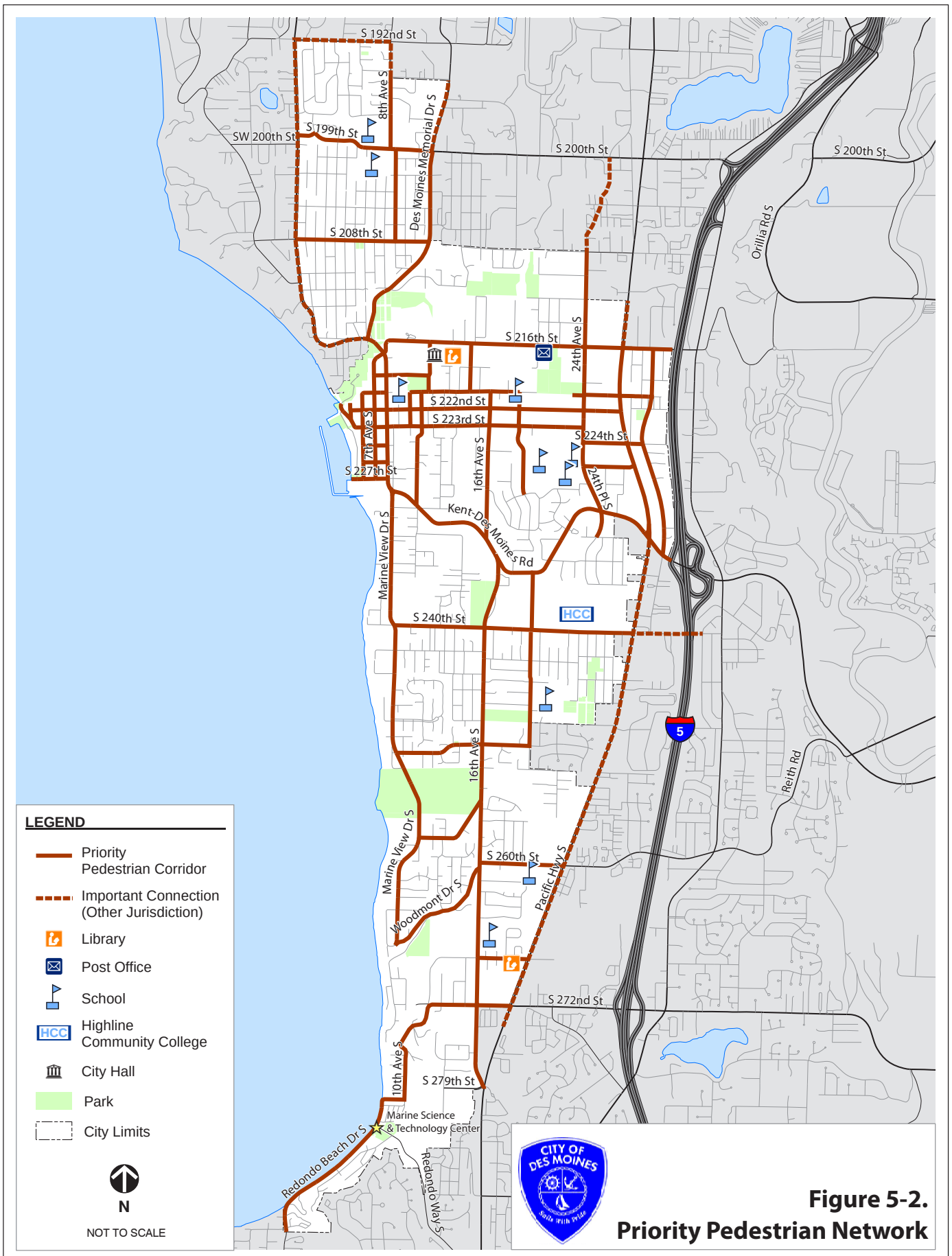
Notably, there are several streets in Des Moines that lack sidewalks which are not a part of the Priority Pedestrian Network. The City will take advantage of opportunities to construct sidewalks along these streets, such as redevelopment or other roadway projects as they arise. Frontage improvements with sidewalks are required for all redevelopment.





Pedestrian and Bike Networks





SIDEWALK IMPROVEMENT PROJECTS

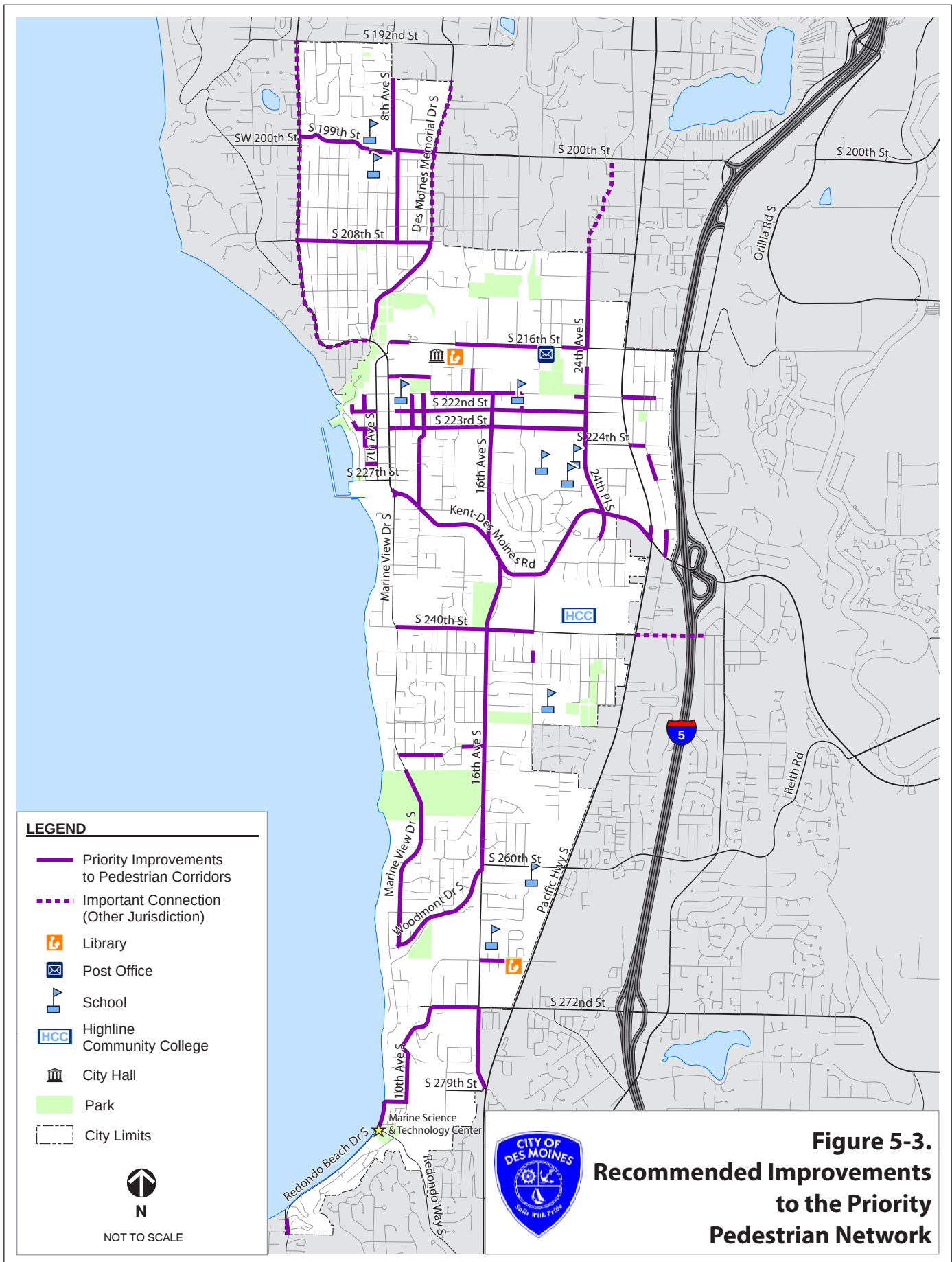
The City's goal is to provide pedestrian provisions along the key corridors shown in **Figure 5-3**. The basic provisions include:

- Sidewalks – At a minimum, sidewalks should comply with the Americans with Disabilities Act Accessibility Guidelines (ADAAG). Where feasible, walkways should include landscape strips and provide a minimum of five feet of sidewalk.
- Curb ramps - Curb ramps requirements are described in ADAAG. An inventory of curb ramps is included in this chapter.
- Countdown pedestrian signals where pedestrian signal heads exist – The 2009 Edition of the Manual on Uniform Traffic Control Devices (MUTCD) will likely require agencies to provide countdown pedestrian signals at all locations where there are pedestrian signal heads, within the next 10 years. Des Moines can begin to meet this goal by including countdown signals in all new and replacement signal projects and by developing an annual program to distribute costs over the compliance period.

Many of the sidewalk projects will be included as part of a street capacity project listed in Table 4-14, included with a bike path shown in Table 5-2, or completed in a project with a neighboring city. Other sidewalk projects in the Priority Pedestrian Network are detailed in **Table 5-1**.

Table 5-1. Priority Pedestrian Network Projects

Location	Limits	Centerline Miles
Downtown Commercial Streets	6th Avenue South, East-West cross streets	0.85
South 199th and South 200th Street	1st Avenue South to Des Moines Memorial Drive	0.74
8th Avenue South	South 194th Street to South 208th Street	0.86
South 208th Street	1st Avenue South to Des Moines Memorial Drive	0.7
South 222nd Street	Marine View Drive to 24th Avenue South	1.04
South 223rd Street	Marine View Drive to 24th Avenue South	1.04
South 220th Street	11th Avenue South to 16th Avenue South	0.48
9th Avenue South	South 220th Street to Kent-Des Moines Road	0.23
10th Avenue South	South 220th Street to Kent-Des Moines Road	0.61
16th Avenue South	South 220th Street to Kent-Des Moines Road	0.78
Marine View Drive	South 250th Street to Woodmont Drive South	1.05
Woodmont Drive South	Marine View Drive to 16th Avenue South	0.65
S 272nd Street and 10th Avenue South	16th Avenue South to Redondo Beach Drive	1.09
Redondo Beach Drive	Sidewalk to South City Limits	0.16



CURB RAMPS

Another element of the pedestrian realm is the provision of curb ramps for accessibility. Curb ramps benefit many users, including those in wheelchairs and walkers, older adults, and parents with strollers. The City undertook a survey of intersection corners to create the foundation of a plan to bring all ramps into compliance with federal guidelines, as described in the following section.

Americans with Disabilities Act (ADA)

The Americans with Disabilities Act (ADA) is a landmark piece of federal legislation enacted in 1990 that provides thorough civil liberties protections to individuals with disabilities with regards to employment, state and local government services, access to public accommodations, transportation, and telecommunications.

Title III of the act requires places of public accommodation to be accessible and usable to all people, including those with disabilities. While the letter of the law applies to “public accommodations,” the spirit of the law applies not only to public agencies but to all facilities serving the public, whether they are publicly or privately funded.

Title II of the act requires that all government services, programs, and activities be accessible to and usable by persons with disabilities. However, Title 28 of the Code of Federal Regulations, Section 35.150(a), states that if the public entity can demonstrate that modifications would fundamentally alter the nature of its service, program, or activity, or cause undue financial and administrative burdens, it is not required to make that particular modification.

ADA Transition Plan Requirements

ADA requires that cities have ADA Transition Plans in place, which should include a Self Evaluation and a plan to address physical barriers, among several other elements. Many cities interpreted this requirement to cover curb ramps exclusively. A recent U.S. Supreme Court opinion (Barden v. Sacramento) indicated that the plans must also address sidewalks, and the City should show a good faith effort to fund improvements. The Transition Plan must have a clear inventory of ADA issues throughout the City, including curb ramps, tripping concerns, and sidewalks with insufficient width or cross slopes that exceed ADAAG. The Plan should include a prioritized project list with cost estimates, and the City should be able to demonstrate that funds are identified to meet the need.

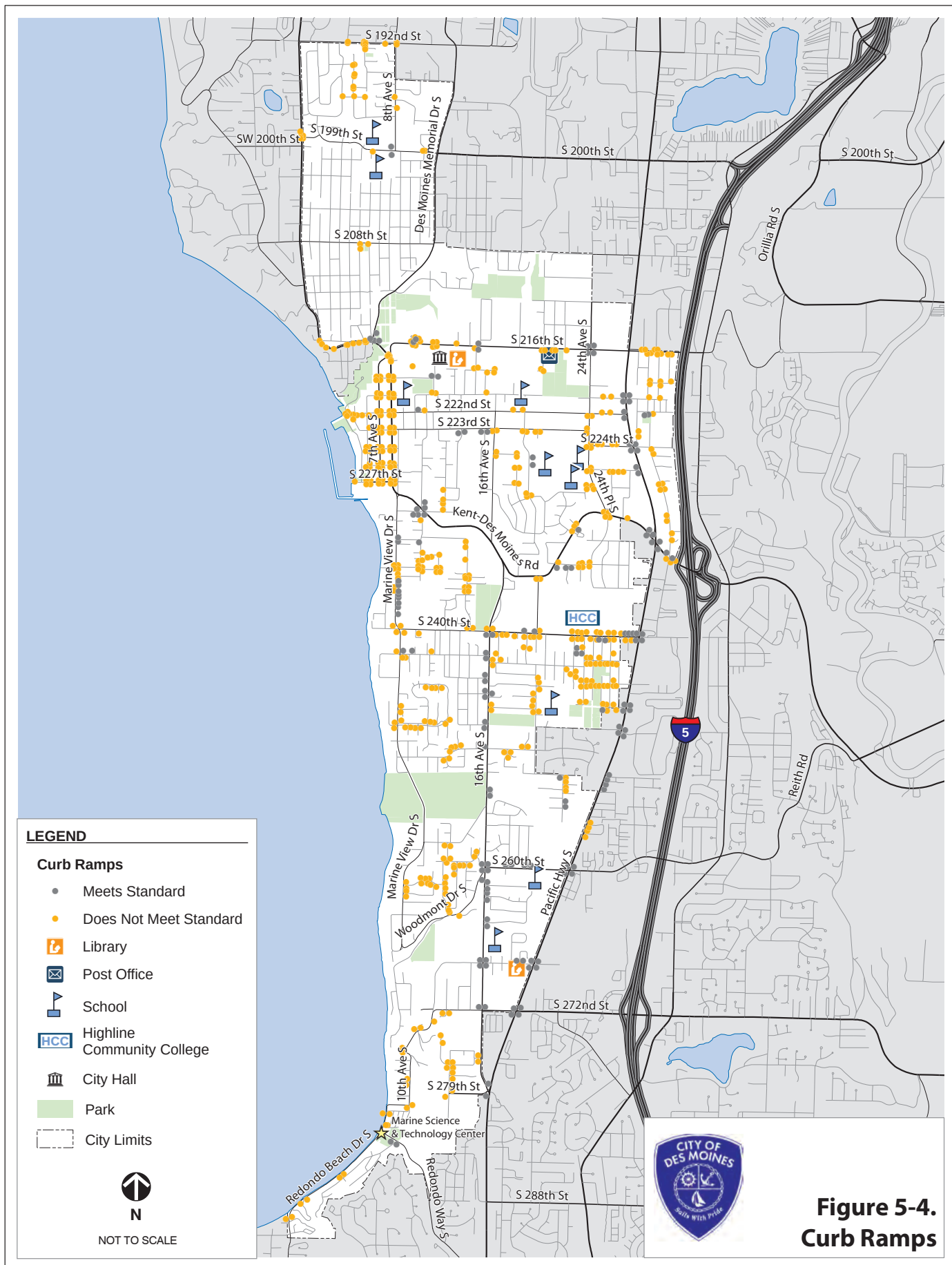
Curb Ramp Analysis

The survey of curb ramps throughout the City identified three main categories of curb ramps:

- Curb ramps that are installed and have truncated domes, indicating that they were likely constructed or retrofit recently to current standards issued by the Access Board in the ADAAG for Public Rights-of-Way (ADAAG PROW). Note: Ramps and landing strips were not measured, and the inventory did not include an evaluation of pushbuttons at signalized intersections.
- Curb ramps that are installed but lack truncated domes, indicating that they are not likely up to the current ADAAG.
- Corners with missing curb ramps.

Of the 636 corners surveyed, 24 percent fell into the first category, meaning they had curb ramps with truncated domes and were likely up to current standards. Corridors with standard ramps include portions of Pacific Highway South, South 260th Street, 16th Avenue South, and South 272nd Street. Other standard ramps are scattered throughout the City.

However, almost all the ramps surveyed in the downtown commercial district were either missing or not to standard. **Figure 5-4** displays the results of the inventory.



Washington State Pedestrian Law Summary

Pedestrians must obey traffic control signals and traffic control devices unless otherwise directed by a traffic or police officer. (RCW 46.61.050)

Vehicles shall stop at intersections to allow pedestrians and bicycles to cross the road within a marked or unmarked crosswalk. (RCW 46.61.235)

Every pedestrian crossing a roadway at any point other than within a marked crosswalk or within an unmarked crosswalk at an intersection shall yield the right of way to all vehicles. (RCW 46.61.240)

Pedestrians must use sidewalks when they are available. (RCW 46.61.250)

Drivers and bicyclists must yield to pedestrians on sidewalks and in crosswalks. (RCW 46.61.261)

Conclusions

Using a rough estimate of \$1,500 per ramp, the City would need to allocate \$840,000 to upgrade or construct new ramps at the 480 corners that require attention. Although the survey is incomplete (it did not include detailed measurements of other ramp components such as landing strips), it does provide an order-of-magnitude estimate of the challenge the City will face in bringing its corners into compliance with the current ADAAG. An initial step would be to complete a thorough curb ramp survey in the Downtown neighborhood and along streets in the Priority Pedestrian Network. A second step is to budget an estimated \$42,000 annually to upgrade existing ramps to ADAAG standards. At this funding level, it would take 20 years to upgrade the existing ramps that require attention.

OTHER RECOMMENDED PEDESTRIAN PROGRAMS AND POLICIES FOR THE CITY TO CONSIDER

Pedestrian Design Guidelines

The Des Moines CTP addresses sidewalks and corners, and this approach will ensure that basic pedestrian provisions are in place. However, a great walking environment includes several components of the pedestrian realm which influence walkability, or the safety, comfort, and desirability of a place for pedestrians. The pedestrian realm consists of walkways, pedestrian crossings, and open spaces, and the quality of the pedestrian realm has two components: accessibility and comfort.

Pedestrian Design Guidelines would allow the City to address elements such as curb extensions, traffic circles, raised crosswalks, and pedestrian signals, to assist staff in recommending where and how these elements should be implemented. Other potential policy changes could include the use of street furniture and news racks to ensure continued access and walkability. The City may wish to identify pedestrian districts (such as the area around Highline Community College or the Downtown neighborhood) where wider sidewalks and planting strips are desirable.



Crosswalks

Critical elements of the pedestrian travelway are crossing locations. Well-marked, highly visibility pedestrian crossings accomplish dual goals. They prepare drivers for the likelihood of encountering a pedestrian, and they create an atmosphere of walkability and accessibility for pedestrians. One of the most vital strategies to prevent collisions involving pedestrians is to ensure they cross the street at safe locations and to ensure that the locations where pedestrians

are likely to cross are as safe as possible. A comprehensive crosswalk policy can help City staff to determine when and how to treat pedestrian crossings, whether at signalized or unsignalized locations. Staff will develop and administer such a policy.

A crosswalk policy for the City would present a variety of special treatment options to mitigate safety, visibility or operational concerns at specific locations and provide a clear decision-making process for City staff based on the best management practices and standards (such as the MUTCD) about where and how to mark crosswalks.

A crosswalk policy could help the City accomplish key goals:

- Identify where unmarked crosswalks are safe and acceptable
- Ensure consistency in City approach to marking crosswalks
- Make the City's guidelines clear to resident

BICYCLING

Bicycling is a low-cost, quiet, non-polluting, and healthy form of transportation ideal for many trips, including recreation, commuting, and running errands. A bicycle network benefits an entire community, including walkers, hikers, wheelchair users, and people of all ages and abilities.

Des Moines has many qualities favorable to bicycling, including existing regional trails and relatively flat terrain from north to south. Heavy traffic and a lack of bicycle facilities on major arterials are existing constraints to bicycling.

USER GROUPS

Bikeways, like streets and sidewalks, are used by a wide range of people--children riding to school, commuters riding to work, people exercising, racing, or touring. A comprehensive bicycle system meets the needs of several user groups.

Related to the user groups mentioned above is trip purpose, which helps identify common needs among the groups. In general, bicycle trips can be broken down into recreational (including all discretionary trips), commuter (whether to work or school), or shopping trips. The biggest difference between these groups is that while recreational riders may be interested in routes leading to parks or other areas of interest, commuters and shoppers are interested in the shortest and safest route between two points.

Recreational Destinations and Needs

Des Moines has a diverse recreational system that includes city parks and trails as well as regional parks and trails that appeal to various types of bicyclists. Recreational bicycling includes children riding to a nearby park, more serious cyclists riding tours, casual riders riding in the evening for exercise, and older adults riding to a community center. The common attribute of all of these activities is that they are generally done for the pleasure of the ride itself, they have a recreational facility as a final destination, they are discretionary by nature, and they value speed and directness less than surroundings and relative safety.

Recreational bicyclists can generally be categorized into two groups. The first group is casual bicyclists who typically have short trips and often include less experienced cyclists, particularly young children and older adults. The second group includes more experienced and athletic riders who generally seek scenic back roads as their favorite domain.



It is important to understand these distinct types of bicyclists as the proposed system must provide opportunities for both groups. For the person riding for exercise, the needs are for a relatively quiet route with no stops, away from automobile traffic, if possible, preferably with visual interest and shade from the wind and sun. A loop configuration is preferred so that the rider ends up back at his/her starting point without backtracking. For the person going to another recreational destination (a park or a shopping mall), the route may consist of fairly direct back streets that allow arrival with reasonable time through a comfortable environment. For other casual riders, a route that leads through interesting neighborhoods, along creeks, or through parks and open space offers the greatest interest.

Commuter and Student Destinations and Needs

Commuter and student destinations include transit stops, downtown employment centers, office parks, and elementary, junior high, and high schools. Targeting bikeway improvements to commuters is important because most roadway congestion and a significant portion of air contaminants occur during the AM and PM peak periods.

Commuters and students have similar travel behavior, which is typically to take the most direct route from origin to destination. For elementary school students, this may consist of residential or collector streets, with few crossings of major arterials. For junior high and high school students, riders may have to cross several arterials to reach school. For college students and adult commuters, rides are most often less than five miles but may be as long as 10 or 15 miles.

Commuters and students (in the morning) travel during peak periods of traffic to destinations that may have high levels of congestion and speeds. For example, one of the most challenging parts of a student's commute is the drop-off zone in front of the school where many vehicles search for parking or drop-off spaces.

Commuting bicyclists have simple and obvious needs. They require bike lanes or wide curb lanes along arterials and collectors, loop detectors at signalized intersections, signals where school children need to cross busy arterials, periodic maintenance of the pavement, and adequate bicycle parking, storage, and lockers/showers at their destination points.

TYPES OF BIKEWAY FACILITIES

Figure 5-5 shows the existing bikeway network in the City. Currently, bikeways within the City generally fall into one of three categories.

- Bike lanes provide a restricted right-of-way and are designated for the use of bicycles with a striped lane on the street. They are generally at least five feet wide. Vehicle parking and vehicle/pedestrian cross-flow are prohibited. Bike lanes are preferred to bike paths on roadways with multiple intersections and/or driveways, for the reasons described above.
- Bike routes on shared facilities share the roadway with pedestrians and motor vehicle traffic, typically on lower volume roads.
- Bike paths that provide a completely separate right-of-way and are designated for the exclusive use of bicycles and pedestrians with vehicle and pedestrian cross-flow minimized. Bike paths are for non-motorized use only.

RECOMMENDED BIKEWAY NETWORK

The proposed bikeway system, when fully implemented, will provide 23.5 miles of bikeways, a comprehensive system for the City of Des Moines. The prioritization is meant to serve as a guide and not an impediment to implementation. The City will pursue opportunities to implement projects through routine resurfacing, restriping, or development projects as they arise, regardless of a project's place in the prioritization. The prioritization of the bicycle projects is based on the following four criteria:

- **Activity Centers:** The project is near existing and planned activity centers such as parks, schools, employment centers, and shopping centers.
- **Connectivity:** The project provides connections to existing bicycle facilities, activity centers, or closes a gap in the existing bikeway network.
- **Regional Access:** The project provides access to regional trails, bikeways in adjacent cities, across freeways, or to transit stops.
- **Relative Ability to Implement:** The project can be implemented based on the amount of roadwork and coordination needed.

The recommended bikeway network should be reevaluated every five years as the plan is updated.

Figure 5-5 shows existing system and **Figure 5-6** shows the proposed bikeway network. **Table 5-2** below details the on-street projects by priority.

Table 5-2. Recommended Bikeway Network Projects

Rank	Project Name	From	To	Length (miles)
1	16th Ave South Bike Lanes	South 250th Street	South 260th Street	0.65
2	24th Place South Bike Lanes	South 208th Street	Kent-Des Moines Road	1.38
3	South 224th Street Bike Lanes	24th Avenue South	Eastern City Limits	0.44
4	South 240th Street Bike Lanes	Marine View Drive South	Pacific Hwy South	1.26
5	South 216th Street Bike Lanes	Marine View Drive South	I-5	1.57
6	30th Avenue South Bike Lanes	Kent-Des Moines Road	South 216th Street	1.10
7	Kent-Des Moines Road Bike Lanes	Marine View Drive South	Pacific Highway South	1.83
8	Dock Street Bike Lanes	South 227th Street	Cliff Avenue South	0.53
9	Des Moines Memorial Drive South Bike Lanes	South 216th Street	South 208th Street	0.63
10	16th Avenue South	Pacific Hwy South	South 272nd Street	0.44
11	Bicycle Route Network and Way-finding Signs	Citywide	Citywide	13.09
12	Barnes Creek Trail	South 216th Street	Kent-Des Moines Road	1.0



Pedestrian and Bike Networks

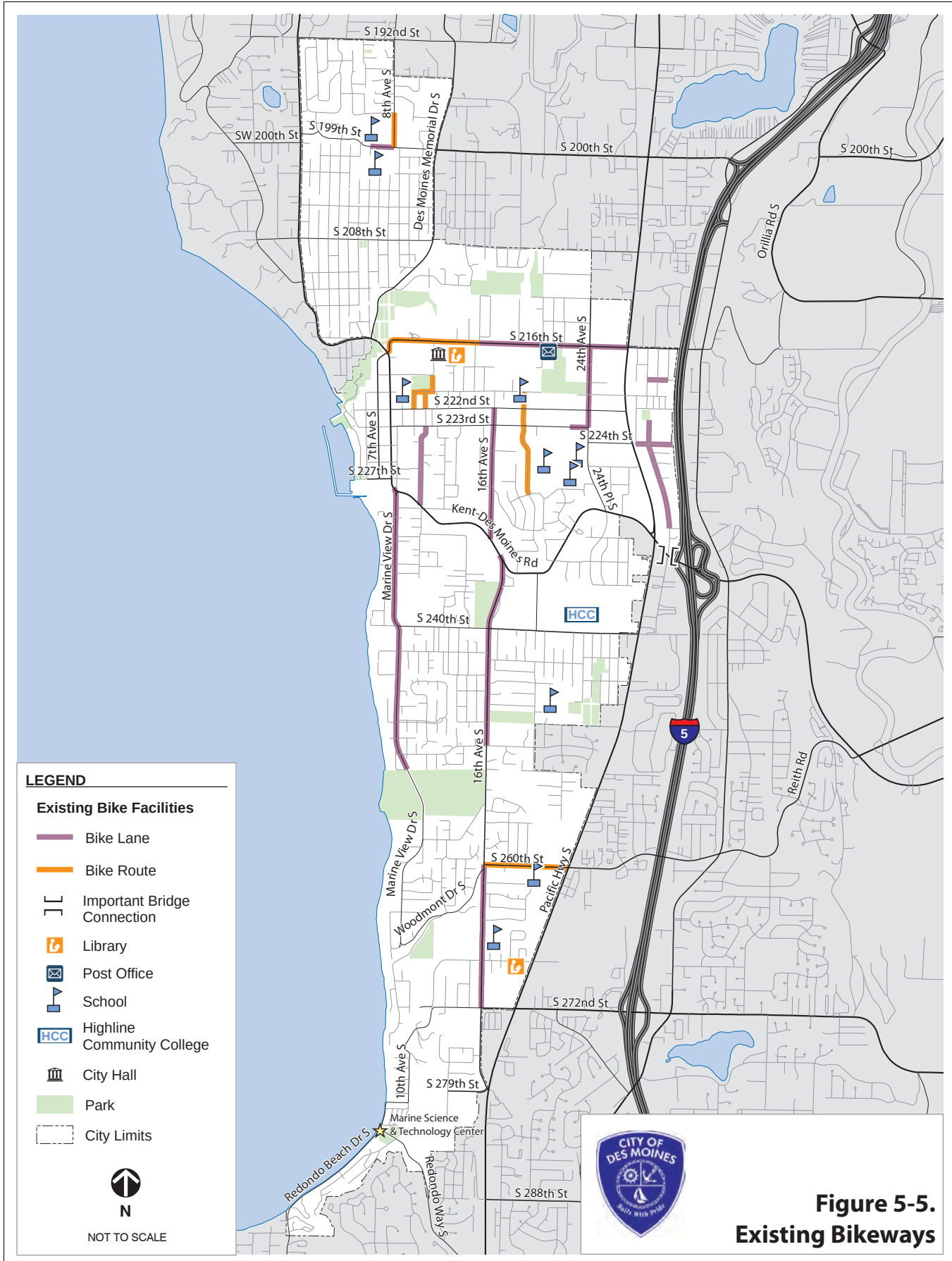
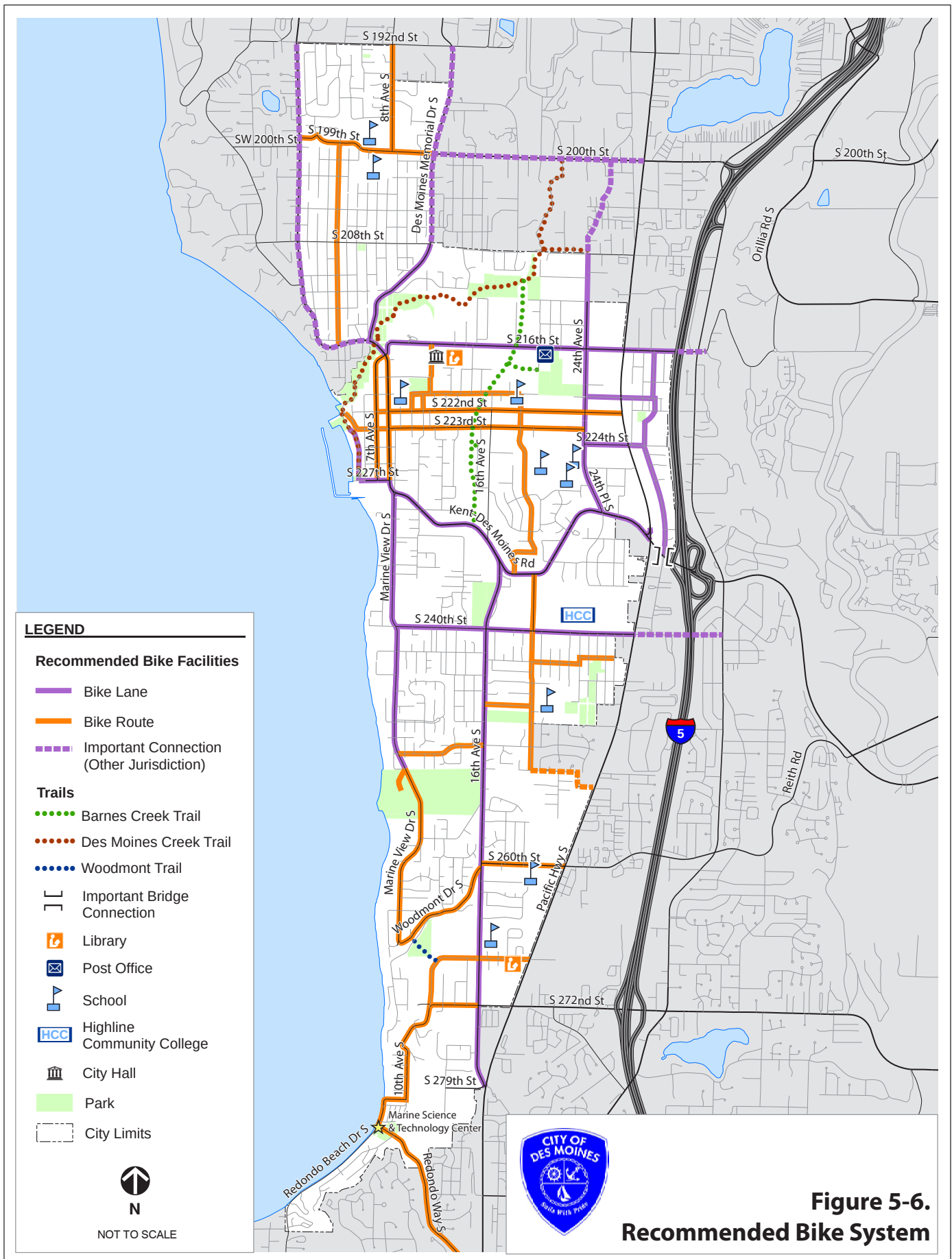


Figure 5-5.
Existing Bikeways



OTHER RECOMMENDED BICYCLING PROGRAMS AND POLICIES FOR THE CITY TO CONSIDER

Bike Parking Ordinance

Every bicycle trip has two components: the route selected by the bicyclist and the “end-of-trip” facilities at the destinations. Bicycle support facilities are facilities that cyclists use when they reach their destinations. They can include short and long-term bicycle parking, showers, lockers, restrooms, good lighting, bicycle repair facilities and even public phones. The lack of bicycle facilities at the destination can be one of the largest deterrents to cycling for many riders.

The City may wish to consider including a bicycle parking ordinance in its municipal code that would detail the required amounts of bicycle parking for various land uses. The ordinance can ensure that adequate bike parking is provided as development occurs.

Education, Enforcement, Engineering and Encouragement

A comprehensive pedestrian and bicycle safety program includes education, enforcement, engineering and encouragement.

- Public education efforts include banners, websites, posters, and public service announcements. Education campaigns targeted at school children such as a model curriculum for inclusion in elementary school physical education programs can be effective.
- Encouragement includes involving the community as part of any solution and programmed events like “Walk to School Day” and “Bike to Work Day.”
- Enforcement efforts may include special training for officers in pedestrian and bicycle collision analysis and red-light running programs.
- Engineering includes improvements to signal timing and physical enhancements to the pedestrian travelway.

The existing pedestrian and bicycle components of the CTP addresses elements such as curb ramps and bike lanes, which fall in the engineering realm. While critical, these improvements can also be expensive to fund and disruptive to construct, oftentimes requiring right-of-way acquisition or major utility relocation. Education, enforcement, and encouragement programs are much less expensive and have demonstrated success in improving pedestrian and bicycle safety. A comprehensive review of the City’s current pedestrian programs, called a Pedestrian Safety Audit, would allow the City to get a clear understanding of its current status and to develop an action plan to take simple steps towards incorporating some of these more cost-effective model programs.

Safe Routes to School

Many students walk or ride bicycles on the sidewalks to school. Students are among the most vulnerable pedestrians, and areas around schools require special attention in the form of pedestrian facilities and safety measures. Currently, Des Moines schools have maps that identify walking routes to schools. While useful, the routes are based on where there are current pedestrian facilities. As federal funding is available for school improvements, the City could use the Priority Pedestrian Network to identify Safe Routes to School projects for funding applications. The projects could include additional elements such as curb extensions and other appropriate crossing treatments.

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Chapter 6 | Transit Service and Travel Demand Management

Transit service is an increasingly important element of Des Moines' transportation system. Improved transit service and new capital investments are integral to meeting the City's land use goals and the needs of the community.

Expanding service would improve mobility not only within the City but provide more connections to regional destinations for employment. However, unlike the street and non-motorized systems, the City does not directly provide transit service. Instead, the City must coordinate service expansions and changes with the region's two providers --- Sound Transit and King County (Metro and the Ferry District). The City often works with other cities in South King County to lobby these agencies for expanded service and better transit options for residents.

This chapter describes the existing transit service in Des Moines, identifies community needs and gaps in service, and recommends a set of transit improvements for the short term, mid-term, and long term.

EXISTING TRANSIT SERVICE

REGIONAL SERVICE

Sound Transit provides regional express bus service, commuter rail, and light rail in the Puget Sound Region¹. Sound Transit's network of regional express service connects the regional park-and-ride system with the major employment centers of Tacoma, Bellevue, Seattle, and Everett. The nearest park-and-rides with regional service are the Star Lake and Kent-Des Moines lots along I-5; the Redondo Park-and-Ride has only local service. Sound Transit Route 574 provides weekday and weekend service that operates at 30-minute intervals during the day and hourly during the morning and evenings in the off-peak direction between the cities of SeaTac and Tacoma.

Sound Transit also operates the regional commuter rail system, called "Sonder." Commuter rail runs a total of eight morning trips and eight evening trips between Tacoma and Seattle. Two reverse commute trains depart Seattle for Tacoma in the morning and from Tacoma to Seattle in the evening commutes. The nearest Sonder station for Des Moines residents is at Kent Station, located in downtown Kent approximately 3 miles east of I-5. King County Metro Route 166 provides all-day service between downtown Des Moines, the Kent-Des Moines Park-and-Ride, and the Kent Station.

¹ Sound Transit was created by the state legislature to build a mass transit system that connects major regional job and housing centers in King, Pierce and Snohomish counties. Voters in 1996 approved a plan that provides the foundation of that system - regional express buses, commuter rail and light rail. Voters in 2008 approved ST2 to expand the light rail system south to South 272nd Street. Today, Sound Transit carries nearly 14 million riders a year.

What is in this Chapter

Existing Transit Service

- Regional
- Local

Community characteristics affecting transit service needs

Key Transit Demographics

Planned Service Improvements

Transit Recommendations

LOCAL SERVICE

King County Metro Transit (Metro) provides local buses throughout King County. Metro provides local bus service in Des Moines within the City limits and regional connections to both downtown Seattle and Tacoma. **Figure 6-1** shows the transit routes serving the City of Des Moines, separated into those that provide all-day and those that provide peak-only service.

More detail about each of the following routes, including frequency, span of service and weekend information, is included in **Table 6-1**.

Route 121 - Provides daytime service from downtown Seattle/Burien/Normandy Park and peak period service to Highline Community College and downtown Des Moines. Service runs into downtown Seattle in the morning and from downtown Seattle to Highline Community College in the afternoon. The route is useful for commuters working in Seattle, but not for Highline Community College students who usually arrive during the morning peak period for classes.

Route 122 - Provides direct service intertwined with Route 121 and provides service from downtown Seattle/Burien Transit Center to Highline Community College/ downtown Des Moines.

Route 131 -- Service from downtown Seattle/Burien to Highline Community College/ downtown Des Moines. Service is hourly bringing riders from Seattle in the morning and returning them in the afternoon peak hours and evening.

Route 132 - Service from downtown Seattle/Burien to Highline Community College/ downtown Des Moines. Service is hourly and serves only morning and evening peak hours.

Route 166 - Service from downtown Des Moines to downtown Kent, including Kent Station. This route stops at City Hall and Highline Community College. This route provides all day and evening 30-minute service. The route stops at the Kent-Des Moines Park-and-Ride and connects with Sounder Commuter Rail (and other buses) at the Kent Station.

Route 174 - This route provides continuous service between Seattle/SeaTac/Des Moines/Federal on Pacific Highway South throughout the day with 30-minute service. It provides weekend service also.

Route 175 - Route has 2-way directional service between Seattle/ SeaTac /Des Moines/Federal Way. Service is limited to late afternoon to early evening schedule.

Route 191 - Provides 2-way directional service between Seattle/SeaTac /Des Moines/Federal Way. Service is peak period limited to early morning and late afternoon to early evening schedule.



Transit Service and Travel Demand Management

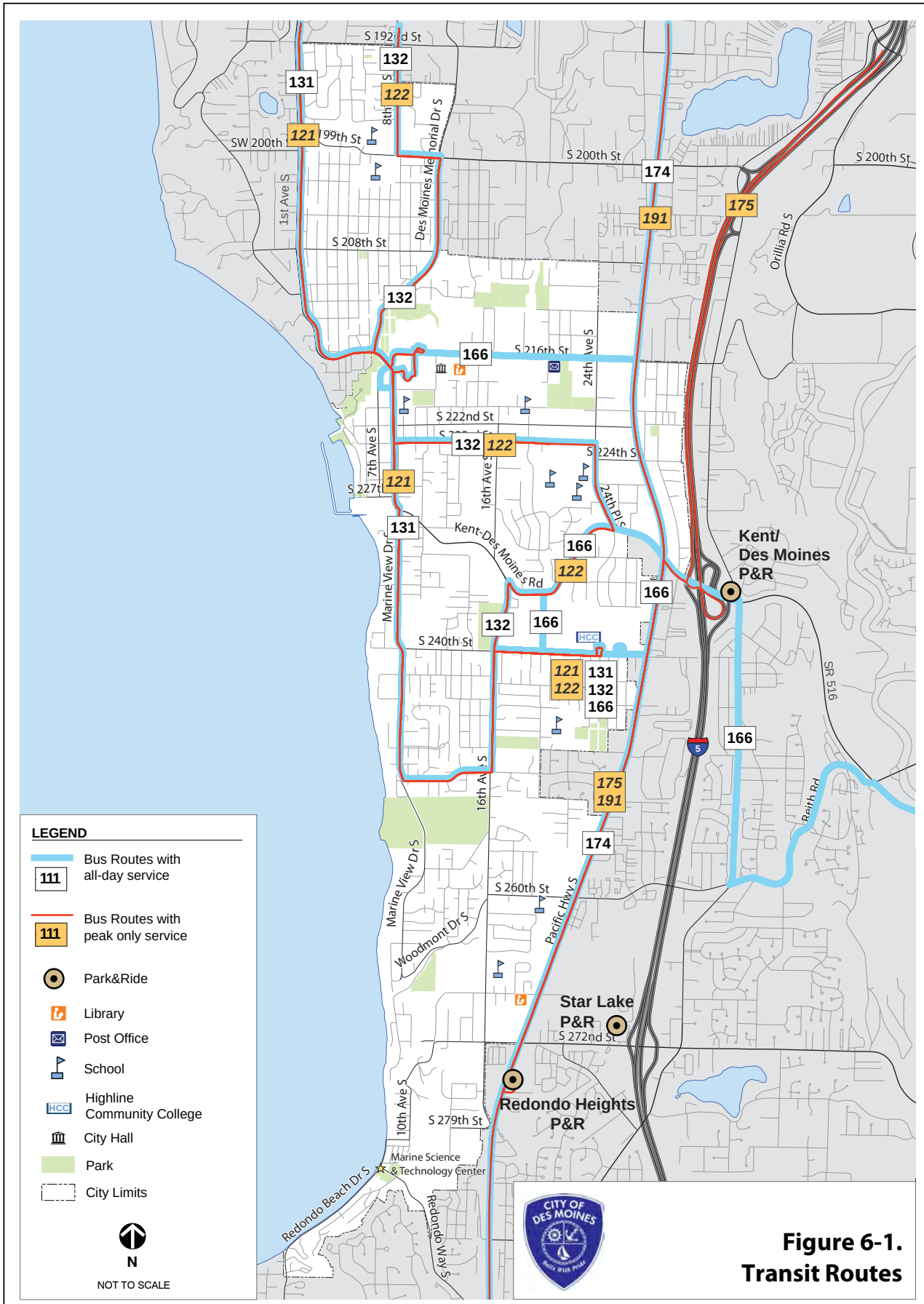


Table 6-1. Existing Transit Service

Bus Route #	Route Direction	Weekday				Weekend	
		Daily Trips	Approx Time Range*	Peak Headway (minutes)**	Off-Peak Headway (minutes)**	Sat	Sun
121	To Highline CC To Downtown Seattle	10 7	2:26 pm to 7:32 pm 4:55 am to 8:20 am	15 15	30-60 30-60	no	no
122	To Downtown Seattle To Highline CC	6 6	2:46 pm to 6:56 pm 6:05 am to 8:45 am	20 to 40 15 to 20	60 60	no	no
131*	To Highline CC To Downtown Seattle	14 15	6:53 am to 1:17 pm 7:42 pm to 1:23 am 9:23 am to 11:25 pm	60 40 to 60 60	same	Yes	yes
132	To Highline CC To Downtown Seattle	16 17	6:43 am to 1:50 pm 7:26 pm to 12:58 pm 4:53 am to 11:52 pm	45 to 60 40 to 60 60	same	yes	yes
166	To Des Moines To Kent (Sounder)	35 35	5:54 am to 11:21 pm 4:36 am to 9:42 pm	30 30	30 to 60 30	yes	yes
174	To Des Moines, et al To Downtown Seattle	46 47	6:20 am to 4:21 am 4:35 am to 2:22 am	20 to 30 20 to 30	30 to 60 30 to 60	yes	yes
175	To Des Moines, et al To Downtown Seattle	5 4	3:47 pm to 8:18 pm 6:05 am to 7:42 am	30 30	n/a	no	no
191	To Des Moines, et al To Downtown Seattle	6 5	4:21 pm to 6:55 pm 5:52 am to 8:02 am	30 30	n/a	no	no
ACCESS	ACCESS Transportation available to qualified elderly and disabled passengers living within 3/4 miles of fixed route local service.						

* Partial service to Wesley Terrace and Wesley Gardens

** Approximate; likely expands to 60 minutes end of service day

Ride-matching service available Vanpool service available

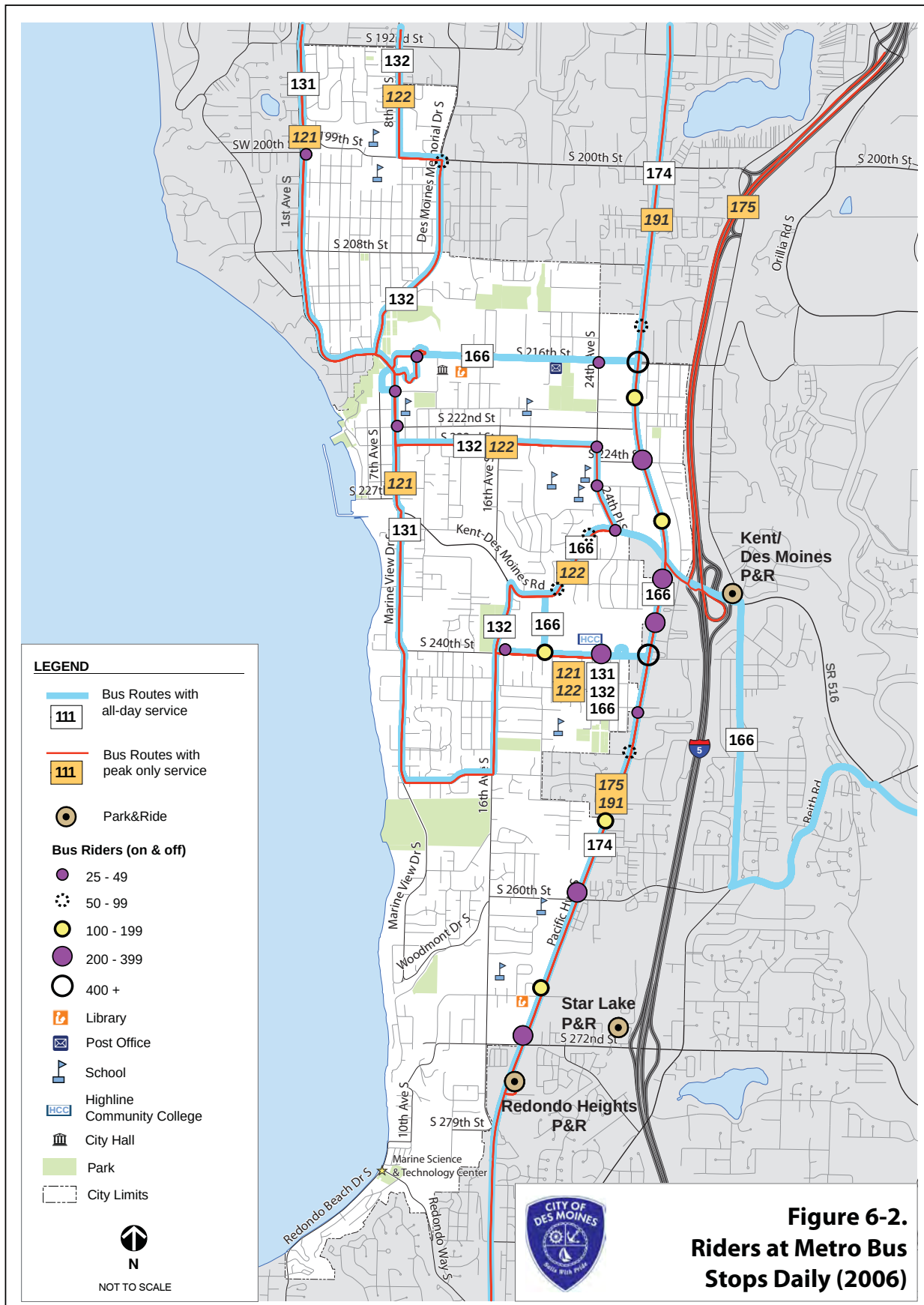
Source: Online Schedule, King County Metro website on 07/23/08

Ridership

Ridership statistics indicate where the need is highest for service. The greatest number of boardings and alightings occur where a high level of service is provided and moderate to high population and/or employment densities exist. High levels of ridership activity are also found at locations where convenient transfers are possible between routes and where automobile drivers access the transit system at park-and-ride facilities. **Figure 6-2** shows the location and the number of daily boardings and alightings on Metro bus routes. Not surprisingly, the highest boarding activity within the City occurs along Pacific Highway South, particularly near Highline Community College. Other high boarding areas include the nearby Kent-Des Moines and Star Lake Park-and-Rides.



Transit Service and Travel Demand Management



PARATRANSIT SERVICE

Metro also provides complementary paratransit service within its service area through its ACCESS Transportation Service. Transit is available to individuals who are found to be ADA² eligible. King County passed an ordinance a few years ago that mandates additional service beyond the 3/4-mile required by the ADA requirements. ACCESS now serves the entire urban growth boundary between the hours of 6 am and 10 pm on weekdays, which means that all of Des Moines is served Monday through Friday. On weekends, ACCESS adheres to the ADA minimum requirements, which mandate service 3/4-of-a-mile on either side of Metro fixed-route bus service during the times they operate. ACCESS riders must provide a minimum of 24-hour advance notice, but can reserve a trip up to 3 days in advance. Same-day trips are not available on ACCESS.

City's Senior Service Bus

The City supports the Senior Activity Center that operates a bus with volunteer drivers. The bus operates on a reservation system for seniors, and is only available for local trips during weekdays, but not in the evening or weekends. Demand has increased and an additional bus is planned for the near future.

COMMUNITY CHARACTERISTICS AFFECTING TRANSIT

Several community characteristics in Des Moines make it difficult to deliver transit service beyond the major arterials and the downtown area. Des Moines single-family residential land use patterns, the free parking in downtown and in commercial areas, the discontinuous street patterns in residential areas, and gaps in the pedestrian system --- all make transit service difficult in these areas.

Some key observations include:

- Pacific Highway South has the best transit service and provides access to the largest concentration of jobs in the City and to Highline Community College. Layover constraints at the college limit the ability of Metro to expand service between Seattle and Des Moines.
- The residential areas south of South 240th Street have no scheduled transit service; their only transit option is to drive to one of the park-and-rides or catch a bus along Pacific Highway South.
- Frequent local transit service is needed to complement these new regional services:
 - o Sound Transit Link light rail service to SeaTac Airport, opening in 2009, and extending to Pacific Ridge and Midway neighborhoods with Sound Transit 2.
 - o King County Metro RapidRide service along Pacific Highway South, starting in 2010.
 - o King County Ferry District demonstration project for passenger only ferry service between Seattle and the Des Moines Marina.

² ADA refers to the Federal American with Disabilities Act detailed previously in Chapter 5.



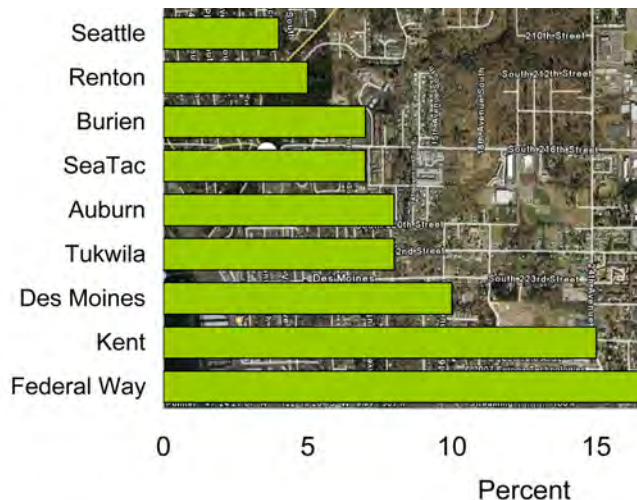
KEY TRANSIT DEMOGRAPHICS

Public transit demand can be linked to a number of demographics. These include seniors over 65 years of age, persons with disabilities, residents living below the poverty level, households without access to an automobile (either by choice or financial constraints), students, and commuters. All these groups tend toward higher than average use of transit services. The percentage of these residents varies within the City. In the Redondo and Woodmont neighborhoods much of the population is older than 55, while the North Hill neighborhood tends to be younger with children.

Several assisted living facilities and senior nursing homes are located along Marine View Drive. Located close to the downtown area, the mobility needs of these elderly residents have increased the need for better transit service and improved pedestrian facilities in the City.

Highline Community College (HCC), located adjacent to Pacific Highway South serves students in the region as shown in **Figure 6-3**. HCC is a commuter college campus, with nearly 50 percent of the students coming from Des Moines or nearby Kent and Federal Way. There are two entrances to the campus: from Pacific Highway South and South 240th Street. The HCC Facilities Master Plan seeks to reconstruct and widen the entry from Pacific Highway South that would be coordinated with a new Transit Center, easing the demands on vehicle and bus traffic on South 240th Street. In the Summer 2005, there were 2,279 parking spaces on campus. Highline Community College is trying to promote carpool/vanpools with free parking; however, the carpool parking is located along the perimeter of the campus and not much of an incentive for potential riders. Parking charges are \$32 per quarter for full time and \$20 per quarter for part time students. Carpools are allowed to park for free and students and faculty are able to receive a 15 percent subsidy for transit passes.

Figure 6-3. Distribution of Resident Cities for HCC Students



90% of HCC students come from cities other than Des Moines

Source: Highline Community College Facilities Master Plan; McGranahan Architects; November 21, 2007, p 5 of 8.

TRANSIT RELATED INFRASTRUCTURE

Riders access buses at park-and-rides and bus stops, where bus shelters offer some protection from the Northwest weather.

PARK-AND-RIDES

The State of Washington Department of Transportation, King County, and Sound Transit have all invested in park-and-ride lots throughout the region, including around Des Moines. Although no park-and-rides are located within the City limits, three nearby lots provide over 1600 parking spaces and regional connections. **Table 6-2** provides information on the use of these lots.

- The Kent-Des Moines Park-and-Ride is located outside the city limits just east of I-5 on Military Road. It is served by 10 Metro routes and Sound Transit Route 574, and is heavily used by commuters. There are 370 parking spaces at this lot.
- Redondo Heights Park-and-Ride is a relatively new lot, located just south of South 272nd Street on Pacific Highway South. It is served by 5 Metro routes and provides 697 spaces. This lot is new and sparsely used.
- Star Lake is located on I-5 at South 272nd Street just west of the I-5 southbound off-ramp. It is served by 8 Metro Routes and Sound Transit Route 574. There are 540 spaces at the lot. The lot is used, but has room to expand.

Table 6-2. Park-and-Rides Located near Des Moines

Park-and-Ride Lot Location	Spaces	Spaces Occupied		Transit Service
		1st Qtr 2007	1st Qtr 2008	
Kent-Des Moines P&R 23405 Military Road/I-5/Kent-Des Moines Road	370	328 89%	370 103%	158, 159, 162, 166, 173, 175, 192, 194, 197, 941 Sound Transit: 574
Star Lake P&R 27015 26th Ave S/ I-5 & 272nd Street	540	445 82%	468 87%	152, 173, 183, 190, 192, 194, 197, 941 Sound Transit: 574
Redondo Heights P&R Pacific Highway S and S 276th Street	697	35 5%	52 7%	173, 174, 175, 190, 191
Totals	1607	808	902	

Source: King County Metro Transit Park-and-Ride Utilization Report, First Quarter 2008 (April 2008); King County DOT, Metro Transit Division; pp. 3 and 4.

STOP AMENITIES

Metro's bus shelter standard was used to evaluate where bus shelters are needed. The current standard is 50 or more passengers boarding per day. A review of locations with 50 or more daily boardings found that most high ridership stops have a bus shelter in Des Moines.



CITY POLICIES, PLANS AND PROGRAMS SUPPORTING TRANSIT

The City recognizes that accessible frequent transit service can make Des Moines an easier place to live and work. Transit is a priority in the City's goals and policies and in local and regional plans.

CITY GOALS AND POLICIES

City policies promote transit-supportive land uses, including higher densities and enhanced circulation for pedestrians and call for new developments to provide convenient pedestrian access to transit stops. City policies support the programs of Sound Transit and King County Metro that expand the number of transit routes and increase the frequency of service on existing routes.

The City supports regional plans for high capacity transit (HCT) in Des Moines along Pacific Highway South, including RapidRide bus rapid transit and Link Light Rail, and the expansion of local bus service needed to provide convenient connections with these systems. The City supports the investigation of passenger-only ferry service, which would provide another option for the commuter.

TRANSIT EFFICIENT LAND USE AND TRANSIT ORIENTED CENTERS

The City has several high-density residential and mixed use areas that typically would be served by frequent transit. The City is encouraging more mixed use in its current subarea planning effort along Pacific Highway South, working with the City of Kent in Envision Midway. Ideas from the visioning process include development of transit-oriented centers near Highline Community College and South 272nd Street with a future Link light rail station and a light rail stop near South 216th Street at the confluence of new employment and housing centers with the Des Moines Creek Business Park and Waterview Crossing. City policies encourage mixed use development for its role in reducing future traffic demand and connections from neighborhoods to bus stops.

COMMUTE TRIP REDUCTION PROGRAM

Since 1991, the City of Des Moines has complied with the Washington's Commute Trip Reduction Laws (CTR) by implementing a local program. The program supports the use of transit, ridesharing, walking, biking and telecommuting to reduce VMT and the use of single occupancy vehicles (SOVs), reducing congestion, ultimately conserving energy and reducing greenhouse gas emissions leading to improved air quality.

The City recently completed an update of the CTR Plan in June 2008³ in accordance with RCW 70.94.521. The plan sets goals, identifies facility and service improvements and TDM strategies that will meet state requirements by 2011. The City's target for drive alone trips and VMT reduction are the same as the minimum reduction goals of the State - a 10 percent reduction in the drive alone rate and a 13 percent reduction in VMT from the 2005 baseline survey.

The City has two CTR affected sites:

- City Hall Site at 11th Avenue South and South 216th Street located near downtown.
- Highline Community College located off Pacific Highway South at South 240th Street.

3 The CTR Plan was adopted by the City in November 2008.

The City has identified several strategies to reduce the number of drive alone trips. Although Metro Route 166 provides service between downtown Des Moines and Kent Station, promoting VanShare as a viable option to provide connectivity between the Kent train station and HCC and City Hall is one of the primary strategies to obtain the 10 percent reduction of drive alone trips by 2011 required by the State.

For Highline Community College, the CTR Plan seeks to reduce traffic congestion, minimize parking demand, and encourage the use of public transit and other alternatives to the single occupant vehicle (SOV). The college currently has 128 carpool spaces on campus. Carpool permits are issued to qualified applicants without charge, as opposed to SOV parking permits, which are assessed a quarterly fee. There is a 90 to 100 percent participation rate in the Carpool program, with the exception of the summer quarter, when parking demand is less.

Eligible faculty and staff are able to purchase bus passes at discounted rates at HCC. The campus is in discussions with Metro for a Transit Center located off Pacific Highway, at the northeast end of campus. These routes stop in the south parking lot on the Highline campus: # 121/122, 131/134, and 132. Route # 166 stops in the administrative parking lot on the Highline campus. The following routes travel Pacific Highway South adjacent to the east side of campus: # 174, 175, and 191. Sheltered waiting areas for bus riders are provided in the administrative and south parking lots.

PROGRAMMED IMPROVEMENTS BY TRANSIT PROVIDERS

SHORT-TERM SERVICE IMPROVEMENTS

King County Metro Transit and Sound Transit short term plans address a variety of problems and opportunities in the Puget Sound Region. Some of these service changes will impact the City of Des Moines over the next several years.

King County Metro Transit

The *Transit Now* initiative to expand Metro Transit service was approved by King County voters in the general election in November 2006. *Transit Now*, which increased the sales tax rate for transit by 0.1 percent, will help Metro keep pace with regional growth by expanding overall service 15 to 20 percent over the next 10 years.

RapidRide

Under the *Transit Now* initiative, Metro is developing RapidRide, a bus rapid transit (BRT) service. The first RapidRide project will be in the Pacific Highway South corridor – beginning in 2010. RapidRide will provide service from Tukwila to Federal Way with a connection to the Sound Transit Link light rail at the Tukwila International Boulevard Station. The route will replace and upgrade Metro Route 174.

RapidRide will provide frequent, reliable bus service that will keep people moving throughout the day along the corridor. The service will be recognized by the frequent service, new buses, passenger waiting areas, traffic signal priority, and real-time bus arrival signs. Riders can expect a bus to be no more than 10 minutes away during the AM and PM peak hours and no more than 15 minutes during the core hours of 6 AM to 10 PM.

Other Changes

Under *Transit Now*, new bus shelters will also be added on routes within Des Moines. Metro plans to extend Route 166 to Burien from the current terminal at 7th Avenue South/South 219th Street; the probable routing will be via Des Moines Memorial Drive and 8th Avenue South (the current routing for Route 132). Metro also proposes an upgrade of service on Route 121 by providing all-day service to HCC.



Potential of Route 156 to Des Moines

With RapidRide bus rapid transit (BRT) coming on Pacific Highway South, and light rail starting from downtown Seattle to the Sea-Tac Airport in 2009, Metro is reviewing its bus service through Des Moines and south King County. Metro has indicated that it could eliminate routes 194 and 174, which currently run from Seattle through Des Moines, and then on to Federal Way.

Metro has proposed a service change that will create a new Route 156, to link the cities of Des Moines, SeaTac, and Tukwila. Route 156 would serve Des Moines' transportation needs by providing a more direct cross-town connection between downtown and the Sea-Tac Airport light rail station, the Southcenter Shopping Mall, and the Tukwila commuter rail station. And should the passenger-only ferry demonstration route start up, Route 156 could be instrumental in connecting other areas of the County to the ferry.

Extending Route 156 along Marine View Drive to South 227th Street would provide a more complete downtown transit network. If Route 156 were to be extended, it could require a new bus layover in the southern part of downtown, significantly enhancing access to the Des Moines Marina, downtown businesses, and multi-family housing.

Envision Midway

South King County cities along Pacific Highway South are working together to improve traffic flow, reduce accidents, and promote transit and carpool use to create an urban character for the SR 99 corridor. The Envision Midway project stakeholder committee and community agree that Metro's RapidRide will provide excellent service until light rail reaches the area. The area around Highline Community College is seen as a logical location for a light rail station. Three potential locations for future light rail stations were identified as part of the Envision Midway planning process and are shown on the next page. Concerns for connectivity, for both pedestrians and vehicles within Midway, suggests the need for a new grid pattern of streets with walkable-size blocks. Extension of 30th Avenue South from South 216th Street to South 240th Street, with grade separation over the Kent-Des Moines Road is identified as a potential key corridor with possible light rail alignment. Extension of South 240th Street across the I-5 corridor is an identified network connection that would support the Midway redevelopment as a transit oriented center with high walkability. Both pedestrian and bicycle connections across I-5 are a missing component identified in the Envision Midway planning process.

The community has a general consensus about the need for east-west feeder transit to support the future light rail corridor. More detail about Envision Midway is provided Chapter 2 Community Trends.

King County Passenger-Only Ferry Service

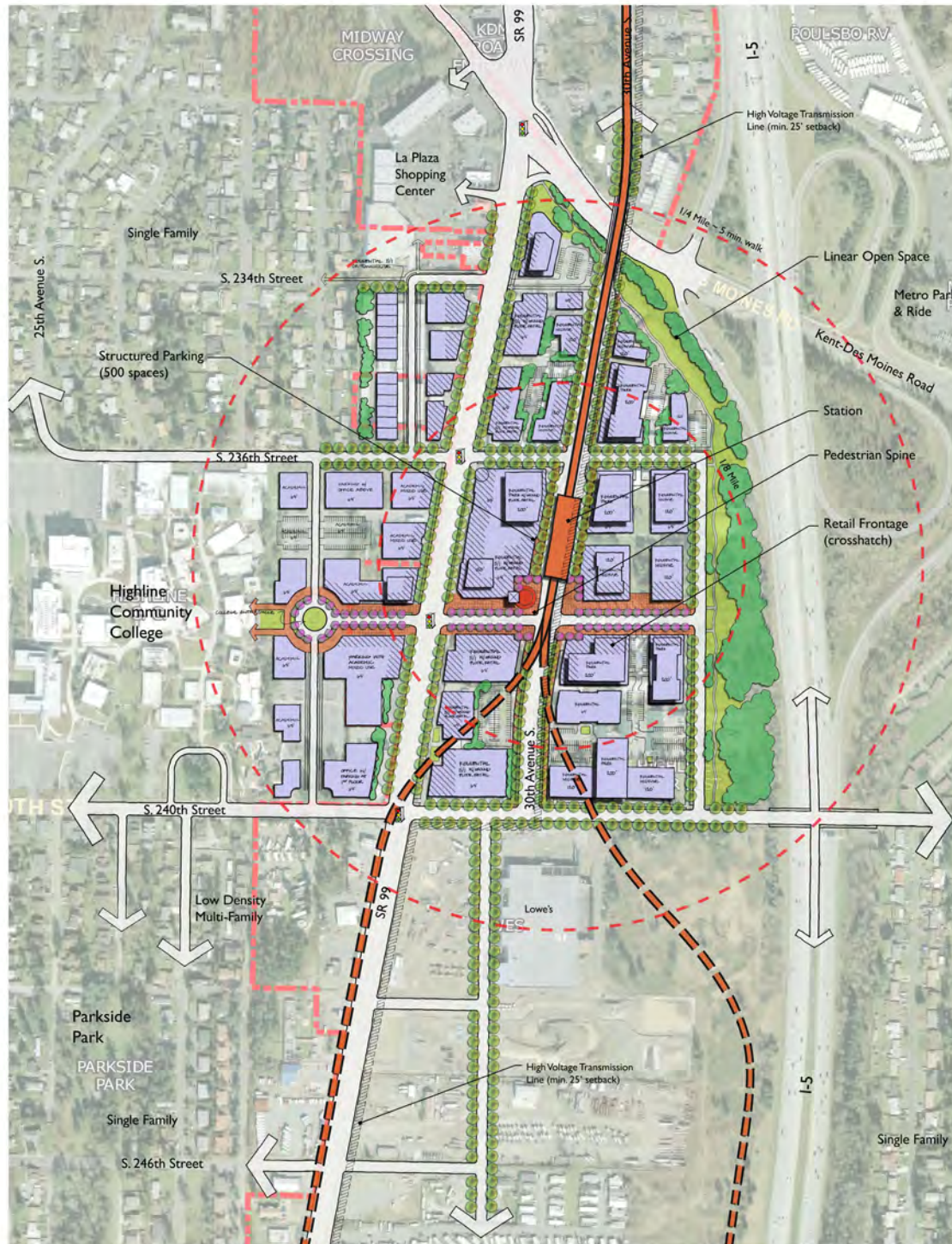
Nearly a century ago a "Mosquito Fleet" of small boats linked the communities that ring Lake Washington and Puget Sound. These vessels provided vital transportation connections. With the advent of automobile travel, passenger ferry service declined. Today, with highways and roads reaching capacity, our region's waterways are once again seen as a viable alternative for moving people within King County.

In 2006, the State Legislature directed Washington State Ferries to exit the passenger-only ferry business to focus its resources on auto ferry routes. Recognizing the importance of passenger-only ferries to the Puget Sound region, the Legislature simultaneously enabled cities, counties and transit agencies to form new Ferry Districts and Public Transportation Benefit Areas with expanded tax-collecting authority to fund passenger-only ferry service. The legislature also reduced regulatory and legal barriers to new passenger ferry service. These actions laid the necessary groundwork for local and private passenger-only ferry service development and delivery.

King County Ferry District

Starting January 2008 the KCFD levied a 5.5 cents (per \$1,000 assessed value) property tax in King County to fund service and capital projects for a maximum seven permanent ferry routes. The plan will generate \$18.3 million per year to fund the ferries.

Midway Light Rail Station Area Concept: 30th Avenue S.



Pros:

- New 'Great Street' with urban feel
- New alternative N/S corridor for all modes of travel
- New link for Des Moines & Kent over SR-518
- Slow rail speed connects riders with passing community
- Provides E/W pedestrian link at-grade across SR-99
- Supports major employment center (HCC)
- High development potential in 1/4 mile radius
- Convenient METRO link from I-5
- Convenient HOV link from I-5
- No impact to SR-99 properties
- No impact to SR-99 street improvements

Cons:

- Proximity to vehicular traffic
- Reduces fast service to speed of auto
- Brings regional traffic into neighborhood
- Brings METRO links into neighborhood
- Need to acquire significant ROW
- Costly to link Des Moines & Kent over SR-518
- Lacks visibility to regional transportation corridor SR-99
- Does not enhance HCC campus
- Siting conflicts with high tension power lines
- Reduces development potential by 1/3



Transit Service and Travel Demand Management

Midway Light Rail Station Area Concept: I-5

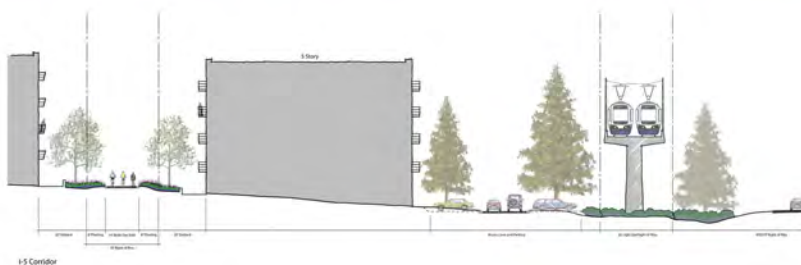


Pros:

- Removes conflict with autos
- Provides fast service
- Convenient METRO link from I-5
- Convenient HOV link from I-5
- Creates sound barrier neighborhood at west

Cons:

- Exceeds 1/4 mile radius to major employment center (HCC)
- Does not enhance HCC campus
- Lacks visibility to regional transportation corridor SR-99
- Brings regional traffic into neighborhood
- Brings METRO links into neighborhood
- Need to acquire all ROW
- Reduces development potential by 1/2 in 1/4 mile radius
- Uphill walk for pedestrians going west
- May require transit shuttle for rider-ship success



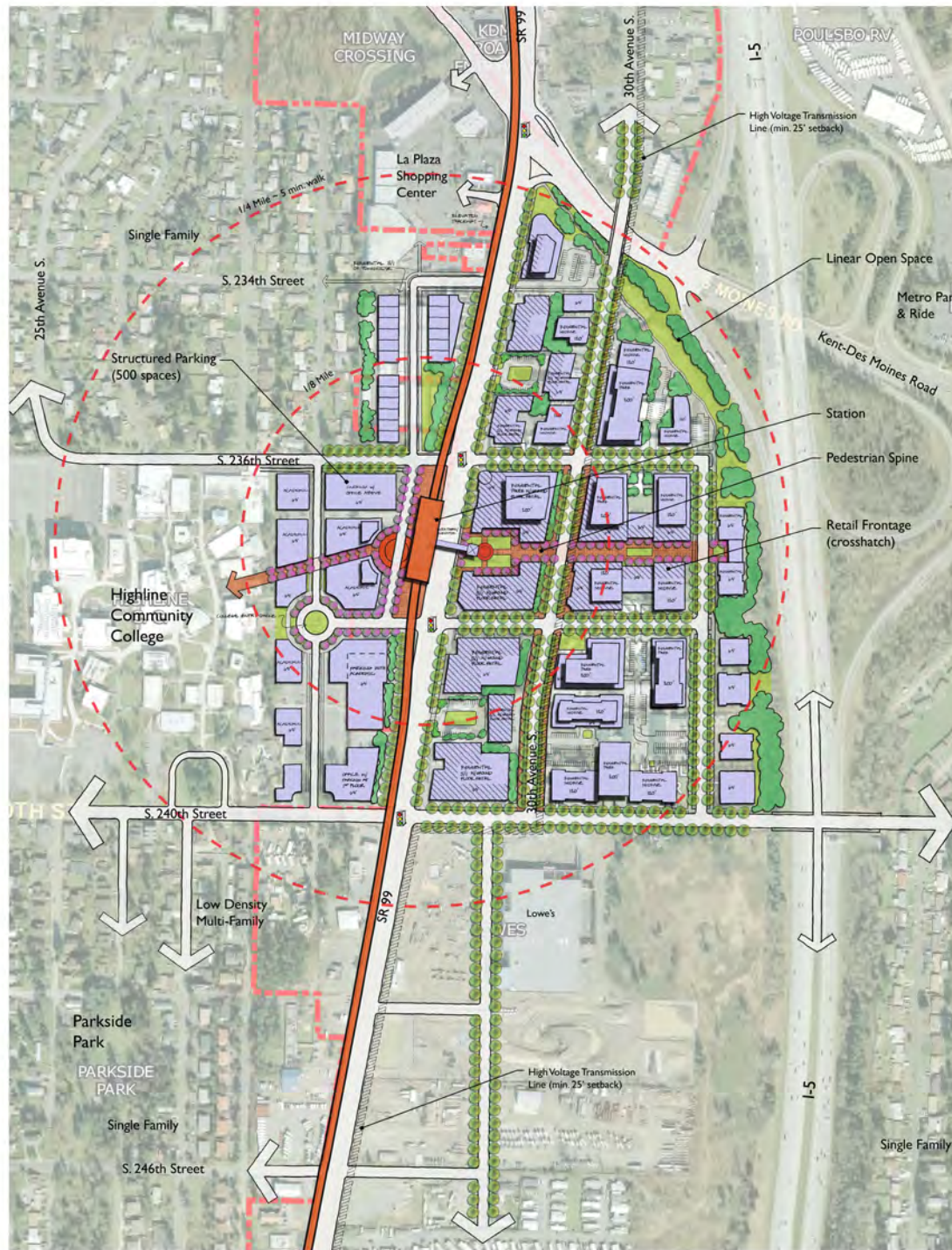
envision
MIDWAY
a collaborative planning project

November 12, 2008

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1" = 150'



Midway Light Rail Station Area Concept: SR 99

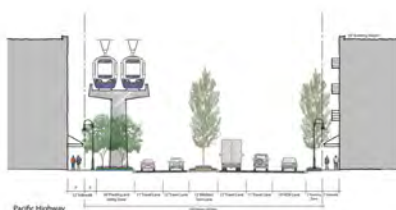


Pros:

- Removes conflict with autos
- Removes conflict with commerce
- Provides fast service
- Fits into existing high capacity transportation corridor
- Convenient E/W METRO link
- Provides E/W pedestrian link across SR-99 (overpass or at-grade)
- Supports major employment center (HCC)
- Enhances HCC campus
- High development potential in 1/4 mile radius
- Allows business at station's ground level
- Pedestrian overpass eases traffic conflicts
- No right-of-way (ROW) purchase for 30th Ave
- Preserves intimate feel of 30th Ave 'Great Street'

Cons:

- Need to acquire ROW
- Narrow lots made smaller by ROW purchase
- Need to reconfigure access to properties
- Impact to pedestrian environment
- Long pedestrian crossing at-grade of SR-99 intersection
- Fast rail speed disconnects riders from passing community



envision
MIDWAY
a collaborative planning project

November 12, 2008



Transit Service and Travel Demand Management

In response, the King County formed a Ferry District (KCFD) in 2007. The funds will be used immediately to take over operation of passenger-only ferry service between downtown Seattle and Vashon Island and to enhance Elliott Bay Water Taxi service between West Seattle and downtown Seattle. Several other routes are now being studied by the KCFD for possible demonstration service.

In the long term, the KCFD is considering the establishment of one of those demonstration routes in Des Moines, linking to Downtown Seattle. City transportation staff will continue to work closely with the King County Ferry District to ensure that if a route comes to the Des Moines Marina, the best interests of the citizens of Des Moines will be considered, including a balanced use of available parking at the Des Moines Marina. Mitigation of passenger-only ferry operation should include bus and shuttle service to the three key transit hubs in Des Moines - Downtown, Gateway and Highline Community

LONG TERM IMPROVEMENTS

Long term improvements include the plans of Sound Transit, which has secured funding for the expansion of Link Light Rail. A mass transit expansion by Sound Transit, was passed by the electorate on November 4, 2008. The funding will make rapid investments to expand regional mass transit to get people where they want to go and cut through rising congestion. The plan will provide an alternative to rising gas prices and greenhouse gas emissions with quick additions of more regional express buses, more commuter trains, and expansion of the regional light rail system.

SOUND TRANSIT 2 PLAN - LINK LIGHT RAIL ON THE HORIZON

In 2009, Sound Transit will launch light rail service between downtown Seattle and Sea-Tac International Airport. This initial light rail system will cover 15.7 miles with 13 stations and is projected to carry more than 45,000 daily riders by 2020. This includes expanding service from Sea-Tac Airport to Highline Community College and Federal Way by 2023, including new light rail stations at South 200th Street, near the community college in Midway and near Redondo/Star Lake. A light rail stop in the vicinity of South 216th Street is also envisioned by Des Moines.

Among other improvements, the Sound Transit 2 Plan proposes a 7-mile Link light rail extension from the Sea-Tac Airport to Midway/Highline Community College and the Redondo/Star Lake area at the south end of Des Moines. The proposed extension will open in phases with the Highline extension opening in 2020, and the Redondo extension opening in 2023. Ridership is expected to be on the order of up to 500 riders per day using the Midway/Highline Community College light rail station. In the station vicinity, development is planned to be mixed use with high reliance on transit service for regional connections. Previous pages show potential layouts of station and adjacent land uses considered as part of Envision Midway along with the pros and cons for each station location. Parking will be in limited supply, and parking management strategies will be needed to balance the competing uses for residential, school, commuter and business/shopping parking demands.



Location of the Midway Light Rail station is not yet determined, however, its close proximity to the college and to both housing and jobs is expected to help encourage light rail ridership and a reduced reliance on auto traffic in the Midway District. The light rail station would be co-located with the RapidRide BRT station, possibly with grade separation for the light rail. Light rail alignment will be evaluated under the Link Extension environmental process. City of Des Moines requires that the light rail be grade separated over the Kent-Des Moines Road and would strongly encourage that the alignment stay east of the Pacific Highway South right-of-way. In March 2009, the City Council indicated their support of light rail alignment on or east of the SR 99 center median, with support for a 30th Avenue South alignment, if there is a light rail stop at South 216th or along the I-5 alignment.

Since Link Light Rail is destined to come through Des Moines by 2023, the City is working to be ready and able to engage Sound Transit on decisions that will impact our community through the Envision Midway planning effort. The City staff will review technical analysis, alternatives, and lengthy environmental impact studies to insure that the impacts to our community are properly mitigated.

TRANSIT RECOMMENDATIONS

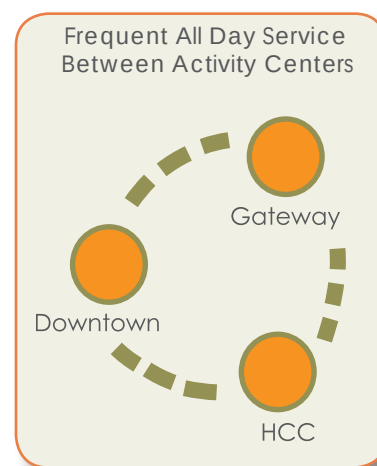
As growth in both housing and employment comes to Des Moines, mobility will rely on the provision of effective transit service to three key hubs of activity – Downtown Des Moines, the Midway/Highline Community College area, and the Pacific Ridge Neighborhood with Waterview Crossing development and the nearby Des Moines Creek Business Park. High frequency bus service is planned for the Pacific Highway South/SR 99 corridor with RapidRide coming in 2010 with both high frequency and long span of service. Transit connections between these three key transit hubs are recommended with high frequency and long span of service (both directions throughout the day, throughout the week).

This section presents a set of regional and local service improvements and capital projects to improve transit service. Service in Des Moines can be sorted into three route types.

- HCT/ Regional Frequent service over much of the day in area where there is high demand. In Des Moines this is in the Pacific Highway South/SR 99 corridor where density is expected to increase the demand for service.
- Local service that provides all day service, but at lower frequencies (20 to 60 minutes) in lower density areas of the City. Links local destinations to the frequent service regional routes along SR 99.
- Peak-only service in high demand times and only during those times.

Concurrency requires that new development meet adopted transportation levels of service and that improvements are concurrent with new development. The presence of transit service may reduce the need for road improvements normally required to achieve concurrency.

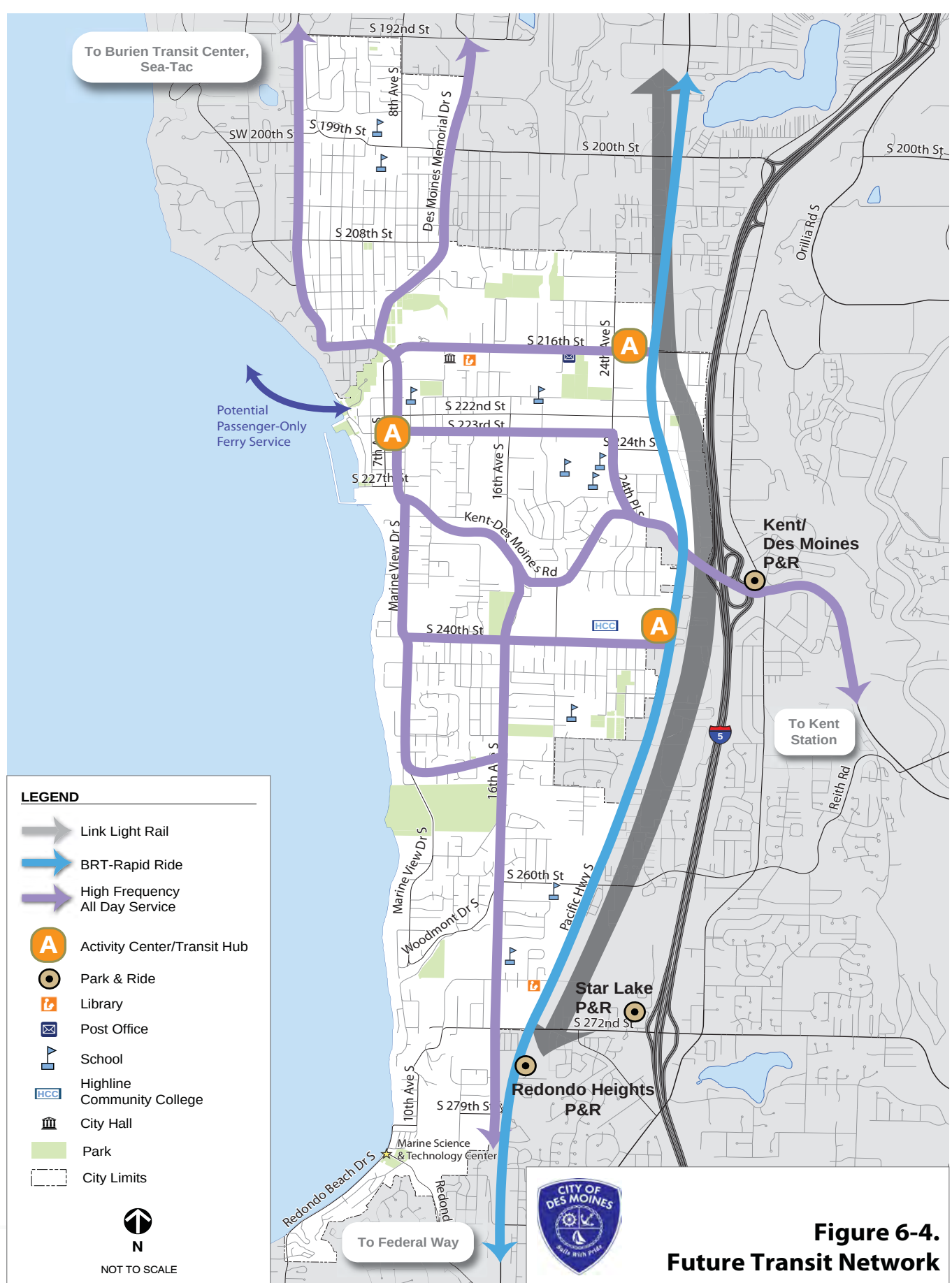
Based on observed needs in the Des Moines area, the following regional and local service improvements are identified in **Table 6-3** and **Figure 6-4**. The recommendations focus on current and expected gaps in service.



Transit Service and Travel Demand Management

Table 6-3. Transit Recommendations

Project Category	Project Details
Transit Hubs	Provide connections to other hubs in Des Moines and to other parts of the region – to the north, east and south.
1. Downtown Transit Hub	Develop transit center hub in Downtown to provide convenient service to SeaTac Airport, Pacific Ridge transit hub and Midway/HCC transit hub, along with connections to Burien Transit Center and Kent Commuter Rail Station.
2. Midway/Highline Community College Transit Hub/Station	Work with Highline Community College, King County Metro and the Envision Midway planning effort to locate and implement a transit hub, with connections to the RapidRide service on Pacific Highway South and other regional destinations, plus connections to Downtown Des Moines and Pacific Ridge transit hubs. Work with Sound Transit on station area planning for Midway Station.
3. Pacific Ridge Transit Hub	Work with King County Metro and Sound Transit to develop transit hub near the intersection of Pacific Highway South and South 216th Street to serve the developing Pacific Ridge Neighborhood and the Des Moines Creek Business Park with connections to Midway/HCC and Downtown Des Moines transit hubs. This location could become a light rail stop.
Local Service	Add frequent all day service from downtown Des Moines to SR 99/Pacific Highway South. This would connect the 3 key activity hubs within Des Moines with frequent all day service: Highline Community College (students, staff), Downtown, (and the future) Pacific Ridge/DM Creek Business Park (216th at SR 99).
Regional Service: Bus Rapid Transit (BRT) Light Rail Transit (LRT) Express Buses Passenger-Only Ferry (POF)	Support additional regional transit service in Des Moines ---including RapidRide bus rapid transit, express buses, Link light rail service, and passenger-only ferry service.
Light Rail Alignment	Alignment for light rail has not been determined, however, the Des Moines City Council endorses the following considerations: * LRT alignment must be east of center median of SR 99. * Any alignment must be grade separated over Kent-Des Moines Road. * An SR 99 alignment would be elevated. * 30th Avenue South at-grade alignment would be acceptable with LRT stop at South 216th Street in Pacific Ridge. * If there is no LRT stop at South 216th Street, then preferred alignment is along I-5.
Local Transit Network	Provide partnership service to neighborhoods south of South 240th Street. Metro is finalizing several new partnerships that will leverage <i>Transit Now</i> funding to pay for additional targeted transit service. Through these partnerships, cities and companies contribute funding to help pay for enhanced bus service serving their employees and communities. <i>Transit Now</i> additional services will be phased in over several years beginning in September 2008.
Station/Hub Areas	Provide connections to the RapidRide on SR 99 and LRT stations in Pacific Ridge and Midway neighborhoods – with local transit service, walking routes and park-and-ride access to RapidRide and Link light rail.
South King County Service	Increase the transit service to make the east-west connections to Kent Valley and the jobs there. Consider a route with 30-minute service during the day or a future BRT route; one that doesn't connect to Downtown Seattle, but serves the South King County area.
Transit Network with high frequency, long span service.	Increase local all day service connecting to Burien and Normandy Park (to the north and west). Develop a North Hill neighborhood connection to RapidRide and a future light rail station at South 200th Street. Extend the service along Marine View Drive, Woodmont, and 16th Avenue South to the Redondo Park-and-Ride and other regional connections.



Chapter 7 | Goals and Policies

The Comprehensive Transportation Plan identifies transportation issues facing Des Moines today and tomorrow, and what the community can do about it.

As part of the update to this Plan, the vision, goals, and policies for transportation were revisited to see if they were still consistent with and represent the future envisioned for the City. This process started by identifying characteristics for Des Moines that define what the City is like now and what leaders envision for the future. These characteristics served as the basis for refining the goals and policies.

As part of the update to the Comprehensive Transportation Plan, some minor revisions were made to the Community Transportation Vision that illustrates how Des Moines envisions itself over the next twenty years. This vision establishes the framework for the goals and policies that are developed to ensure the vision can be met.

The City leaders want to make the inevitable changes work for Des Moines while protecting the best of what we have and recognizing who and what Des Moines will become by preserving a sense of community, identity, and pride.

Based on the community's Transportation Vision, the set of goals established in 2001 were refined as part of the update to the Transportation Plan. The goals have been organized into nine categories --- Transportation and Land Use, Street System, Concurrency, Public Transit, Pedestrian and Bicycle Facilities, Parking, Funding, Environmental, and Transportation Strategies for Sustainability --- to make it easier to translate them into more specific policies, and over time, implement them in an organized way. Most of all, the goals have implications that overlap more than just the single category under which they are listed. While the goals focus mostly on our physical surroundings, they contain implications that affect environmental, economic, and social concerns.

Transportation Vision

Create and maintain an efficient and safe multi-modal transportation system that provides mobility for all users – residents, businesses, employees, students and visitors.

TRANSPORTATION AND LAND USE

Goal TR 1: Design and construct a transportation system to serve the land use pattern set forth by the Land Use Element of the Comprehensive Plan.

TR 1.1: Build a street network that connects to the regional transportation system and to the local street networks in adjacent communities.

TR 1.2: Ensure consistency between land use and the transportation plan so that transportation facilities are compatible with the type and intensity of land uses.

What is in this Chapter

- Land Use
- Street System
- Concurrency
- Transit Service
- Ped & Bike Network
- Parking
- Funding
- Environmental
- Sustainability

STREET SYSTEM

Goal TR 2: Provide a street network that serves the needs of Des Moines residents, businesses, emergency services, and visitors.

TR 2.1: Establish a functional classification system for the street network, consisting of a hierarchy of street functions that generally describes their intended use.

TR 2.2: Provide convenient access to business districts and centers including management of traffic congestion.

TR 2.3: Provide a connected street network or grid pattern that distributes traffic over more streets providing people with more travel routes.

TR 2.4: Protect residential neighborhoods from overflow and cut through traffic through the City's Neighborhood Traffic Calming Program.

TR 2.5: Provide opportunities for residents and business owners to give comments on Des Moines' transportation system.

TR 2.6: Monitor and identify traffic safety concerns, and develop potential corrective measures as necessary.

TR 2.7: Establish street design and construction standards.

TR 2.8: Acquire additional right-of-way (consistent with RCW 35.79) for street segments that contain insufficient right-of-way to allow streets to be developed to the City's desired street classification.

TR 2.9: Identify excess, unused, or unnecessary right-of-way for vacation.

TR 2.10: Plan a street network that provides convenient access within and between neighborhoods.

TR 2.11: Require new development to build streets that connect with or will connect in the future with streets on adjacent developments providing access between neighborhoods.

TR 2.12: Require new development to dedicate and improve abutting right-of-way as necessary to meet street design and construction standards.

TR 2.13: Consolidate access to properties along principal, minor, and collector arterials, where practical, to maximize the capacity of the street and reduce potential safety conflicts.

TR 2.14: Use Intelligent Transportation System (ITS) strategies to optimize the existing street network.

TR 2.15: Preserve and maintain the existing streets.

Definition

Vision: The desired future

Goals: An overall purpose to strive for

Policy: A principle or course of action chosen to guide decision making

CONCURRENCY

Goal TR 3: Require construction of transportation facilities needed to support new growth and achieve adopted level of service standards on the City's transportation network.

TR 3.1: Maintain level of service (LOS) standards that provide for growth and maintain mobility on the existing transportation system.

TR 3.2: Deny approval if a proposed development will cause the LOS to fall below the City's adopted LOS standards, unless the developer makes improvements to mitigate the impacts, concurrent with the development.



PUBLIC TRANSIT

Goal TR 4: Encourage the expansion of public transit services to provide convenient and affordable transportation alternatives for all residents and employees.

TR 4.1: Promote transit use and support programs that improve transit coverage and service within Des Moines.

TR 4.2: Encourage King County Metro and Sound Transit to expand the number of transit routes serving Des Moines and to increase the frequency and span of service on existing routes.

TR 4.3: Require developments to provide convenient pedestrian access to transit stops from new commercial, multifamily, and single family subdivisions. Developments should incorporate facilities, such as transit shelters, bus pullouts, internal circulation paths and landing areas that foster transit ridership.

TR 4.4: Support plans by other agencies to construct park-and-ride lots that are convenient for Des Moines' residents.

TR 4.5: Support increased transit service to park-and-ride lots and major transfer points.

TR 4.6: Support regional plans for high capacity transit (HCT) and opportunities that extend the regional transit system (including BRT and light rail) to provide convenient connections to Des Moines.

TR 4.7: Encourage and support the passenger-only ferry demonstration project and require connecting shuttles to area park-and-ride lots and the downtown neighborhood.

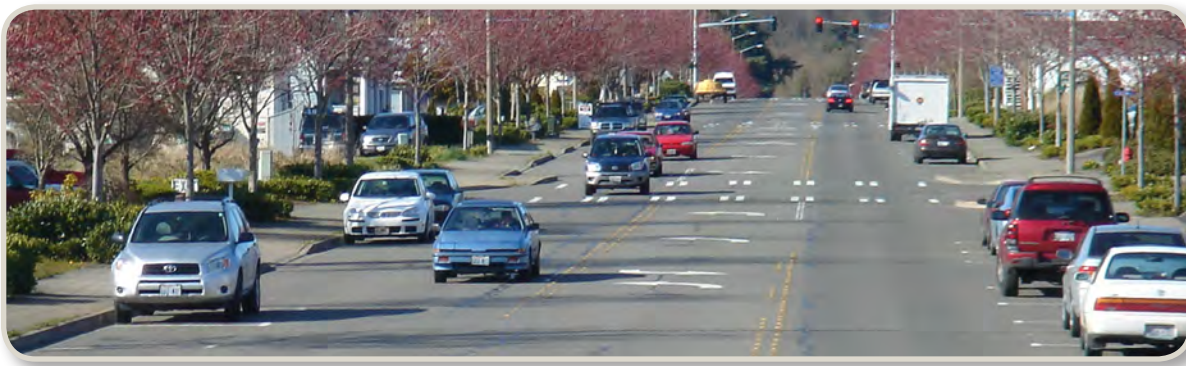
TR 4.8: Support Sound Transit light rail (LRT) station(s) in Pacific Ridge, Midway, and Redondo areas on Pacific Highway South.

TR 4.9: Support frequent local service linking Downtown, Des Moines businesses and Highline Community College with HCT on Pacific Highway South.

TR 4.10: Work with Sound Transit to establish a light rail transit stop at South 216th Street.

TR 4.11: Work with Sound Transit on station area planning for Midway and South 272nd Street stations.

TR 4.12: Coordinate with the City of Kent to implement the Envision Midway subarea plan.



PEDESTRIAN AND BICYCLE FACILITIES

Goal TR 5: Provide a connected network of non-motorized transportation facilities to provide access to local and regional destinations, and support a healthy lifestyle.

TR 5.1: Build a non-motorized transportation network to provide safe pedestrian and bicycle movement.

TR 5.2: Promote multi-modal facilities and services within walking/ bicycling distances of residential and commercial developments. Constructing sidewalks and walkways within pedestrian corridors that link neighborhoods to schools, parks, transit routes, and businesses is a high priority. Provide bicycle parking at key transit hubs and activity centers in Des Moines.



TR 5.3: Require all new roadway construction, reconstruction, or widening projects on arterials to include sidewalks. Street maintenance activities, including pavement overlays should provide upgrades for curb ramps.

TR 5.4: Enhance the attractiveness of the Downtown Neighborhood as a pedestrian environment using features such as benches, landscaping, lighting, drinking fountains, bicycle racks, and public art.

TR 5.5: Work with the Kent, Federal Way and Highline School Districts as well as neighborhood associations to support programs that encourage walking and bicycling to local schools.

TR 5.6: Design pedestrian crossings consistent with standards in regard to crosswalks, lighting, median refuges, corner sidewalk widening, ramps, signs, signals and landscaping.

TR 5.7: Provide a bicycle network that supports the use of bicycles as a means of general transportation as well as a recreational activity. Construct new streets with sufficient width to allow for bicycling on identified bicycle corridors.

TR 5.8: Encourage new and existing schools, multi-family and commercial developments to provide bicycle racks and other amenities to support bicycling.

TR 5.9: Require new or redeveloping properties to design and build sidewalks along property frontage.

TR 5.10: Prioritize pedestrian and bicycle improvements that provide access to schools, parks and other public buildings. Provide bicycle racks at schools, parks, and other public buildings.

PARKING

Goal TR-6: Establish parking strategies that support economic activity, transportation, circulation, and existing and future land uses.

TR 6.1: Require new development in the Downtown neighborhood to provide a sufficient number of parking spaces either on-site or in a shared parking structure.

TR 6.2: Restrict or limit parking on principle arterials with the exception of Marine View Drive in the Downtown neighborhood.

TR 6.3: Provide short term on-street parking on other streets unless prevented by right-of-way limitations or unique neighborhood characteristics.

TR 6.4: Set and enforce parking limits to address parking concerns in neighborhoods.

TR 6.5: Encourage flexible and innovative parking solutions for new commercial development.

FUNDING

Goal TR-7: Pursue funding for transportation improvements from all potential sources.

TR 7.1: Seek funding for projects in the Transportation Improvement Program (TIP).

TR 7.2: Allocate resources to the CIP and TIP in the following ranked priority: 1) safety enhancements; 2) preservation, maintenance and operation of existing facilities; 3) capacity improvements; 4) projects that improve multiple modes while taking full advantage of funding opportunities as they arise.

TR 7.3: Coordinate with other jurisdictions to fund transportation improvements and participate in joint efforts that improve inter-jurisdictional facilities and achieve economies of scale on similar projects.

TR 7.4: Partner with neighboring cities or regional transit agencies/providers in order to improve state and federal funding opportunities.

TR 7.5: Prepare a multi-year financing plan for right-of-way acquisition and transportation improvements.

TR 7.6: Evaluate traffic generated by new development and require off-site improvements to the transportation system that are needed to maintain adopted level of service standards.

TR 7.7: Maintain an impact fee system that equitably and proportionately charges new development for identified growth related improvements to the transportation system.

TR 7.8: Emphasize investments for the preservation and maintenance of the City's existing transportation facilities. Seek funding from a variety of sources and consider pursuing new opportunities for street maintenance revenue.

TR 7.9: Seek funding to correct locations with identified traffic safety concerns.



ENVIRONMENTAL

Goal TR-8: Strive to minimize impact on the environment for all transportation projects and consider context sensitive design strategies when appropriate.

TR 8.1: Balance transportation services with the need to protect the environment.

TR 8.2: Incorporate street trees and landscaping into the design of transportation facilities.

TR 8.3: Provide transportation facilities that fit the character of the neighborhoods through which they pass.

TR 8.4: Construct streets and other transportation facilities using construction methods that minimize adverse impacts upon surface water runoff, drainage patterns, and environmentally sensitive areas.

TR 8.5: Where determined necessary, incorporate sound absorption devices, landscaping, earthen berms and other natural or artificial features that help mitigate adverse noise, light and glare impacts generated by surface transportation facilities.

TR 8.6: Operate the traffic system to minimize congestion and air quality impacts.

TRANSPORTATION STRATEGIES FOR SUSTAINABILITY

Goal TR-9: Reduce congestion, air pollution and fuel consumption through TDM and CTR Programs.

TR 9.1: Use transportation demand management (TDM) strategies to reduce single-occupant vehicle travel and encourage alternative modes of travel. These strategies include parking management, individualized marketing, ridesharing and support of non-motorized travel.

TR 9.2: Work with employers to provide commute trip reduction (CTR) measures in the work place that promote alternatives to driving alone. Encourage businesses to minimize peak hour commuting through the use of strategies such as flextime and telecommuting.

TR 9.3: Encourage new commercial development to implement measures that promote greater use of transit, carpools, van pools, and bicycles.

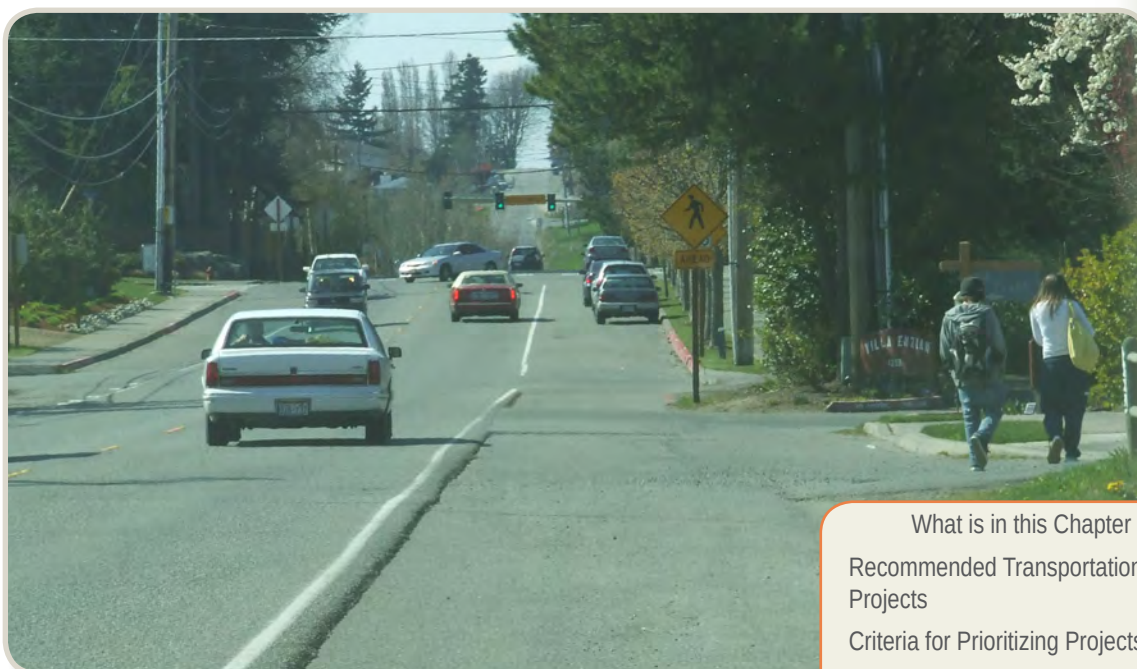


Chapter 8 | Funding and Implementation

The recommended projects and programs of the Comprehensive Transportation Plan were developed by travel mode, as described in previous chapters. In order to guide the City in implementation of the recommended projects, priority should be assigned to assist in assembling the projects into the six-year TIP over the course of the coming 20 years, working toward the 2030 planning horizon. This chapter compiles the recommended projects and programs to meet the expected growth in residents and jobs by 2030 and documents the criteria used to prioritize the projects. The Plan includes both a funding analysis and opportunities open to the City for implementation.

RECOMMENDED TRANSPORTATION PROJECTS

Preceding chapters outlined the analysis process and policies that led to the list of recommended projects and programs for developing Comprehensive Transportation Plan for Des Moines. The CTP consists of improvements to the street network, safety and operations, priority pedestrian network, bicycle network, provisions for transit facilities and the management of on-street public parking. **Table 8-1** is a summary of the recommended projects by mode that comprise the CTP. Estimated costs to implement the recommended projects are provided as input to the funding strategy for implementing the plan, and are shown in 2009 values.



What is in this Chapter

- Recommended Transportation Projects
- Criteria for Prioritizing Projects
- Funding Analysis and Implementation Strategies

Table 8-1. Recommended Projects

Project Type	Location	Project Description	Capacity	Safety	Operations	Development	Cost \$Million (2009)
Streets							
Arterial Widening Projects							
South 216th Street	Marine View Drive to Interstate 5	Widen to three lanes west of 19th Avenue South, to five lanes east of 19th Avenue South. Add bicycle lane, sidewalks and landscaping. Add signals and intersection improvements as warranted by development. See South 216th Corridor Study (March 2009).	X	X	X	X	\$24.2
24th Avenue South	South 208th Street to South 216th Street	Widen to five lanes with bicycle lane, sidewalks and landscaping.	X			X	\$8.9
24th Avenue South	South 216th Street to Kent-Des Moines Road	Widen to three lanes with bicycle lanes, sidewalks and landscaping. See 24th Avenue South Corridor Study (June 2009).	X	X		X	\$5.8
16th Avenue South	Kent-Des Moines Road to South 260th Street	Widen to three lanes with bicycle lanes, sidewalks and landscaping.	X	X	X	X	\$16.3
Kent-Des Moines Road	Marine View Drive to Pacific Highway South (SR 99)	Widen to three lanes west of 16th Avenue South and to five lanes east to Pacific Highway South with bicycle lanes, sidewalks and landscaping.	X	X	X		\$25.1
Roadway Connections							
16th Avenue South	South 216th Street to South 220th Street	Two-lane roadway connection – collector arterial. See Highest and Best Use Analysis of Historic SR 509 Corridor Study (March 2009).			X	X	\$3.3
16th Avenue South	South 276th Street to Pacific Highway South (SR 99)	Two-lane roadway connection/re-alignment – principal arterial.			X	X	\$6.1
20th Avenue South	South 242nd Street to South 244th Street	Two-lane roadway connection – neighborhood collector.			X	X	\$1.5
24th/28th Avenue South (SeaTac)	South 200th Street (SeaTac) to South 208th Street	Create a 4-lane to 5-lane connection to SeaTac. Coordinate with City of SeaTac and WSDOT as part of SR-509 project.	X		X	X	---



Table 8-1. Continued

Project Type	Location	Project Description	Capacity	Safety	Operations	Development	Cost \$Million (2009)
Intersections							
South 216th Street	Pacific Highway South	<u>Without SR 509 project:</u> Add one shared left-through lane and right turn pockets eastbound and westbound.	X		X	X	[1]
South 216th Street	Pacific Highway South	<u>With SR 509 project:</u> Add eastbound and westbound through lanes. Retain eastbound right turn lane. Change eastbound and westbound left turn signal phasing to protected.	X		X	X	[1]
South 220th Street	Pacific Highway South	Widen for left turn pockets, adjust roadway profile and approach grades, and revise signal phasing to remove split phases.	X		X	X	\$0.7
Des Moines Memorial Drive	at South 200th Street	Add left turn pockets for all approaches, modify signal. Joint project with City of SeaTac.	X	X	X		\$0.8
Des Moines Memorial Drive	at Marine View Drive and South 216th Street	Lengthen approach lanes, coordinate signal with Marine View Drive at 7th Avenue South. Also consider roundabout option.	X		X		\$2.5
Marine View Drive	at South 227th Street	Revise lane configuration to single eastbound right with overlap phase. Add second southbound through lane.	X	X	X		\$0.7
Marine View Drive	at Kent-Des Moines Road	Add second eastbound through lane through intersection.	X		X		\$3.0
Marine View Drive	at South 240th Street	Revise lane configuration, add westbound right turn pocket. Add signal or roundabout if warranted.	X		X		\$0.4
16th Avenue South	at South 240th Street	Add left turn pockets for all approaches.	X	X	X		[2]
16th Avenue South	at South 250th Street	Add eastbound right turn pocket.	X		X		---
24th Avenue South	at South 222nd Street	Monitor operation for future signal or other intersection treatment.	X		X		[3]

[1] Included in South 216th Street Project.

[2] Included in 16th Avenue South Project.

[3] Included in 24th Avenue South Project.

Table 8-1. Continued

Project Type	Location	Project Description	Capacity	Safety	Operations	Development	Cost \$Million (2009)
Safety & Operations							
8th Avenue South	at South 200th Street	Monitor operation for possible future signal or other treatment.		X	X		\$0.3
Des Moines Memorial Drive South	at South 208th Street	Add left turn pockets.		X	X		[4]
Des Moines Memorial Drive South	at South 212th Street	Add left turn pockets.		X	X		[4]
Marine View Drive/7th Avenue South	at South 216th Street	Optimize signal timing and coordinate with Des Moines Memorial Drive/Marine View Drive Intersection.		X			\$0.3
South 216th Street	at Pacific Highway South	Add red light camera enforcement.		X			[5]
Pacific Highway South	at South 224th Street	Change westbound left turn phasing to protected/permitted.		X			\$0.1
South 240th Street	at 20th Avenue South	Widen to provide two-way left-turn lane/ refuge pocket along segment. Widen to provide left turn lane at intersection. Improve sight distance at intersection. Install traffic signal if warranted.		X	X		\$1.7
South 240th Street (Kent)	at Pacific Highway South	Add dual left turn for eastbound approach, revise signal phasing. Coordinate with City of Kent.	X		X	X	Kent
South 260th Street (Kent)	at Pacific Highway South	Monitor safety and coordinate with City of Kent.		X			Kent
South 272nd Street	east of 16th Avenue South	Consider access control at development driveway access.		X	X	X	\$0.1
Kent-Des Moines Road	at Pacific Highway South	Improve vehicle detection and signal timing. Carry lane markings through intersection to better define channelization. Add red light camera enforcement.		X	X		\$0.1
Redondo Beach Drive South	at RedondoWay South	Monitor operation for possible future signal or other treatment.		X	X		\$0.5

[4] Included in Des Moines Memorial Drive Bike Lane Project.

[5] Red Light Camera Implementation is planned to be revenue-neutral.



Table 8-1. Continued

Project Type	Location	Project Description	Capacity	Safety	Operations	Development	Cost \$Million (2009)
System Preservation and Management							
Downtown Circulation Study	Downtown	Develop plan to maximize multi-modal use, pedestrian access and traffic operations.	X	X	X		\$0.1
Pacific Highway South	South 216th Street to South 272nd Street	Fiber optic signal interconnect.	X		X		[6]
Marine View Drive South	Des Moines Memorial Drive to Kent-Des Moines Road	Fiber optic signal interconnect.	X		X		\$0.3
South 216th Street	Marine View Drive to Pacific Highway South	Fiber optic signal interconnect.	X		X		[1]
16th Avenue South	North Twin Bridge	Replace or retrofit bridge to standard.		X	X		\$2.8
Marine View Drive	Bridge at Salt Water State Park	Replace or retrofit bridge to standard.		X	X		\$6.5
Pavement Management Program	Citywide	Increase funding program for improvements.		X	X		\$30.8
Traffic Management Center	Public Works	Communication and coordination with WSDOT and King County Traffic Management Centers.	X	X	X		\$0.2
Traffic Calming Program	Citywide	Fund annual program for improvements.		X	X		\$1.1
Parking Management Plan	Downtown and HCC areas	Develop parking management strategy and apply program and actions.		X	X		\$0.2
ITS Plan	Arterial Streets	Develop and implement an ITS Plan for City arterials.			X		[7]
Sign and Signal Upgrades	Citywide	Continue to improve signs and traffic signals to meet MUTCD standards.	X	X	X		\$1.1

[1] Included in South 216th Street Project.

[6] Incorporated in Rapid Ride BRT Project.

[7] ITS Plan being developed in-house.

Table 8-1. Continued

Project Name/Location	Limits	Length (miles)	Cost \$Million (2009)
Pedestrian Projects			
Downtown Commercial Streets	6th Avenue South, East-West cross streets	0.85	\$2.0
South 199th and South 200th Street	1st Avenue South to Des Moines Memorial Drive	0.74	\$1.8
8th Avenue South	South 194th Street to South 208th Street	0.86	\$2.0
South 208th Street	1st Avenue South to Des Moines Memorial Drive	0.7	\$1.6
South 222nd Street	Marine View Drive to 24th Avenue South	1.04	\$2.5
South 223rd Street	Marine View Drive to 24th Avenue South	1.04	\$2.5
South 220th Street	11th Avenue South to 16th Avenue South	0.48	\$1.1
9th Avenue South	South 220th Street to Kent-Des Moines Road	0.23	\$0.5
10th Avenue South	South 220th Street to Kent-Des Moines Road	0.61	\$1.5
16th Avenue South	South 220th Street to Kent-Des Moines Road	0.78	\$1.9
Marine View Drive	South 250th Street to Woodmont Drive South	1.05	\$2.5
Woodmont Drive South	Marine View Drive to 16th Avenue South	0.65	\$3.0
S 272nd Street and 10th Avenue South	16th Avenue South to Redondo Beach Drive	1.09	\$7.5
Redondo Beach Drive	Sidewalk to South City Limits	0.16	\$0.6
Curb Ramp Replacement Program	Citywide	--	\$0.8
Bicycle Projects			
16th Ave South Bike Lanes	South 250th Street to South 260th Street	0.65	[2]
24th Place South Bike Lanes	South 208th Street to Kent-Des Moines Road	1.38	[3]
South 224th Street Bike Lanes	24th Avenue South to Eastern City Limits	0.44	\$2.9
South 240th Street Bike Lanes	Marine View Drive South to Pacific Hwy South	1.26	\$6.0
South 216th Street Bike Lanes	Marine View Drive South to I-5	1.57	[1]
30th Avenue South Bike Lanes	Kent-Des Moines Road to South 231st Street	1.10	\$7.3
Kent-Des Moines Road Bikelanes	Marine View Drive South to South 227th Street to Pacific Highway South	1.83	[8]
Dock Street Bike Lanes	South 227th Street to Cliff Avenue South	0.53	[9]
Des Moines Memorial Drive South Bike Lanes	South 216th Street to South 208th Street	0.63	\$5.5
16th Avenue South	Pacific Hwy South to South 272nd Street	0.44	[10]
Bicycle Route Network and Wayfinding Signs	Citywide to Citywide	13.08	\$0.1
Barnes Creek Trail	South 216th Street to Kent-Des Moines Road	1.0	2.6

[1] Included in South 216th Street Project.

[2] Included in 16th Avenue South Project.

[3] Included in 24th Avenue South Project.

[8] Included in Kent-Des Moines Road Project.

[9] Included in Marina Master Plan implementation.

[10] Included in 16th Avenue South/South 276th Street extension project.



Table 8-1. Continued

Project Name/Location	Limits
Transit	
Transit Hubs	Provide connections to other hubs in Des Moines and to other parts of the region – to the north, east and south.
Downtown Transit Hub	Develop transit center hub in Downtown to provide convenient service to SeaTac Airport, Pacific Ridge transit hub and Midway/HCC transit hub, along with connections to Burien Transit Center and Kent Commuter Rail Station.
Midway/Highline Community College Transit Hub/Station	Work with Highline Community College, King County Metro and the Envision Midway planning effort to locate and implement a transit hub, with connections to the Rapid Ride service on Pacific Highway South and other regional destinations, plus connections to Downtown Des Moines and Pacific Ridge transit hubs. Work with Sound Transit on station area planning for Midway Station.
Pacific Ridge Transit Hub	Work with King County Metro and Sound Transit to develop transit hub near the intersection of Pacific Highway South and South 216th Street to serve the developing Pacific Ridge Neighborhood and the Des Moines Creek Business Park with connections to Midway/HCC and Downtown Des Moines transit hubs. This location could become a light rail stop.



CRITERIA FOR PRIORITIZING PROJECTS

In developing the annual six-year Transportation Improvement Plan (TIP) for the City, project prioritization is needed to help identify when best to fund and implement the projects since funding is limited. Criteria were established to help prioritize the projects and implementation based on several goals for the Des Moines transportation system, as noted in **Table 8-2**.

Table 8-2. Criteria for Project Prioritization

Criteria	Measurement
Mobility	
Traffic Mobility	Improves corridor and signal LOS operation
Regional Mobility	Vehicle capacity improvements on major regional routes
System Preservation	Improves existing or substandard roadways
Safety	
Traffic Safety	Improvements that address HAL (based on collision history) location
Emergency Response	Reduces travel time to fire demand zones based on percent response in <= 7 minutes
Environment	
Environmental Preservation	Protects open spaces and minimizes increases to paved areas
Neighborhood Protection	Supports protection of residential areas and neighborhood streets
Multimodal	
Transit Mobility	Supports transit operation on primary transit corridors
Pedestrian Mobility	Improvements that benefit pedestrians based on Accessibility
Bicycle Mobility	Improvements that provide bicycle facilities
Connectedness-Accessibility	Completes missing links to improve access
Implementation	
Cost Effectiveness	Maximizes PM peak usage per 1000 dollar of investment
Funding	Level of funding commitment for project
Project Readiness	Degree the project is ready to be implemented
Economic Development	Supports Land Use Vision

Using these criteria, the recommended projects will need to be evaluated and ranked based on how well each could meet the criteria. High priority projects for Des Moines are those that meet multiple criteria in enhancing travel, mobility for all modes of travel and that will meet the near-term requirements of development and growth. Opportunities for funding can help to boost the priority of a project – allowing the City to take advantage of funding sources and development contributions to the completion of a key project.



FINANCING PLAN

This Chapter includes the potential revenue sources that can be used to fund the City of Des Moines's 2009-2030 Transportation Plan.

The Transportation Plan for the City of Des Moines contains a variety of high priority projects. Table 8-1 summarizes the recommended transportation improvements by mode and includes descriptions of the proposed projects.

REVENUE ESTIMATES

The City of Des Moines uses several sources of revenue to pay for transportation improvements, which are described below. Implementation of the recommended projects will require aggressive exploration of funding and also will require careful prioritization of the projects to ensure an effective use of available funds. **Table 8-3** summarizes the potential revenue for a 22-year period from 2009 to 2030.

Table 8-3. Projected Revenue for Transportation Improvements

Funding Source		Potential 22-Year Total (2009-2030)
Existing Revenue Source		Range in \$ Millions
Grants		\$35 to 70
In-Lieu Fees		\$8 to 11
Local Improvement Districts		\$0 to 10
Motor Vehicle Fuel Tax		\$5 to 7
Interest Earnings		\$0.5 to 2
General Fund		\$0
Public Works Trust Fund Loan		\$0
Real Estate Excise Tax		\$3 to 13
Impact Fees		\$25 to 68
Transportation Benefit District		\$0 to 3
Total Revenue Forecasts from Existing Sources		\$76 to \$184 (Average \$130)
Transportation Costs (from Table 8-1)		Range in \$ Millions
Capital Costs		\$169
Capacity Projects	\$98	
Non Capacity Projects	\$71	
Non Capital Costs		\$33
Total Transportation Costs (2009-2030)		\$202
Additional Revenue Needed from Other Sources		\$18 to \$126

Revenues Compared with Costs

Combined, the expected revenues from existing sources could range from \$76 to \$184 Million, as shown in Table 8-3. The average revenue expectation would be \$130 Million. In comparison, the capital costs estimated in Table 8-1 total approximately \$169 Million and non-capital costs of transportation are estimated at \$33 Million. This results in a potential revenue shortfall of \$18 to \$126 Million. The following sections describe options for dealing with the revenue shortfall.

Grants

Source of Revenue: Some federal and state gas taxes are given to local governments through competitive grants. There are a variety of grant programs, each focused on different types of transportation needs (i.e., safety, congestion, rural roads, bridge replacement, etc).

Forecast: Forecasting future grant revenue is difficult because of the uncertain outcome of the competition for grant awards. While the City has been very successful with grants during the past five years, averaging over \$8 million annually, the City's 2008-2013 Capital Improvement Plan only estimates around \$1.6 million in grants annually. The low estimate in Table 8-3 assumes \$1.6 million annually, while the high estimate is double that value. Given the success of the City in the past, the City should apply for grants whenever possible.

In-Lieu fees

Source of Revenue: In lieu fees are fees paid by developers for frontage improvements, associated with new or redevelopment, that will be constructed with a current City project, in lieu of the developer installing the improvements directly. This may occur when the City already has a project underway and allows the developer to submit the funds.

Forecast: The city has averaged \$360,000 annually in in-lieu fees during the past five years, and forecasts this to increase to \$490,000 annually for the next six years. These two rates form the low and high forecasts.

Local Improvement Districts (LIDS)

Source of Revenue: LIDs collect special assessments from properties in the district to repay the cost of specific transportation improvements in the district that benefit the property owners. LIDs have not been a major funding source for the City.

Forecast: The low estimate assumes no LIDs while the high estimate assumes the city would implement one or two LIDs totalling \$10 million.

Motor vehicle fuel tax

Source of Revenue: The City collects a motor vehicle fuel tax based on population. These fuel taxes are designated for city street purposes. Approximately \$230,000 annually has been allocated to street projects in the 2008-2013 Capital Improvement Plan.

Forecast: The low estimate assumes the historic average while the high estimate assume the city would allocate 40 percent more of the fuel tax to transportation projects.

Interest earnings

Source of Revenue: The City earns interest on various investments and allocates a portion to capital improvements. Approximately \$43,000 annually has been allocated to transportation capital projects in the 2008-2013 Capital Improvement Plan.



Forecast: Potential funding from interest earnings can be included in the anticipated funding for the recommended projects. The low estimate assumes that the City will allocate 50 percent of these interest earnings to other city purposes. The high estimate assumes that the City will allocate double its interest earnings to the capital program.

General Fund

Source of Revenue: The City of Des Moines has occasionally appropriated some of its general fund money to pay for specific transportation improvements. The City's general fund includes property taxes, utility taxes, and sales taxes that are primarily used for operational costs.

Forecast: No general fund money for major transportation capital facilities is included in the forecast.

Public Works Trust Fund (PWTF) Loans

Source of Revenue: Washington's Public Works Trust Fund (PWTF) makes low interest loans to local governments for infrastructure improvements. The City of Des Moines has used the PWTF for selected transportation facilities in the past and has a current PWTF loan for the Des Moines Gateway project on South 216th Street. The City does not show use of PWTF loans in its 2008-2013 Capital Improvement Plan.

Forecast: No PWTF loans are assumed in the forecast in the forecast.

Real Estate Excise Tax (REET)

Source of Revenue: The City of Des Moines has adopted both 0.25% real estate excise taxes authorized by the state law. REET is collected each time a real estate transaction occurs in the city. The money is used for many types of infrastructure improvements, but historically has not included many transportation projects. During the years 2003-2008, the City collected approximately \$1.2 million annually from REET.

Forecast: The low estimate assumes that 10 percent of the REET would be allocated to transportation, while the high estimate assumes a 50 percent allocation.

Impact Fees

Source of Revenue: The Growth Management Act (GMA) created RCW 82.02.050 et seq. that authorizes impact fees for streets and roads. The fees must be based on, and used for, specific improvement projects in the Transportation Plan. The City adopted a transportation impact fee program in 2003. The transportation impact fees, by City policy, are utilized in the following priority order:

- Payment of debt service on bonds or loans for "Comprehensive Transportation Plan" (CTP) identified eligible projects.
- Reimbursement of past CIP Transportation capital expenditures for CTP identified eligible projects.
- Reimbursement of current CIP Transportation capital expenditures for CTP identified eligible projects.
- Use as matching funds required to obtain grants for CTP identified eligible projects.

Forecast: The City has collected approximately \$1.8 million in impact fees since they were adopted in 2003. Using the current impact fee rate of \$2,615 per PM peak hour trip, the forecast assumes 22-year revenues of around \$25 million. This is shown as the low estimate.

Potential Additional Revenue: The impact fee program has been reexamined to match the proposed 2009-2030 transportation plan. Using a revised methodology and updated travel forecasts, there is the potential to increase the impact fee rates over time. The high estimate assumes the adoption of a impact fee rate of \$7,000 per trip.

Transportation Benefit District (TBD)

Source of Revenue: The City has adopted a Transportation Benefit District to collect an annual local Motor Vehicle Excise Tax of \$20 per vehicle. The current proceeds of \$460,000 per year are anticipated to be allocated to city street maintenance needs.

Forecast: The low estimate assumes no allocation of TBD revenues to transportation capital facilities, while the high estimate assumes 30 percent of the TBD funds would be allocated.

CONTINGENCY PLANS IN THE EVENT OF REVENUE SHORTFALL

Some of the revenue forecasts are for revenues that are very secure, and highly reliable, but other revenue forecasts are for sources that are volatile, and therefore difficult to predict with confidence. The revenues forecast from existing sources may not meet the cost of the recommended projects and therefore the City has several options:

- Increase the amount of revenue from existing sources.
- Adopt new sources of revenue.
- Change the Land Use Element to reduce the amount of development, and thus reduce the need for additional public facilities.
- Lower the level of service standard, and therefore reduce the need for some transportation improvements.

The GMA concurrency requirements must be met regardless of funding shortfalls.

REVENUE FROM NEW SOURCES

As indicated in the previous section, if the revenue forecasts do not pay for the needed transportation improvements, the City of Des Moines could adopt one or more new sources of revenue to make up the shortfall. These sources of revenues could include the following:

- Proceeds from General Obligation Bond
- Use of General Funds
- Street Utility (not currently authorized)

The city should further prioritize the transportation improvements to focus on the most needed projects during the next 22 years. This will be most important with the non-motorized projects, which are not eligible directly for impact fees.



Talking Transportation | Glossary and Acronyms Used in this Report

Word/Acronym	Meaning
ADAAG PROW:	The Americans with Disabilities Act Accessibility Guidelines for Public Right-of-Way. These guidelines are issued by the U.S. Access Board and include standards for curb ramps, sidewalks, and traffic signals, among several other elements of the public realm.
Access	Ability to make convenient use of the transportation system.
Americans with Disabilities Act (ADA)	This 1990 federal legislation mandates changes in building codes, transportation and hiring practices to prevent discrimination against persons with disabilities involving federal dollars, including federally and non-federally funded transportation projects.
Average Daily Traffic (ADT)	The average number of vehicles that pass a specified point during a period. Unless otherwise stated, the period is a year.
Arterial	A major street carrying the traffic of local and collector streets to and from freeways and other major streets. Arterials generally have traffic signals at intersections.
Bus Rapid Transit (BRT)	An express or limited stop, rubber-tired transit system operating predominately in roadway managed lanes (e.g. HOV 3+, HOT lanes, etc.)
Capacity	The maximum amount of traffic or people that can be accommodated on a transportation facility at any point in time.
Capacity-related Projects	Projects that increase the number of vehicles or people that can be served by a transportation facility.
Capital Improvement Program (CIP)	City list of capital improvement projects for streets and utilities.
Commute	Regular travel between home and a fixed location (e.g., work, school).
Commute Trip Reduction (CTR)	A state law mandating that affected jurisdictions enact ordinances requiring major employers to implement programs reducing commuting vehicle miles traveled and rates of their employees driving alone. (RCW 70.94.521-551).
Complete Street	Designed and operated to ensure safe travel for all users – pedestrians, cyclists, transit-riders, and motorists. Typically, complete streets include sidewalks, crosswalks, bike lanes, and other features and amenities.
Concurrency	A state planning requirement to ensure that needed services and facilities are in place by the time development is completed and to be occupied or that funding has been committed to provide such services within six years.
Congestion	A condition characterized by unstable traffic flows that creates stop-and-go movement on a transportation facility. Nonrecurring congestion is caused by actions such as special events, weather, and/or traffic accidents. Recurring congestion is caused by problematic facility design at a key location or constant excess volume compared with capacity.
Context Sensitive Design	A concept in transportation planning that addresses the physical setting of the project and the preservation of scenic, aesthetic, historic, and environmental resources.
Corridor	A broad geographical band that follows a general directional flow or connects major sources of trips. It may contain a number of streets and highways and transit lines and routes.
Comprehensive Transportation Plan (CTP)	The is required by the Growth Management Act to prepare a comprehensive transportation plan to accommodate the growth expected by providing the transportation facilities needed to maintain the community's quality of life.

Word/Acronym	Meaning
Deficiency	The condition when a facility does not meet adopted level of service standards.
Delay	An indicator of transportation level of service at intersection measured as the length of time at which a vehicle is stopped.
Dial-a-Ride	Dial-a-Ride services are specifically designed for passengers who are unable to access local bus services. Typically these services provide curb to curb transportation.
Forecast	Projection of employment or population for a given future year.
Facility	A general term that refers to any transportation item such as a road, sidewalk, bus stop or bike lane.
Growth Management Act (GMA)	Washington State legislation passed in 1990 and subsequently amended that requires long-range comprehensive plans prepared by cities and counties to be balanced with supporting transportation infrastructure (RCW 36.70A).
GIS (Geographical Information System)	GIS technology provides a powerful way to see things in context. Spatially explicit models study relationships between population, land use, and the environment. GIS is a way of analyzing data through the relationship of spatial data and physical attributes.
Goal	In the planning process, a goal identifies a purpose towards which an endeavor is directed and that guides the actions of the City staff and Council.
Grade-separated	Crossing lines of traffic that are vertically separated from each other (i.e., a pedestrian bridge that crosses over a rail track).
Highline Community College (HCC)	A community college chartered by the State that serves nearly 17,000 students.
High Capacity Transit (HCT)	A public transit system, such as rail, that can accommodate large volumes of riders.
Highway of Statewide Significance (HSS)	A roadway, route, or interstate highway designated by the State Transportation Commission, the Washington State Department of Transportation, or the Legislature.
High Occupancy Vehicle (HOV)	A motor vehicle with two or more people traveling in it. Includes carpools, vanpools, and transit. A high-occupancy vehicle lane refers to a highway and arterial lane restricted to vehicles carrying multiple occupants or passengers (with the exception of motorcycles).
Impact Fee	Costs imposed on new development to fund public facility improvements required by new development and ease fiscal burdens of providing services on localities.
Infrastructure	The set of interconnected transportation elements that provide the framework for moving people and goods.
Intermodal	Accommodation or interconnection of various transportation modes for the movement of both people and goods. (See also Multimodal)
Intelligent Transportation System (ITS)	Generally refers to the application of advanced electronics and computer technology to automate highway and vehicle systems to enable more efficient and safer use of existing roads.
Jurisdiction	A municipal government agency such as a city or county.
Land Use	The land use element of the comprehensive plan designates the proposed general distribution and general location and extent of the uses of the land. Land uses include, but are not limited to the following: housing, commerce, industry, recreation, open spaces, public facilities and public utilities. The land use element includes population densities, building intensities, and estimates of future population growth.

Word/Acronym	Meaning
Larger City	Puget Sound Regional Council VISION 2040 Plan identifies a city without a regionally designated center that has a combined total population and employment of 22,500 or greater.
Level of Service (LOS)	Innovations in level-of-service for transportation now take into account overall people-moving performance, rather than focusing on traditional assessments of vehicular volume and capacity.
Maintenance	Those activities that ensure that the right-of-way and each type of roadway, roadway structure and facility remain, as nearly as practical in its original, as constructed condition.
Functional Classification	See Street Functional Classification.
Mitigation	Measures taken to reduce adverse impacts on the environment.
Mixed Use	Projects or districts that include residential, commercial, and business accommodations. Vertical mixed-use development refers to buildings that have multiple uses in a single structure, such as ground-floor retail, offices, and residences. Horizontal mixed-use development refers to districts where zoning allows for different uses to be in adjacent buildings and complexes.
Mobility	The ability of people to move about the region from one location to another.
Mode	A particular form of travel (e.g., walking, bicycling, driving alone, carpool or vanpool, bus, train, ferry, or airplane).
Mode Split	A term that describes the relative number of people using various forms – or modes – of transportation. Frequently used to describe the percentage of people using private automobiles as opposed to the percentage using transit.
Multimodal	Buses, ferries, cars, bicycles, and aviation are all examples of modes of travel. In a multimodal transportation system, each of these components is factored in so that service can be delivered efficiently.
MUTCD	The Manual on Uniform Traffic Control Devices is the standard for signs, signals, and pavement markings for the United States by the Federal Highway Administration.
Non-motorized	Generally refers to bicycle, pedestrian, and other modes of transportation not involving a motor vehicle.
Performance Measure	An indicator used in determining how adopted provisions are performing (also see monitoring).
Passenger-Only Ferry (POF)	Passenger-Only Ferry. A ferry boat that only takes passengers is called to a passenger only ferry.
Paratransit	Transit service that is scheduled or dispatched upon demand, providing “point-to-point” travel. Normally used in specialized applications with user eligibility limitations (e.g., elderly and/or handicapped) or where demand is not sufficient to support fixed-route service.
Peak Period	The period of day during which the maximum amount of travel occurs. It may be specified as the morning (AM) or afternoon or evening (PM) peak, depending on the facility.
Pedestrian-Oriented Development	The development and siting of housing, commercial space, services, and job opportunities in a manner that accommodates walking. Such development is intended to create more vibrant urban areas and to reduce dependency on automobile travel.
Puget Sound Regional Council (PSRC)	Puget Sound Regional Council serves at the regional planning organization for the 4-county region of Snohomish, King, Pierce and Kitsap counties. As such it develops a plan that identifies and addresses regional transportation issues.

Word/Acronym	Meaning
Revised Code of Washington (RCW)	Revised Code of Washington. Code enacted by the State of Washington and intended to embrace in a revised, consolidated, and codified form and arrangement all the laws of the state of a general and permanent nature.
Right-of-Way	A general term denoting land, property, or interest therein, usually in a strip of land, acquired for or devoted to transportation purposes.
Single Occupancy Vehicle (SOV)	A vehicle occupied only by the driver.
Street Functional Classification	The City classifies streets according to a hierarchy of functions according to their role in the street network. The functional classification of each roadway determines its roadway design and ultimate cross section.
Traffic Calming Program (NTCP)	The City's Neighborhood Traffic Calming Program responds to neighborhood issues such as cut-through traffic and speeding by offering controls designed to slow down traffic and reduce vehicle volumes.
Transportation Facility	Refers to any facility related to transportation including streets, bus stops, sidewalks, walkways, shared-use paths, trails, overpasses, light rail, passenger-only ferries, and pedestrian crosswalks.
Transportation Improvement Program (TIP)	The City prepares a list of transportation projects needed for the next 6 years and provides cost estimates.
Transit Dependent	Individual(s) dependent on public transit to meet personal mobility needs (e.g., unable to drive, not a car owner, not licensed to drive).
Transit-Oriented Development (TOD)	The development of housing, commercial space, services, and job opportunities in close proximity to public transportation. Such development is intended to reduce dependency on automobiles, as well as to improve mobility and access between residences, jobs, and services.
Transportation Demand Management (TDM)	A concept designed to reduce or eliminate vehicle trips, including a variety of programs and strategies, such as carpool/vanpool, flextime, working from home, and ride matching.
Transportation System Management (TSM)	Improvements to existing transportation facilities that increase the flow of travel, such as ramp metering and signal synchronization. Such improvements typically have a lower capital cost than major construction and can be implemented in a relatively short time.
Vehicle Miles Traveled (VMT)	A measurement of the total miles traveled by all vehicles for a specified time period. For transit, the number of vehicle miles operated on a given route, line, or network during a specified time period.
Walkability	Walkability is a relative measure of the overall walking conditions in an area and encompasses both land use mix as well as roadway conditions that influence pedestrian comfort.
Work Trip	One-way person-trip between home and work.
Washington State Department of Transportation (WSDOT)	The Washington State Department of Transportation is a state agency charged with planning, constructing and maintaining the state highway system.

City of Des Moines Comprehensive Transportation Plan June 2009

APPENDIX A

BACKGROUND ON THE DES MOINES TRAVEL DEMAND MODEL

Appendix A: Travel Model Background



BACKGROUND ON THE DES MOINES TRAVEL DEMAND MODEL

This appendix provides a general overview about the travel demand modeling process and documentation, including a brief description of the modeling process, the assumptions used in the analysis to predict future travel demand, and the model validation process.

Introduction

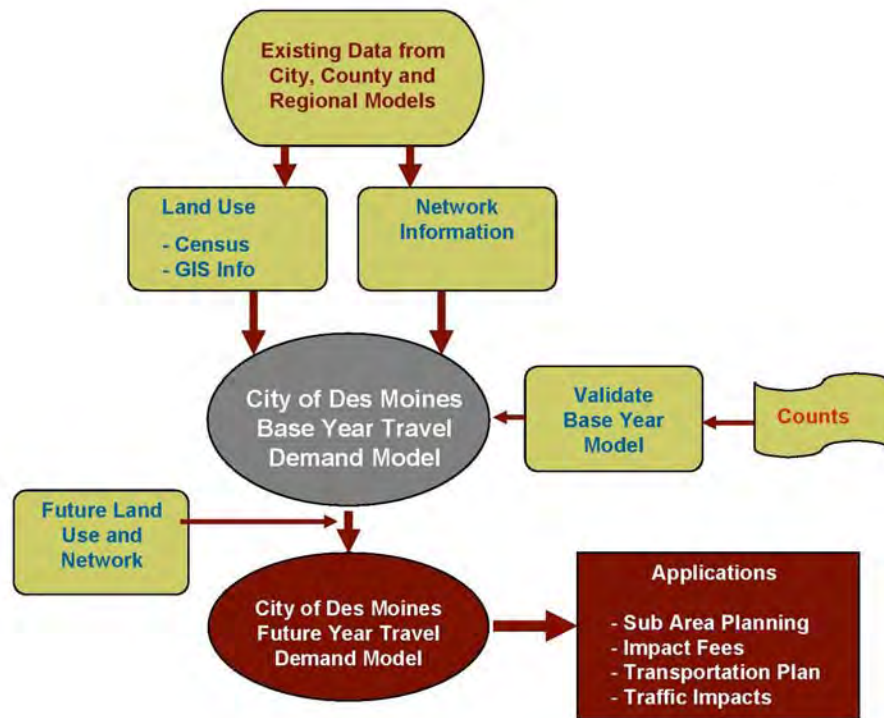
Forecasting future travel demand is a key step in the transportation-planning process. The forecast provides the foundation for a variety of studies including transportation needs analyses, comprehensive plans, EIS studies, detailed operational analyses, and design projects. A travel demand forecasting model can be used for both regional analysis and subarea studies including cities. For subarea studies, the regional model is refined to provide greater level of detail in a focused study area than would be provided at the regional modeling level.

We use travel models to determine the quantitative relationship between land development and the need for future roadway network improvements. Understanding the future nature of traffic volumes and travel patterns in a study area makes it possible to recommend an appropriate set of future transportation improvements. The forecast of future travel demand builds upon an understanding of existing traffic volumes and flow patterns, future land use, and the city's proposed plans.

Travel demand model documentation is as important as the model itself. It is important to document the model input assumptions in order to understand its capabilities and flexibility. Good documentation provides information for all users, not only the technical experts who run the models, but also the planners who use information from the model. This report documents the model developed for the City of Des Moines.

In transportation planning, models imitate the travel patterns of people and/or goods so that they can be studied. Travel demand models are based upon the practical relationships between socioeconomic characteristics, land uses, and travel patterns. By approximating future travel patterns, models make it possible to assess the implications of growth with differing land uses, to compare alternative transportation solutions, and to provide a testing ground for changes in transportation policy. **Figure 1** shows the components and step involved with the development of the model.

Figure 1. Process to Develop Travel Demand Model



The Four-Step Model

For over half a century, what transportation professionals have referred to as the four-step model has been the primary tool for estimating future travel demand for transportation planning projects in the United States. These models use a series of calculations that determine trip characteristics based on assumed land use patterns, socio-economic data and transportation system parameters.

Four-step models were originally employed during the 1950's to forecast the future demand for highway infrastructure, focusing on the predicted number of trips between regional activity centers. Overtime, the model has evolved to include non-automobile modes of travel and to address a number of transportation-related issues.

In a typical travel demand modeling process, a study area is divided into small geographic areas called Travel Analysis Zones (TAZ). TAZs can range in size from a few blocks in dense urban areas to several square miles in rural areas. A travel demand model is comprised of four sequential calculation sub-models – hence the four-step nomenclature. **(Figure 2)**

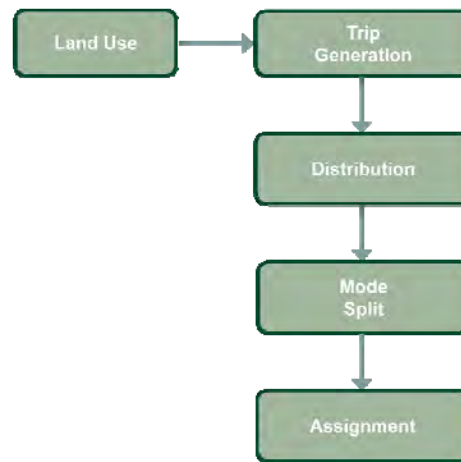
The four steps include:

1. Trip generation step estimates number of trips to and from all areas in the region
2. Trip distribution step links trips to and from all areas of the region
3. Mode Choice step estimates the modes people use to get their destinations
4. Route Assignment determines which route each vehicle will take to reach its destination

The Puget Sound Regional Council (PSRC) develops its regional model to assess regional trends in transportation within the Kitsap, King, Pierce and Snohomish county region. The current multi-modal PSRC model is capable of forecasting auto trips by occupancy, transit person trips, and pedestrian and bicycle trips. The PSRC networks contain the assumed highway infra-structure and transit service changes that are described in the regional transportation plan, *Destination 2030*. While this regional model is too coarse for a subarea analysis for the City of Des Moines, using the current PSRC modeling platform avoids the time and expense of constructing a new subarea model and provides consistency with the regional vision.

The Des Moines travel model contains demographic data sets, including household and employment forecasts, which are associated with a system of transportation analysis zones (TAZs). Household data consists of dwelling units of single family and multifamily categories. The employment data consists of jobs in retail, FIRES (finance, insurance, real estate and services), government and education, manufacturing and WTCU (wholesale, transportation, communications and utilities) sectors. Within the Des Moines Model, refinements were undertaken to allocate the existing and forecast land use to smaller areas within the City's project study area,

Figure 2. Four-Step Travel Demand Model



Trip Generation

Person trips are the first step in the modeling process, before a determination is made of where they go (distribution), what mode they use (mode choice) or which route they take (trip assignment).

Trip generation rates are estimated using household and census surveys, which are performed periodically by PSRC for the Seattle region with the latest completed in 2006. Different trip rates are estimated for each trip purpose – e.g., work, shopping, social/entertainment, school. Trip generation rates on the home end can vary by the following characteristics of a household:

- Income
- Number of workers
- Vehicle availability

Trip generation rates per employee vary by employment type, breaking employment into six industry sector groups:

- Manufacturing
- Wholesale Trade, Transportation, Communications, and Utilities (WTCU)
- Retail Trade
- Finance, Insurance, Real Estate, and Services (FIRES)
- Government and
- Education

The trip generation model is the first of the four primary model components identified in the four-step modeling process. The trip generation model estimates the number of trips produced and attracted to each TAZ. The trips produced are estimated from households and their socioeconomic characteristics. The trips attracted are estimated from employment categorized by type.

Trip generation model was estimated using the 1999 household travel survey data in the Puget Sound region. These models were developed from 5,387 households in the survey, out of a total of 6,000 (90 percent) that was processed to ensure that the data were complete and logical, based on a series of validation tests. The models were estimated for each trip purpose separately. **Table 1** provides an overview of trip rates by purpose for households, persons and employees.

What are person trips?

The term “person trip” is a way to measure the number of people using a transportation facility. When person trips are identified for various modes – carpools or vanpools, transit or single occupant vehicles (SOVs) – mode shares can be analyzed.

A person trip represents each time a person leaves their origin (e.g. home) and arrives at their destination (e.g. work).

Numerous combinations of trips are analyzed in the model process (including work, shop, school, social/entertainment, etc.). The destination for each trip may vary, depending on what type of trip it is, travel time and cost in each scenario. For example, the trip from home to work is a person trip and the return trip from work to home is a second person trip.

Table 1. Trip Rates by Purpose

Trip Purpose	Trips Per Household	Trips Per Person	Trips Per Employee
Home-Based Work	1.55	0.61	1.13
Home-Based College	0.08	0.03	0.06
Home-Based School	0.69	0.27	0.51
Home-Based Shop	1.11	0.44	0.82
Home-Based Other	3.44	1.35	2.53
Non-Home-Based Work	0.88	0.34	0.65
Non-Home-Based Other	2.16	0.85	1.59
Total Person Trips	9.91	3.88	7.27

The trip generation model produces estimates for seven trip purposes:

1. Home-based work
2. Home-based college
3. Home-based school
4. Home-based shop
5. Home-based other
6. Non-home-based work
7. Non-home-based other

Fehr and Peers updated the home-based and non-home-based trip production and attraction models using the 1999 household travel surveys¹. Trip purposes are defined by the activities reported in the household survey at the origin and destination of each trip. If a person's trip has one end at home and one end at work with no stops in between, then this trip is defined as a home-based work trip. If a person's trip begins at home, then involves stopping at the store to buy groceries and continues on to work, this set of trips is defined as a home-based shopping trip and a non-home-based trip. Home-based other trips include activities for visiting, free-time, personal business, and appointments. Non-home-based trips include any trips that begin and end at places other than home.

Trip Distribution

The trip distribution model is the second of the four primary model components identified as part of the four-step modeling process. The trip distribution models estimate the number of trips from each TAZ to each other TAZ. The trips are estimated as a function of the travel impedance from one zone to another.

¹ Puget Sound Regional Council, 1999 *Household Travel Survey, Puget Sound Region*, July to November 1999.

Results from the trip distribution model are shown as trip tables by purpose. These can be summarized by the average trip length in both miles (distance) and minutes (travel time). **Table 2** presents a summary of the trip distribution results for the daily trip tables. Average speeds are calculated from the distance and travel time for each purpose. Changes in trip distance reflect changes in chosen routes due to congestion, and changes in travel time reflect changes in chosen routes, as well as changes in time caused by the congestion.

Table 2. Summary of Trip Distribution Results

Daily	Trips	Average Trip Length		Average Speed
		Miles	Minutes	
Home-based work				
Income less than \$25,000	146,924	9.01	20.12	26.9
Income \$25,000-\$45,000	345,518	11.33	23.95	28.4
Income \$45,000-\$75,000	640,106	12.64	26.01	29.2
Income more than \$75,000	851,933	13.42	26.78	30.1
Subtotal	1,984,481	12.50	25.58	29.3
Home-based college	98,030	9.15	19.84	27.7
Home-based school	883,724	4.06	11.54	21.1
Home-based shop	1,427,492	6.17	13.72	27.0
Home-based other	4,418,377	6.61	15.10	26.3
Non-Home-Based Work	1,129,434	6.26	14.11	26.6
Non-Home-Based Other	2,774,412	7.08	14.88	28.5
Total Person Trips	12,715,950	7.39	16.23	27.3

Mode Choice

The modal choice model is the third stage of the four-step travel demand modeling process. The mode choice steps considers trip variables such as auto operating costs, transit fares, routes, travel time, waiting time and parking costs, to estimate how many trips will be made by single occupant auto, carpool, local bus, express bus and rail transit. For all transit trips, the model also estimates how many people will walk and how many people will drive to get to the transit stop.

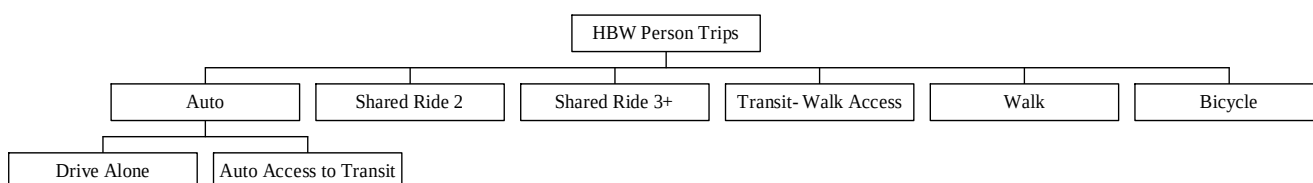
Mode choice models are used in the analysis of policy-oriented transportation planning scenarios and in examining the effects of various policy measures, as well as changes in the socioeconomic composition of an urban area on transportation-related social and environmental issues. A wide range of transportation policies can be evaluated through the application of the behavioral-based mode choice models. Examples include scenarios evaluating the effectiveness of high-occupancy vehicle (HOV) lanes, toll-ways, fixed guideway transit, exclusive bus lanes, and parking pricing.

Internally, the nested logit model for the home-based work trips addresses the following modes of transportation based on the AM peak roadway and transit travel times and level of transit service:

- Drive alone – Single-occupancy auto trips
- Shared ride 2 – Double-occupancy auto trips
- Shared ride 3+ – Auto trips with three or more occupants
- Transit – Walk access
- Transit – Auto access
- Bicycle
- Walk

The nesting structure of the nested multinomial logit model used for the home-based work trip purpose is presented in **Figure 3**.

Figure 3. Nesting Structure of the Home-Based Work Mode Choice Model



The mode choice model produces trips by various modes. The outputs of the model in the format of zone-to-zone travel movements by transit and highway modes are then assigned onto the highway and transit network for further analysis. **Table 3** presents the average vehicle occupancies for auto modes based on 2000 data. A regional summary of trips by various modes and trip purposes produced by the mode choice model for 2000 conditions is shown in **Table 4**.

Table 3. Regional Auto Occupancies (2000)

Trip Purpose	Total Trips
Home-Based Work	1.05
Home-Based College	1.09
Home-Based School	2.48
Home-Based Non-Work	1.45
Non-Home-Based	1.36
Total	1.36

Appendix A: Travel Model Background



Table 4. Regional Person Trips (2000)

Trip Purpose	Drive Alone	Shared Ride 2	Shared Ride 3+	Transit Walk	Transit Auto	Walk	Bicycle	Total
Home-Based Work	1,574,751	124,051	25,196	139,798	32,839	56,515	31,329	1,984,479
	79.4%	6.3%	1.3%	7.0%	1.7%	2.8%	1.6%	
Home-Based College	54,062	10,635		19,121		8,324	5,887	98,030
	55.1%	10.8%		19.5%		8.5%	6.0%	
Home-Based School*	20,779	135,332	217,786			509,826		883,724
	2.4%	15.3%	24.6%			57.7%		
Home-Based Non-Work	2,571,845	1,697,123	1,183,116	111,337		297,597	60,106	5,921,123
	43.4%	28.7%	20.0%	1.9%		5.0%	1.0%	
Non-Home-Based	1,937,757	962,933	645,323	81,587		268,151	28,028	3,923,779
	49.4%	24.5%	16.4%	2.1%		6.8%	0.7%	
Total	6,159,195	2,930,074	2,071,420	351,842	32,839	1,140,413	125,350	12,811,134
	48.1%	22.9%	16.2%	2.7%	0.3%	8.9%	1.0%	

*Walk and bicycle trips combined.

Trip Assignment

The trip assignment mode, the last of the four primary model components, determines the fastest paths or routes for trips between zones and assigns the traffic volume or transit ridership to those routes. The trip assignment model estimates the volume on each link in the transportation system for both highway and transit modes and considers the likely effect of congestion and delays on the most heavily-used facilities and diverts trips to other, less congested links. The trip assignment model generates specific performance measures, such as the congested speed or travel time on a highway link or the boardings and alightings on a transit route. Trip assignment is performed separately for each mode (auto and transit) and time period (AM peak, off-peak, PM peak, evening and night).

TRAVEL FORECAST METHODOLOGY

The travel model uses geographic areas for the estimates and analysis. For the City of Des Moines, the travel forecasting model study area consists of 58 transportation analysis zones (TAZs) as the basic geographic unit for estimating travel demand as described in the section above (Land Use Development). The model includes data for the entire Puget Sound Region in order to accurately analyze the impact of regional traffic on the City.

For the model, the City roadway and intersection characteristics are updated to reflect the city conditions. Initially, the model's trip purposes, trip generation rates and trip distribution parameters were based on those of the Puget Sound Regional Council (PSRC) surveys and parameters used in other travel models in the region. These were adjusted as part of the validation process. The final model validation procedure calibrated the base year model to the 2008 PM peak hour traffic counts, which had been collected as part of the transportation planning effort.

Future Des Moines Street Network

In order to address the growing traffic volumes and congestion levels on City streets, two future roadway improvement scenarios were examined: the Baseline without SR 509 and the Baseline with SR 509. While the Baseline without SR 509 represents a minimum level of roadway improvements, the Baseline with SR 509 project represents a level of roadway improvements listed for SR 509 extension and associated projects.

The 2030 Baseline scenario represents the traffic conditions assuming the street network with the projects committed to date. The Baseline network consists primarily of the existing City street system, funded projects programmed in the City's *Six Year Transportation Improvement Program (TIP) 2008-2013* and the State's Highway Program. The projects in **Table 5** are assumed to be in place by 2030 as part of the region's baseline traffic model and street system. Most of these projects are at least partially funded and have a reasonable likelihood of being implemented during the next 20 years. This set of projects provides a frame of reference for examining the performance of the City street system in 2030.

Table 5. Future Baseline Projects

	Project	Description
Regional Projects		
1	SR 167 – I-405 to SR 18	Add one travel lane in each direction
2	I-5 – SR 509 Extension to S 277th Street	Add travel lanes for merging traffic to/from SR 509 Extension
3	SR 509 Extension – SR 518 to I-5	Construct new freeway extension from Sea-Tac Airport to I-5
4	I-405 – I-5 to Bellevue	Add travel lanes (funded by WSDOT gas tax projects)
City of Des Moines Projects		
1	South 216th Street Improvement-Phase 1	From Pacific Highway South to 24th Avenue South –Widens from three lanes to five lanes roadway.
2	South 216th Street Improvement-Phase 2	From 24th Avenue South to 20th Avenue South – Widens from two lanes to five lanes roadway.
3	South 216th Street Improvement-Phase 3	From 20th Avenue South to 11th Avenue South – Widens from two lanes to three lanes roadway.
4	South 216th Street Improvement-Phase 4	From Marine View Drive to 11th Avenue South –Widens from two lanes to three lanes roadway.
5	24th Avenue South Improvement-Phase 1	From South 216th Street to Kent-Des Moines Road –Widens from two lanes to two-three lanes roadway.
6	24th Avenue South Improvement-Phase 2	From South 208th Street to South 216th Street –Widens from two lanes to five lanes roadway.
7	16th Avenue South Improvement-Phase 3	From Kent-Des Moines Road to South 240th Street – Widens from two lanes to three lanes roadway.
8	16th Avenue South Improvement-Phase 4	From South 240th Street to South 250th Street – Widens from two lanes to three lanes roadway.
9	16th Avenue South Improvement-Phase 5	From Pacific Highway South to South 272nd Street – Widens from two lanes to three lanes roadway.
10	Kent-Des Moines Road Improvement-Phase 1	From 16th Avenue South to 24th Avenue South – Widens from two lanes to three lanes roadway.
11	Kent-Des Moines Road Improvement-Phase 2	From 24th Avenue South to Pacific Highway South – Widens from two lanes to five lanes roadway.
12	Kent-Des Moines Road Improvement-Phase 3	From Marine View Drive to 16th Avenue South – Widens from two lanes to three lanes roadway.

A summary of Des Moines trips by various modes and trip purposes produced by the mode choice model for existing conditions, 2030 Baseline without SR 509 project and 2030 Baseline with SR 509 project are shown in **Table 6, 7 and 8**.

Table 6. Existing Des Moines Person Trips (2008)*

Trip Purpose	Drive Alone	Shared Ride		Transit		Walk	Bicycle	Total
		2	3+	Walk	Auto			
Home-Based Work	713	44	9	257	51	113	61	1,248
	57.14%	3.53%	0.69%	20.59%	4.12%	9.06%	4.86%	
Home-Based College	119	21		41		7	18	206
	57.78%	10.30%		19.78%		3.37%	8.77%	
Home-Based School^	193	630	830			5,078		6,731
	2.9%	9.4%	12.3%			75.4%		
Home-Based Non-Work	3,344	2,411	1,740	335		774	123	8,728
	38.3%	27.6%	19.9%	3.8%		8.9%	1.4%	
Non-Home-Based	2,055	1,005	669	165		421	38	4,353
	47.2%	23.1%	15.4%	3.8%		9.7%	0.9%	
Total	6,425	4,111	3,248	798	51	6,394	240	21,267
	30.2%	19.3%	15.3%	3.8%	0.2%	30.1%	1.1%	

*2008 Person Trips based on 2006 PSRC data.

^Walk and bicycle trips combined.

Table 7. Des Moines Person Trips (2030 Baseline without SR 509)

Trip Purpose	Drive Alone	Shared		Transit		Walk	Bicycle	Total
		Ride 2	Ride 3+	Walk	Auto			
Home-Based Work	1,328	84	17	557	86	254	133	2,460
	54.00%	3.42%	0.68%	22.66%	3.51%	10.34%	5.41%	
Home-Based College	119	21		41		9	22	213
	55.96%	9.94%		19.26%		4.38%	10.46%	
Home-Based School*	212	691	911			5,582		7,397
	2.9%	9.3%	12.3%			75.5%		
Home-Based Non-Work	5,918	4,104	3,049	1,058		1,782	265	16,177
	36.6%	25.4%	18.9%	6.5%		11.0%	1.6%	
Non-Home-Based	4,902	2,401	1,599	727		1,404	119	11,152
	44.0%	21.5%	14.3%	6.5%		12.6%	1.1%	
Total	12,480	7,302	5,576	2,383	86	9,033	539	37,399
	33.4%	19.5%	14.9%	6.4%	0.2%	24.2%	1.4%	

*Walk and bicycle trips combined.

Table 8. Des Moines Person Trips (2030 Baseline with SR 509)

Trip Purpose	Drive Alone	Shared		Transit		Walk	Bicycle	Total
		Ride 2	Ride 3+	Walk	Auto			
Home-Based Work	1,253	79	16	481	55	215	115	2,215
	56.57%	3.59%	0.71%	21.70%	2.50%	9.73%	5.19%	
Home-Based College	126	22		39		9	21	218
	57.92%	10.29%		17.98%		4.01%	9.80%	
Home-Based School*	210	685	902			5,526		7,323
	2.9%	9.4%	12.3%			75.5%		
Home-Based Non-Work	6,063	4,220	3,133	953		1,622	241	16,232
	37.4%	26.0%	19.3%	5.9%		10.0%	1.5%	
Non-Home-Based	4,994	2,447	1,630	626		1,223	102	11,022
	45.3%	22.2%	14.8%	5.7%		11.1%	0.9%	
Total	12,647	7,454	5,680	2,098	55	8,595	479	37,010
	34.2%	20.1%	15.3%	5.7%	0.1%	23.2%	1.3%	

*Walk and bicycle trips combined.

Des Moines Land Use Development

Base year estimates for housing and employment were developed using the latest PSRC databases available.² Housing data were developed using building permit data provided by PSRC and the US Census Bureau. Employment data were developed using Washington State Employment Security data as processed by the Puget Sound Regional Council. The base year estimates of housing and employment are key inputs to the refined Des Moines transportation model.

Des Moines Zone Structure

With guidance from Des Moines staff, transportation analysis zones (TAZ's) were developed for the Des Moines travel demand model. A total of 58 internal zones were created to provide information for Des Moines and a few of the zones adjacent to City (See **Figure 4**). The final Des Moines zone structure was aggregated to the 19 TAZ of the PSRC covering the City and its vicinity as defined by PSRC. This zone change affects the ability of modelers to quickly summarize data for the City road network.

Where did the land use forecasts come from?

The land use forecasts used in the city of Des Moines model are derived from regional forecasts prepared by the PSRC who develops forecasts for the four-county region. PSRC coordinates this effort regionally and has done so for over three decades.

Over this time period of time, PSRC has updated their regional models every 2 to 5 years advancing their methods of forecasting land use by incorporating actual trends and historic data regarding growth in each on-going update.

By updating conditions periodically, the PSRC modelers are able to adjust forecasts to trends that are relative to the region. At any point in time their land use projection represents the best available data set for transportation analyses, understanding that the refinement of forecasts is an on-going task. The regional land use models are not typically re-run for every project or analysis.

Housing

Staff initially developed estimates of base year housing units using census block data for year 2000, found in Summary File 1 (SF 1) and adding the growth information provided by PSRC for the following 6 years. In general, the Des Moines zone structure has a correlation to census block geography. To the degree possible, census tract housing unit totals (single family, multi-family and mobile homes) were used as the universe for the Des Moines TAZ that makes up the census tract. The PSRC collects building permit records from all jurisdictions and converts the data into point level geometry. Modelers put the point level data over the Des Moines TAZ system to determine the growth in housing units.

The housing unit data was then converted to households. Housing units and households data from SF1 was used to determine an occupancy estimate for the Des

² PSRC housing and employment data is based on 2006 data. The development of the 2008 Des Moines model assumed the 2006 PSRC data was representative of 2008 housing and employment conditions within the City.

Moines zones. Multiplying the estimated housing units within a TAZ by the occupancy rate gives an estimate of total households. The initial estimate of housing units and households were reviewed and agreed to by Des Moines staff.

Future year (2030) household forecasts were initially developed using the latest household estimates adopted by the Puget Sound Regional Council. The development of the year 2030 housing data was based on the Des Moines base year distribution and the growth assumed in the PSRC forecasts. Des Moines staff reviewed the 2030 estimated forecasts and recommended some modifications based on the City's latest buildable lands analysis.

The Des Moines TAZs are a subset of a series of census tracts (285 to 292, 294, 297 to 300). **Figure 5** shows the graphical correlation between PSRC TAZs and Des Moines TAZs.

Figure 4. PSRC TAZs for the City of Des Moines

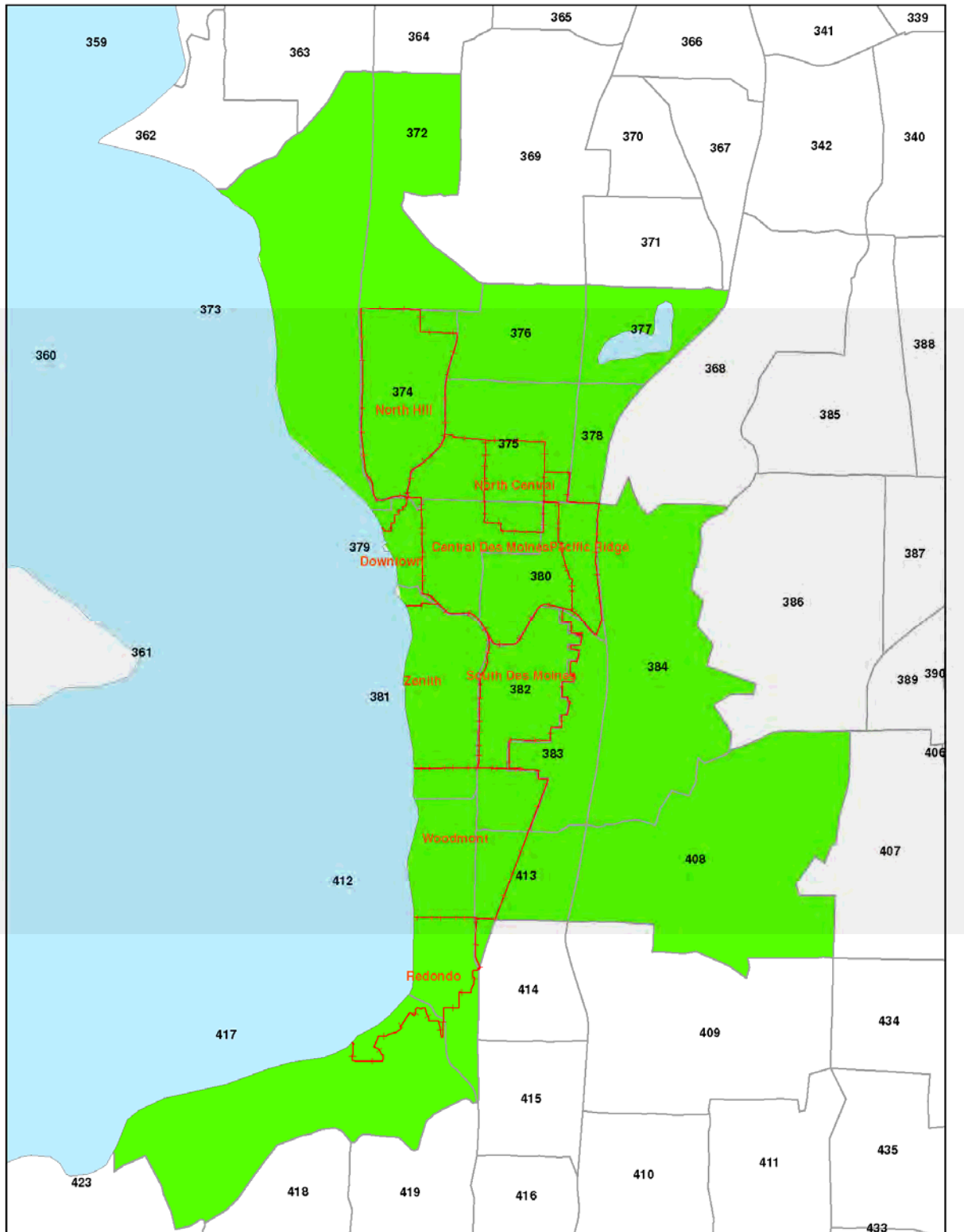


Figure 5. Des Moines TAZs Overlayed on PSRC TAZs

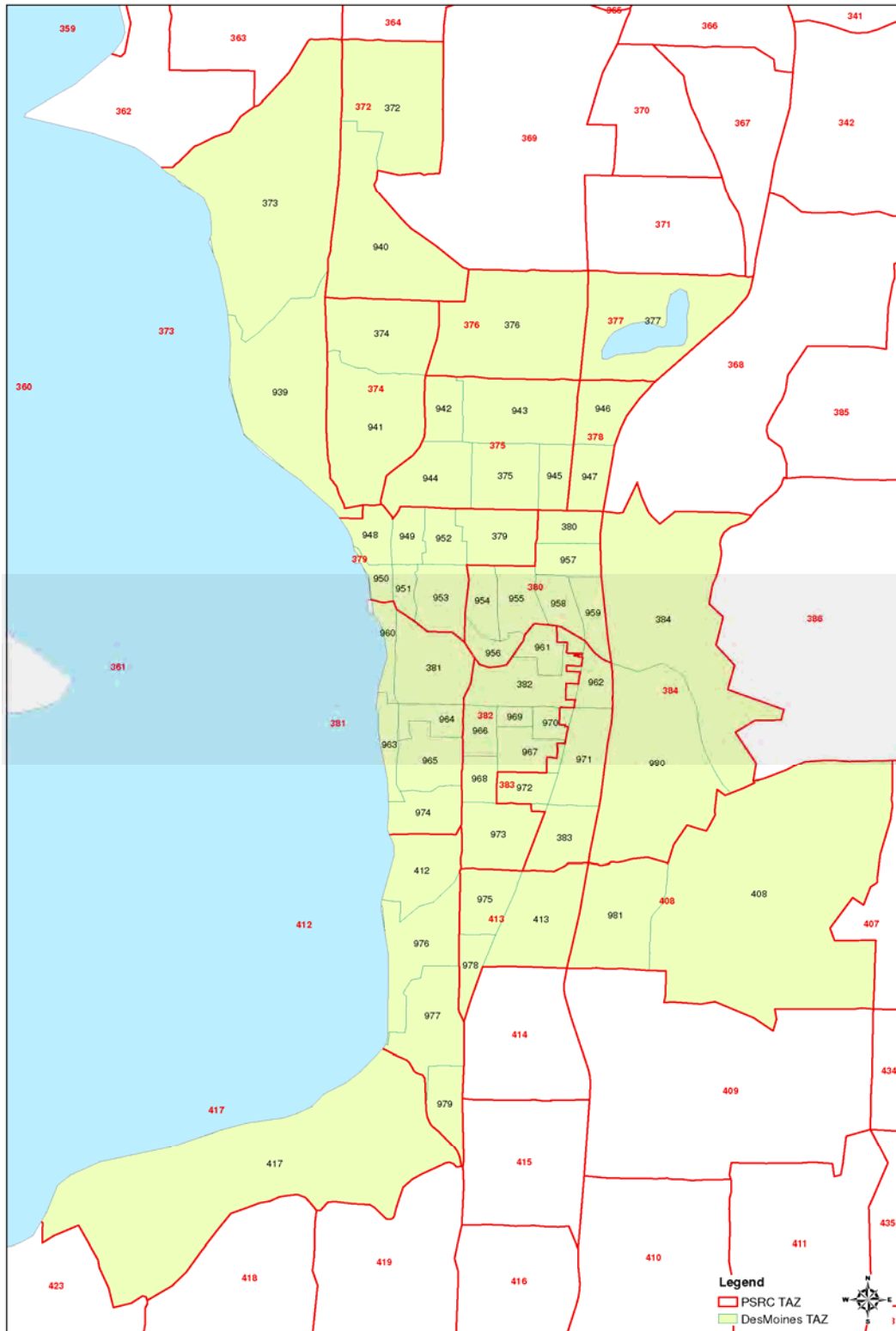


Table 9 shows the results of the methodology that created base year estimates of housing units and households in Des Moines TAZs within census tracts defining the study area.

Table 9. Sample of Land Use Data for 2008 Base Year

Des Moines TAZ	2000 Housing Units	2000 Households	2000 Vacancy Rate	Growth in Housing Units	2008 Housing Units*	2008 Households*
372	538	428	0.8	43	581	462
373	1952	1906	0.98	118	2070	2021
374	709	695	0.98	4	713	699
939	669	652	0.97	16	685	668
940	1197	1155	0.96	8	1205	1163
941	1237	1211	0.98	9	1246	1220
942	263	259	0.98	12	275	271
943	357	332	0.93	-7	350	325
944	350	333	0.95	-1	349	332

*2008 housing unit data analysis based on 2006 PSRC data.

Employment

Estimates of base year employment data were developed using the year 2006 Washington State Employment Security data. The employment data which includes those employees covered by the Washington Unemployment Insurance Act, typically accounts for 85 to 90 percent of the total employment in a region. The Puget Sound Regional Council in accordance with agreements between the Washington State Employment Security Department, and the City of Des Moines processed the initial dataset.

The final zonal estimates are summarized into six groups of employment sectors and then factored to develop full employment in a zone. The employment sectors include Retail, FIRES (Finance, Insurance, Real Estate and Services), Government, Education, Manufacturing and WTCU (Wholesale, Transportation, Communication and Utilities). The estimates provide the distinct distribution of employment within the City of Des Moines. City staff reviewed and agreed to the initial estimates of total employment.

Fehr and Peers developed future year employment initial estimates using the PSRC database for year 2030. The PSRC TAZ employment was distributed into Des Moines TAZ based on the proportions from base year employment. Des Moines staff reviewed the initial estimated forecasts for year 2030 and recommended some modifications based on current development patterns and local knowledge. The modelers used the estimates provided by the City for the Des Moines transportation model development. **Tables 10, 11 and 12** show estimates for households and employment by Des Moines TAZ.

Table 10. Households and Employment Estimates Summary (2006 and 2030)

Des Moines TAZ	2008 Households*	2008 Employment*	2030 Households	2030 Employment
372	462	87	550	523
373	2021	484	2198	1032
374	699	311	818	312
375	0	0	0	1317
376	68	2322	81	2887
377	1164	1007	1325	3872
379	273	44	418	72
380	625	133	2519	1344
381	542	300	1055	301
382	419	961	446	1093
383	816	258	989	619
384	860	181	886	222
408	2312	575	2933	1364
412	435	8	498	8
413	473	221	571	384
939	668	106	726	149
940	1163	1247	1384	2745
941	1220	31	1276	32
942	271	4	323	6
943	325	486	387	581
944	332	268	375	350
945	32	16	32	737
946	915	325	1162	341
947	334	494	424	598
948	326	266	511	524
949	168	473	223	553
950	186	196	371	456
951	102	118	204	241
952	192	127	219	127
953	264	6	295	6
954	138	26	149	26
955	124	154	144	179
956	350	1	385	1
957	440	468	1400	843
958	357	214	557	1396
959	496	228	1636	692
960	276	134	288	134
961	397	148	397	183
962	178	289	216	590

Appendix A: Travel Model Background

Des Moines TAZ	2008 Households*	2008 Employment*	2030 Households	2030 Employment
963	91	3	103	3
964	202	9	214	9
965	604	6	617	6
966	212	10	221	10
967	191	127	191	171
968	119	6	133	6
969	68	6	95	6
970	199	41	222	66
971	51	305	62	433
972	268	35	325	72
973	512	96	571	109
974	72	2	82	2
975	265	57	349	95
976	338	40	405	41
977	286	97	577	97
978	153	396	153	396
979	343	132	411	151
980	1501	191	1547	523
981	646	72	819	176
	26544	14348	35468	29212

*2008 housing unit/employment data based on 2006 PSRC and 2006 Washington State Employment Security data.

Table 11. Employment Estimates 2008*

Des Moines TAZ	RETAIL	FIRES	Adj Gov	EDUC	WTCU	Adj Man
372	57	27	3	0	0	0
373	96	323	0	55	10	0
374	11	98	0	48	140	14
375	0	0	0	0	0	0
376	46	1038	24	0	1213	1
377	22	721	152	0	93	19
379	0	1	3	0	40	0
380	29	62	0	0	42	0
381	0	296	0	0	4	0
382	22	60	0	872	7	0
383	155	85	0	0	0	18
384	121	19	0	19	22	0
408	11	388	5	136	30	5
412	0	6	0	0	2	0
413	98	103	20	0	0	0
939	3	64	0	38	1	0
940	29	428	55	15	576	144
941	0	27	0	0	2	2
942	0	2	0	0	2	0
943	8	307	0	0	138	33
944	7	261	0	0	0	0
945	13	3	0	0	0	0
946	11	186	0	52	76	0
947	144	285	0	0	65	0
948	52	193	0	0	19	2
949	19	402	10	33	7	2
950	50	134	11	0	0	1
951	31	73	0	0	4	10
952	0	0	126	0	1	0
953	0	6	0	0	0	0
954	0	26	0	0	0	0
955	0	3	22	129	0	0
956	0	1	0	0	0	0
957	0	404	19	42	3	0
958	56	94	0	0	64	0
959	12	215	0	0	1	0
960	13	119	0	0	2	0
961	6	137	4	0	1	0
962	38	215	0	0	36	0
963	0	3	0	0	0	0
964	0	5	0	0	4	0
965	0	6	0	0	0	0

Appendix A: Travel Model Background

Des Moines TAZ	RETAIL	FIRES	Adj Gov	EDUC	WTCU	Adj Man
966	0	10	0	0	0	0
967	0	73	0	43	9	2
968	0	6	0	0	0	0
969	0	6	0	0	0	0
970	30	10	1	0	0	0
971	10	40	0	0	53	202
972	18	17	0	0	0	0
973	27	59	0	0	0	10
974	0	2	0	0	0	0
975	0	24	0	33	0	0
976	21	3	16	0	0	0
977	6	90	0	0	1	0
978	209	168	16	0	0	3
979	10	109	0	0	9	4
980	2	149	0	39	1	0
981	7	19	5	0	41	0

*Employment data based on 2006 Washington State Employment Security data.

Table 12. Employment Estimates 2030

Des Moines TAZ	RETAIL	FIRES	Adj Gov	EDUC	WTCU	Adj Man
372	407	114	2	0	0	0
373	519	391	38	78	6	0
374	30	131	0	84	61	6
375	187	1130	0	0	0	0
376	216	757	35	0	1879	0
377	106	3601	0	0	157	8
379	0	1	4	0	67	0
380	418	494	0	0	432	0
381	0	297	3	0	1	0
382	209	341	0	510	33	0
383	426	182	0	0	0	11
384	90	53	0	30	49	0
408	219	944	5	180	16	0
412	0	2	0	0	6	0
413	228	155	1	0	0	0
939	18	77	0	53	1	0
940	207	1791	41	23	497	186
941	0	30	0	0	1	1
942	0	3	0	0	3	0
943	53	320	10	0	162	36
944	50	300	0	0	0	0
945	709	28	0	0	0	0
946	13	262	0	28	38	0
947	163	402	0	0	33	0
948	217	269	0	0	35	3
949	61	433	11	35	10	3
950	230	207	17	0	0	2
951	122	95	0	0	8	16
952	0	0	125	0	2	0
953	0	6	0	0	0	0
954	0	26	0	0	0	0
955	0	3	19	157	0	0
956	0	1	0	0	0	0
957	0	696	32	98	7	10
958	509	477	0	0	410	0
959	64	624	0	0	4	0
960	54	80	0	0	0	0
961	3	48	132	0	0	0
962	97	427	46	0	20	0
963	0	3	0	0	0	0
964	0	8	0	0	1	0
965	0	6	0	0	0	0

Des Moines TAZ	RETAIL	FIRES	Adj Gov	EDUC	WTCU	Adj Man
966	0	10	0	0	0	0
967	0	147	0	8	15	1
968	0	6	0	0	0	0
969	0	6	0	0	0	0
970	26	5	35	0	0	0
971	62	191	0	0	36	144
972	41	31	0	0	0	0
973	45	61	0	0	0	3
974	0	2	0	0	0	0
975	0	36	0	59	0	0
976	36	1	4	0	0	0
977	35	55	0	0	7	0
978	255	134	0	0	5	2
979	50	52	0	0	45	4
980	2	411	43	62	2	3
981	112	40	5	0	19	0

Existing Model Validation

Model validation is a method used to match the known land use data to the existing traffic count data. The validated model then ready to for forecasting future travel demand based on changes in land use. The Des Moines model with the estimated base year land use data as an input was used to get the estimated trip volumes. The model volumes were validated against the observed data at a set of screenlines defining the study area. **Table 13** provides the initial demand estimates before calibration. Modelers used the initial model validation data to refine and calibrate the existing model to match the observed data better. Multiple model runs were performed to have the final calibrated model match the observed data better.

The final validated model includes a number of refinements including speed changes to reflect the existing conditions rather than the posted speed, and the weighting and placement of centroid connectors reflect the existing driveways and access points. **Table 14** provides the citywide demand estimates with all the enhancements incorporated based on the independent review and recommendations. The screenline summaries with the recommended enhancements match the observed data better than the estimates that were initially developed.

Traffic Forecasts

The validated model is used with the 2030 land use to forecast the future traffic volumes. The 2030 model for the City follows the four-step process (trip generation, distribution, mode split and assignment) to estimate the future 2030 traffic volumes on the future street network. A post-processing step is used to adjust the model

volumes to reflect any differences previously between the base year observed and model volumes. The resulting volumes are used to analyze future traffic conditions and to identify any needed system improvements.

Table 13. Observed and Estimated Existing (2008) PM Peak Hour Volumes-City of Des Moines (Before Validation)

	Observed Volumes		Model Volumes		Ratio (Model/Observed)	
	EB	WB	EB	WB	EB	WB
Screenline 1, East of SR99 - Pacific Highway	3,695	3,705	4,544	3,915	23.0%	5.7%
	NB	SB	NB	SB	NB	SB
Screenline 2, South of S 272nd St	1,130	2,720	1,125	2,363	-0.4%	-13.1%
	NB	SB	NB	SB	NB	SB
Screenline 3, North of S 216th St	7,990	12,890	9,526	15,052	19.2%	16.8%
	NB	SB	NB	SB	NB	SB
Screenline 4, North of S 223rd St	1,620	3,350	2,096	3,906	29.4%	16.6%
	NB	SB	NB	SB	NB	SB
Screenline 5, South of S 240th St	7,070	11,600	7,615	12,822	7.7%	10.5%
	EB	WB	EB	WB	EB	WB
Screenline 6, West of SR99- Pacific Highway	2,105	2,275	1,470	1,661	-30.2%	-27.0%
	EB	WB	EB	WB	EB	WB
Screenline 7, East of Marine View Drive	1,780	1,915	1,204	1,425	-32.4%	-25.6%
	NB	SB	NB	SB	NB	SB
Screenline 8, North of Kent Des Moines Road	7,000	11,420	9,095	14,313	29.9%	25.3%
	NB	SB	NB	SB	NB	SB
Screenline 9, I-5 Interchange at Kent Des Moines Road	6,360	11,420	8,026	12,363	26.2%	8.3%
Total	38,750	61,295	44,701	67,820	15.4%	10.6%

Table 14. Observed and Estimated Existing (2008) PM Peak Hour Volumes – City of Des Moines (After Validation)

	Observed Volumes		Model Volumes		Ratio (Model/Observed)	
	EB	WB	EB	WB	EB	WB
Screenline 1, East of SR99 - Pacific Highway	3,695	3,705	4,118	3,794	11.4%	2.4%
	NB	SB	NB	SB	NB	SB
Screenline 2, South of S 272nd St	1,130	2,720	1,336	2,540	18.2%	-6.6%
	NB	SB	NB	SB	NB	SB
Screenline 3, North of S 216th St	7,990	12,890	8,676	13,167	8.6%	2.1%
	NB	SB	NB	SB	NB	SB
Screenline 4, North of S 223rd St	1,620	3,350	1,798	3,121	11.0%	-6.8%
	NB	SB	NB	SB	NB	SB
Screenline 5, South of S 240th St	7,070	11,600	6,908	11,341	-2.3%	-2.2%
	EB	WB	EB	WB	EB	WB
Screenline 6, West of SR99- Pacific Highway	2,105	2,275	1,789	1,837	-15.0%	-19.3%
	EB	WB	EB	WB	EB	WB
Screenline 7, East of Marine View Drive	1,780	1,915	1,526	1,816	-14.3%	-5.2%
	NB	SB	NB	SB	NB	SB
Screenline 8, North of Kent Des Moines Road	7,000	11,420	7,835	12,004	11.9%	5.1%
	NB	SB	NB	SB	NB	SB
Screenline 9, I-5 Interchange at Kent Des Moines Road	6,360	11,420	6,808	10,866	7.0%	-4.9%
Total	38,750	61,295	40,794	60,486	5.3%	-1.3%

**City of Des Moines
Comprehensive Transportation Plan
June 2009**

APPENDIX B

PROPOSED STREET FUNCTIONAL CLASSIFICATION AND BUILDOUT BY SEGMENT

Street Functional Classification and Buildout by Segment



Appendix B: Proposed Street Functional Classification and Buildout by Segment

Street Name	From	To	2 Lanes*	3 Lanes*	4 Lanes*	5 Lanes*	6 Lanes *	Bike Lane	Bike Route	Priority Ped	Proposed Functional Classification
16th Avenue South	Kent-Des Moines Road	Pacific Highway South		X				X		X	Principal Arterial
Pacific Highway South	South 216th Street	Kent-Des Moines Road					X			X	Principal Arterial
Kent-Des Moines Road	Marine View Drive South	24th Avenue South		X				X		X	Principal Arterial
Kent-Des Moines Road	24th Avenue South	30th Avenue South (City Limits)				X		X		X	Principal Arterial
Marine View Drive South	Des Moines Memorial Drive South	Kent-Des Moines Road		X					X	X	Principal Arterial
Des Moines Memorial Drive South	South 208th Street (City Limits)	Marine View Drive South	X					X		X	Principal Arterial
South 272nd Street	16th Avenue South	Pacific Highway South				X				X	Principal Arterial
South 216th Street	20th Avenue South	East City Limits, I-5				X		X		X	Principal Arterial
24th Avenue South	South 208th Street	South 216th Street				X		X		X	Principal Arterial
South 200th Street	8th Avenue South	Des Moines Memorial Drive South	X						X	X	Minor Arterial
South 216th Street	7th Place South	20th Avenue South		X				X		X	Minor Arterial
7th Place South	Marine View Drive South	South 216th Street		X				X		X	Minor Arterial
7th Avenue South	Marine View Drive South	South 227th Street		X					X	X	Minor Arterial
South 240th Street	Marine View Drive South	27th Avenue South (City Limits)		X				X		X	Minor Arterial
Marine View Drive South	Kent-Des Moines Road	South 240th Street	X					X		X	Minor Arterial
South 260th Street	16th Avenue South	Pacific Highway South		X					X	X	Minor Arterial
South 227th Street	Marine View Drive South	7th Avenue South			X			X		X	Minor Arterial
South 199th Street	1st Avenue South	5th Avenue South	X						X	X	Collector Arterial
South 200th Street	5th Avenue South	8th Avenue South	X						X	X	Collector Arterial
Marine View Drive South	South 240th Street	South 252nd Street	X					X		X	Collector Arterial
Marine View Drive South	South 252nd Street	Woodmont Drive South	X						X	X	Collector Arterial

Street Functional Classification and Buildout by Segment



Street Name	From	To	2 Lanes*	3 Lanes*	4 Lanes*	5 Lanes*	6 Lanes *	Bike Lane	Bike Route	Priority Ped	Proposed Functional Classification
Woodmont Drive South	Marine View Drive South	16th Avenue South	X						X	X	Collector Arterial
8th Avenue South	South 194th Street (City Limits)	South 200th Street		X					X	X	Collector Arterial
South 223rd Street	Marine View Drive South	24th Avenue South	X						X	X	Collector Arterial
24th Avenue South	South 216th Street	Kent-Des Moines Road		X				X		X	Collector Arterial
20th Avenue South	Kent-Des Moines Road	South 240th Street	X						X	X	Collector Arterial
South 272nd Street	16th Avenue South	12th Avenue South	X						X	X	Collector Arterial
Marine View Drive South	12th Avenue South	10th Avenue South	X						X	X	Collector Arterial
10th Avenue South	Marine View Drive South	South 281st Street	X						X	X	Collector Arterial
South 281st Street	10th Avenue South	Redondo Beach Drive South	X						X	X	Collector Arterial
Redondo Beach Drive	1st Avenue South	Redondo Way South	X							X	Collector Arterial
Redondo Beach Drive	Redondo Way South	South 281st Street	X						X	X	Collector Arterial
12th Avenue South	Marine View Drive South	South 272nd Street	X						X	X	Collector Arterial
1st Avenue South	Redondo Beach Drive	City Limits	X							X	Collector Arterial
Redondo Way South	Redondo Beach Drive South	City Limits	X						X	X	Collector Arterial
South 224th Street	24th Avenue South	Pacific Highway South	X					X		X	Collector Arterial
South 268th Street	16th Avenue South	Pacific Highway South	X						X	X	Neighborhood Collector
South 227th Street	7th Avenue South	Marina		X				X		X	Neighborhood Collector
11th Avenue South	South 216th Street	South 220th Street	X						X	X	Neighborhood Collector
10th Avenue South	South 220th Street	South 222nd Street	X						X	X	Neighborhood Collector
10th Avenue South	South 222nd Street	Kent Des Moines Road	X							X	Neighborhood Collector
10th Avenue South	Kent Des Moines Road	South 232nd Street	X								Neighborhood Collector
South 232nd Street	10th Avenue South	14th Avenue South	X								Neighborhood Collector
14th Avenue South	South 232nd Street	South 234th Street	X								Neighborhood Collector
16th Avenue South	South 220th Street	Kent-Des Moines Road	X							X	Neighborhood Collector
19th Avenue South	South 220th Street	South 234th Street	X						X	X	Neighborhood Collector
South 234th Street	19th Avenue South	18th Avenue South	X						X		Neighborhood Collector
18th Avenue South	South 234th Street	Kent-Des Moines Road	X						X		Neighborhood Collector

Street Functional Classification and Buildout by Segment



Street Name	From	To	2 Lanes*	3 Lanes*	4 Lanes*	5 Lanes*	6 Lanes *	Bike Lane	Bike Route	Priority Ped	Proposed Functional Classification
20th Avenue South	South 243rd Street	South 252nd Street	X						X	X	Neighborhood Collector
South 251st Street	Marine View Drive South	South 250th Street	X						X	X	Neighborhood Collector
South 250th Street	South 251st Street	20th Avenue South	X						X	X	Neighborhood Collector
South 222nd Street	5th Avenue South	24th Avenue South	X						X	X	Neighborhood Collector
South 223rd Street	Marine View Drive South	Cliff Avenue South	X						X	X	Neighborhood Collector
Cliff Avenue South	South 223rd Street	Marina/Park	X						X	X	Neighborhood Collector
South 208th Street	1st Avenue South	Des Moines Memorial Drive South	X							X	Neighborhood Collector
30th Avenue South	South 224th Street	Kent-Des Moines Road	X					X		X	Neighborhood Collector
8th Avenue South	South 200th Street	South 208th Street	X							X	Neighborhood Collector
4th Avenue South	South 199th Street	South 216th Street	X						X		Neighborhood Collector
6th Avenue South	South 220th Street	South 227th Street	X							X	Neighborhood Collector
9th Avenue South	South 220th Street	South 222nd Street	X						X	X	Neighborhood Collector
9th Avenue South	South 222nd Street	South 223rd Street	X							X	Neighborhood Collector
25th Avenue South	Kent-Des Moines Road	South 232nd Street	X							X	Neighborhood Collector
14th Place South	South 258th Street	16th Avenue South	X							X	Neighborhood Collector
South 258th Street	14th Place South	Marine View Drive South	X							X	Neighborhood Collector
Woodmont Beach Drive	Woodmont Drive South	South 270th Place	X								Neighborhood Collector
South 220th Street	6th Avenue South	Marine View Drive South	X							X	Neighborhood Collector
South 220th Street	9th Avenue South	11th Avenue South	X						X	X	Neighborhood Collector
South 220th Street	11th Avenue South	19th Avenue South	X						X	X	Neighborhood Collector
South 222nd Street	24th Avenue South	Pacific Highway South	X						X	X	Neighborhood Collector
South 225th Street	6th Avenue South	Marine View Drive South	X							X	Neighborhood Collector
South 226th Street	6th Avenue South	Marine View Drive South	X							X	Neighborhood Collector
5th Avenue South	South 222nd Street	Cliff Avenue South	X							X	Neighborhood Collector
South 216th Street	1st Avenue South	4th Avenue South	X						X		Neighborhood Collector
South 252nd Street	20th Avenue South	City Limits	X								Neighborhood Collector

Street Functional Classification and Buildout by Segment



Street Name	From	To	2 Lanes*	3 Lanes*	4 Lanes*	5 Lanes*	6 Lanes *	Bike Lane	Bike Route	Priority Ped	Proposed Functional Classification
South 220th Street	24th Avenue South	30th Avenue South	X					X		X	Neighborhood Collector
30th Avenue South	South 216th Street	South 220th Street	X					X		X	Neighborhood Collector
South 224th Street	Pacific Highway South	30th Avenue South	X					X		X	Neighborhood Collector
14th Avenue South	South 234th Street	South 240th Street	X								Neighborhood Collector
16th Avenue South (new)	South 216th Street	South 220th Street	X							X	Neighborhood Collector
20th Avenue South (new)	South 240th Street	South 243rd Street	X						X	X	Neighborhood Collector
South 276th Street Connection (new)	16th Avenue South	Pacific Highway South		X				X		X	Principal Arterial
*Additional turn pockets may be required at intersections.											