AGENDA
PLANNING COMMISSION

Connie Coleman-Lacadie • Don Daniels • Robert Estrada • James Guerrero • Robert Pourpasand • Paul Wagemann • Christopher Webber

Regular Meeting
Wednesday, October 7, 2015, at 6:30 pm
City Hall, Council Chambers
6000 Main Street SW, Lakewood, Washington

1. **Call to Order**

2. **Roll Call**

3. **Approval of Minutes from September 23, 2015**

4. **Public Comments**
(Members of the audience may comment on items that are not included on the agenda. Each person will be allowed 3 minutes to speak, to a total of 15 minutes per topic. Groups with a designated speaker may have a total of 10 minutes to speak.)

5. **Public Hearings**
   - None

6. **Unfinished Business**
   - Closure of Written Comment Period for 2015 CPAs–(motion)
   - 2015 Comprehensive Plan Amendments and Update Recommendations (Resolution)
   - Floodplain Management and Critical Areas Ordinance Amendments (Study Session)

7. **New Business**
   - None

8. **Reports from Commission Members and Staff**
(Planning Commission members and staff may make committee reports and announcements relating to items not on the agenda.)

Enclosures: September 23, 2015 Draft Minutes
Staff Report re:
2015 Comp Plan Amendments and Update Recommendations (Resolution)
Flood Plain Management and Critical Areas Ordinance Amendments

Members Only:
Please call Karen Devereaux at 253.983.7767 by Tuesday, October 6, 2015, if you are unable to attend. Thank you.

The next meeting is tentatively scheduled for October 21, 2015

PLANNING COMMISSION
REGULAR MEETING
WEDNESDAY September 23, 2015
Council Chambers
6000 Main Street SW
Lakewood, WA 98499

Chairman Mr. Don Daniels called the meeting to order at 6:30 p.m.

Roll Call
Planning Commission Members Present: Don Daniels, Chair; Robert Estrada, Paul Wagemann, Vice-Chair; Connie Coleman-Lacadie, James Guerrero and Christopher Webber
Planning Commission Members Excused: Robert Pourpasand
Planning Commission Members Absent: None
Staff Present: David Bugher, Assistant City Manager, Community & Economic Development; Dan Catron, Long Range Planning Manager; and Karen Devereaux, Recording Secretary
Council Liaison: Councilmember Paul Bocchi

Acceptance of Agenda

Approval of Minutes
Chairman Mr. Don Daniels, opened the floor for discussion of the draft minutes of the meeting held September 2, 2015.

Mr. Robert Estrada made the motion to approve the minutes as written. The second was made by Mr. Christopher Webber. A unanimous voice vote carried the motion.

Public Comments
Lorrie O'Brien, Lakewood resident, expressed concerns about the Cottage Housing proposals the planning commissioners have been discussing in recent months and asked how she could receive more information to understand the different zoning. Mr. Don Daniels, Chair, suggested she look at the City website then contact planning staff in the Community Development Department.

Dennis Haugen, Lakewood resident, emphasized that the Comprehensive Plan makes a basic assumption that the City of Lakewood is going to grow. Mr. Haugen cautioned commissioners in how they allowed the City growth commenting that there has been no regional planning.

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Glen Spieth, Lakewood resident, queried commissioners for assistance in securing a viable solution to provide year-round bathrooms at the Kiwanis Skate Park and discourage park visitors from using his adjacent property to relieve themselves.

Public Hearing
2015 Comprehensive Plan Updates and Amendments
(Continued from September 16, 2015)

- *City Initiated Amendments*

In April 2015 the Planning Commission adopted a resolution of intent directing the Community and Economic Development Department to consider two amendments to the Land-Use and Zoning Maps:

Interlaaken Dr and Tower Rd SW Amendment
Mr. Dan Catron noted that he had provided copies of several letters the department had received over the last week from citizens on this proposal. It was noted these letters would be compiled into their next agenda packet for deliberations at their next meeting. The names were stated as follows: Baxter Shaffer, Arthur Peavey, Burton and Doris Johnson, Lakewood Water District, Merrit Lawson Jr., Mickey Porto, Preston and Elizabeth Carter, State Department of Transportation and Mr. Bruce Dayton of the Lakewood Racquet Club.

Mr. Dan Catron explained that in response to last week's unfortunate incidence with the recording equipment staff sent letters to everyone who had signed in with a full address mailed a letter announcing the continuation of the public hearing to Wednesday, September 23, 2015, as well as reposting the public notice signs at the parcel locations of the map amendments, reposting the information on the City website and revised notices on entrance doors of the City Hall.

Mr. Catron suggested the commissions allow testimony on the map amendments first, and then after all public comments have been heard on one amendment then moving to the next.

Mr. Catron described the City proposal to rezone 75 parcels located between Interlaaken Dr SW and Tower Rd SW, north of Washington Blvd from R1 (25,000 sq. ft. minimum lot size) to R2 (17,000 sq. ft. minimum lot size) to reflect the existing mix of lot sizes and provide for increased in-fill housing options. It was explained these areas were chosen because of the variety of existing lot sizes. However, a more detailed analysis of land and structure values in the area indicates that the proposed rezone is not likely to have much of a practical effect in terms of new development, and further up-zone to R3 is not appropriate. For this reason, staff is recommending that this amendment not be pursued at this time. Mr. Catron did urge the commission to hear the public comment on this issue at this time.

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Mr. Don Daniels, Chair, opened the floor for testimony explaining to citizens they would be called forward in small groups by the Vice-Chair, Mr. Paul Wagemann, and requested citizens limit their speaking to 3 minutes, or 10 minutes if they represent a group.

Bob Lenigan, Lakewood resident opposed to the amendment, noted the Lake City area is a jewel and should not be disturbed from its present zoning. He wholeheartedly agrees with staff recommendation not to pursue rezoning.

Katie Howard, Lakewood resident opposed to the amendment, is strongly opposed to the rezoning, commenting that contractors do not care about the integrity of the area and feels Lakewood is robbing residents of equity in their private property.

Lorrie O'Brien, Lakewood resident opposed to the amendment, grateful staff is not recommending rezoning in this area. She read her letter describing the historic area known as Interlaaken Township in the early 1800's with beautiful, stately homes urging commissioners to never sub-divide these properties. She spoke about the natural beauty and that people come to her neighborhood to enjoy the natural rural settings, wildlife and beauty of the area.

Lissa Tommervik, Lakewood resident opposed to the amendment, related the history of beautiful expansive estates built in the 1920's around the lakes and in the wooded areas. It was noted how the 1950's brought many young families to the Lakewood area and the sub-dividing began. It was emphasized that rezoning would increase the loss of wildlife and a habitat of trees. Noting that the neighborhood encompasses the historical character of the City, Ms. Tommervik urged that the City leave it alone.

Marsha Evans, Lakewood resident opposed to the amendment, objected to developing in this neighborhood when there are areas of business that could be redeveloped.

Roberto Quintana-Leon, Lakewood resident opposed to the amendment, commented that most of Lakewood is very industrial and does not have an aesthetic feel. Mr. Quintana called the neighborhood a beautiful oasis in the middle of doom; noting many other areas in the City could consider the addition of small residences as a beautification, but the neighborhood would be downgraded if re-zoning were allowed to increase traffic in a pristine area.

Bill Clark, Lakewood resident opposed to the amendment, pointed out the infrastructure through the neighborhood is insufficient now and feels the neighborhood is not prepared for an increase in traffic volumes.

Veterans Dr and Gravelly Lk Dr SW Amendment

Mr. Catron noted that, as part of the City's effort to locate properties where additional single-family housing could be developed, the City proposes to re-designate and rezone 7 acres of mostly vacant land located on the southwest corner of Gravelly Lk Dr SW and

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Veterans Drive from *Residential Estate* to *Single Family*, and rezoned from *R1 (25,000 sq. ft. minimum lot size* to *R3 (7,500 sq. ft. minimum lot size)*.

Staff is recommending that the density be increased on this site partly in consideration of extensive street frontage improvements that would be required for the development of the site. That seems to be a limiting factor in enticing anyone to look at redeveloping the site. Staff is recommending these amendments.

Mark Pfeiffer, Lakewood resident opposed to the amendment, advocated that the re-zoning of the Barker estate lot goes against everything the Comprehensive Plan states it wants to uphold in the historic neighborhood such as preserving significant tree stands, providing visible open space in the urban environment, and lowering density around the lakes.

Don Russell, Lakewood resident opposed to the amendment, shared that his property has been in his family for 106 years, stated that a discontinuity would be caused in the neighborhood if smaller homes were allowed and urged commissioners to consider an R2 zoning allowing larger lots instead of an R3 zone.

John Kohler, Lakewood resident opposed to the amendment, expressed how he felt fortunate to live in a rural setting along Gravelly Lk Dr and Veterans area that is worth preserving.

Tom Coates, representing Garrett Homes, a Fircrest based custom homes builder, is in support of the amendment to make land available to build retirement sized homes on the smaller lots, but not build them out to the maximum density.

Preston Carter, Lakewood resident opposed to the amendment, noted the Barker property is unique and expressed concerns over increased traffic volumes and issues of noise if R3 zoning permitted 33 new homes to be built.

Kathryn Van Wagemen, Lakewood resident opposed to the amendment, stressed that no changes should be allowed to the current R1 zoning to preserve the heritage, beauty and health of the trees and forested land and all they provide the community.

Janet Spingap, Lakewood resident opposed to the amendment, stated she was born and grew up on an estate in the neighborhood playing in the woods of the property which has impacted her life proven by the fact she has taken a career in forestry and works for a lobbyist in Olympia, urged Lakewood to continue the continuity of the neighborhood.

Connie Wright, Lakewood resident, opposed the amendment because, as an architectural designer, she admires the current beauty and architecture on Gravelly Lake Dr. It was noted that sometimes when properties are redeveloped the new homes don't match an area very well and other properties are negatively impacted and wants to appeal to the City to keep Gravelly Lake beautiful just as it is.

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Lakewood Racquet Club

This is a privately initiated amendment where the LRC is proposing to re-designate and rezone 5.5 acres of their 11.5 acre property from Open Space and Recreation and OSR2 zoning to Mixed-Residential and MR1 zoning to accommodate residential development on the site. The surrounding development is zoned R3.

The proposed Mixed-Residential 1 zone would allow for a variety of medium density housing types including single family detached, two-family and single-family attached residential development. Apartments or a multi-family development is not a permitted use type in the MR1 zone.

There has been a change in circumstances since the property was originally designated Open Space and Recreation in 2001, in that the Club was successful in removing a deed restriction affecting the property. The proposal is consistent with Comprehensive Plan policies that encourage infill development in urban areas with existing services and infrastructure. Staff believes that providing the Club with the possibility of developing a portion of the site in order to stabilize the Club financially and help retain the facility within the Lakewood community would be a net advantage to the City. Staff is recommending that the proposed re-designation and re-zoning of a portion of the Lakewood Racquet Club be approved.

Mike Cina, with Austin Cina Architects and representing Lakewood Racquet Club, in full support of the amendment, explained an approval of the request will help the LRC to create funds that will help to expand the facility and maintain it. Their proposal would support a number of the guidelines outlined in the Comprehensive Plan by reducing sprawl, encouraging infill projects and supporting economic development by promoting the retention and expansion of existing businesses. Their proposal offers to use infill land that will never be used by the club. Development on vacant land of a planned residential community comprised of smaller quality homes will create a much needed housing opportunity. It was urged that if granted the change their intent is to control the type of development on the property to ensure that it is compatible and complementary to the surrounding neighbors and to their club and its members. The upkeep and maintenance of these exteriors would be handled by the HOA ensuring the community will maintain its appearance for years to come.

Doug Cooke, Lakewood resident representing the Cloverdale Court HOA, who is also a long-time member of the LRC, noted they do not oppose the amendment but suggests it be rezoned to R3 zoning to make it similar to the surrounding area.

Robert Daly, Lakewood resident representing the Racquet Club Estates HOA, voiced concerns over privacy of the homeowners bordering the LRC property. The main concern stated was the stormwater drainage and instances of current flooding. They urged the development of retainage ponds to handle all the current and proposed run-off citing the problems with the amount of impermeable surface of an additional development.

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An unidentified woman stated that she signed wrong sheet but sent a letter August 14 to the City. She stated she was a Lakewood resident opposed to the Interlaaken amendment and agreed with everything already said about the beauty of the neighborhood noting she is very happy to hear that staff has decided not to rezone the area.

Andrea Gernon, Lakewood resident and LRC member in full support of the amendment, pointed out the primary purpose of the proposal is to enable the LRC to generate resources to upgrade their facility. The 50-year-old structure must be brought up to current standards of the code. By selling the property and providing a middle market of housing to the community they will continue to be a viable asset to the City. She described prominent citizens with moderate income who have difficulty finding an appropriate home to downsize to within the City have moved to University Place as a result. LRC wishes to continue to be good neighbors, provide opportunities to new families with housing that is compatible to the neighborhood but not identical, and turn grass and blackberry bushes into homeownership. Ms. Gernon urged commissioners to approve the amendment.

William Kikillus, Lakewood resident in support of the amendment, explained the new development should blend in with the adjacent existing estates by increasing the proposed lot sizes. Additional comments were made regarding providing enough parking spaces to accommodate the additional tennis courts and tournament events to avoid causing traffic problems with all the visitors to the neighborhood.

Mr. Don Daniels, Chair, provided one more opportunity for citizens to comment on the proposed map amendments.

Mark Pfeiffer, suggested the developer with an interest in the Barker estate property on Interlaaken could get together with the trustee and request a zoning change along with at least a conceptual plan of how they would develop it.

Preston Carter, encouraged the staff to be mindful of the possible effect on the Gravelly Lake - American Lake aquifer with regard to the Barker property, although it is not lake front property, it is situated on the narrowest point between the spring fed lakes and the development would directly affect the health of the lakes.

John Kohler commented that the state pressures communities with their Growth Management Act to infill areas.

Bob Lenigan requested an explanation of the process of the amendments.

Mr. David Bugher explained once all comments have been received during this public hearing the commissioners have a few options of either closing the public hearing and begin debating the amendments, continue the public comments until next meeting on October 7th, or as has been the past practice of the planning commission is to close hearing for public comments but leave open for written comments until the next meeting

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then close the acceptance of written comments and immediately begin the deliberation process at that meeting on October 7, 2015.

Mike Cina, representing Lakewood Racquet Club, reiterated that it is not his goal to put in large houses stacked up against each other and he stipulated that provision for appropriate stormwater systems will be addressed.

Roberto Quintana restated his concern with the aesthetics of the proposed new developments and poor planning.

Text updates to the 2015 Comprehensive Plan covering the six chapters listed below were reiterated and described by Mr. Dan Catron again.

- *Chapter 1 Introduction*
- *Chapter 4 Community Design*
- *Chapter 6 Transportation*
- *Chapter 8 Public Services*
- *Chapter 9 Public Facilities and Improvements*
- *Chapter 10 Implementation*

The commissioners have been in the process of reviewing these changes over the last several months, tonight's public hearing was held to hear the community's residents comments regarding the proposed amendments.

There were no comments on the proposed comprehensive plan updates.

Mr. Don Daniels, Chair, closed the floor for public comments on the proposed amendments. **Ms. Connie Coleman-Lacadie made the motion close the public comments section of the hearing but to hold the record open for written comments only until their next planning commission meeting on 10/7/15. Mr. Christopher Webber seconded the motion. A roll call vote was called and the motion carried unanimously.**

Unfinished Business
None.

New Business
None.

Reports from Commission Members and Staff
Mr. David Bugher quickly informed commissioners of staff projects updates:

Council did award the Motor Avenue Urban Street design project contract to KPG.

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An advisory committee to assist in the charrette processes will be formed and be composed of two members each from the Planning Commission, Landmarks and Heritage Advisory Board and the Parks and Recreation Board.

Critical Areas and Flood Plain Regulation Update will be in front of the commission again by the end of the year.

Mr. Bugher gave the following list of topics that will be presented to the Council during a study session on October 12, 2015:

- Cost Recovery Report
- Pierce County Sewers permitting issues
- Economic Development Update Report
- Title IV Temporary Business Licensing implementation
- Street Trees in the City Rights-of-Way

The topic of trees was mentioned quite frequently in comments this evening. Mr. Bugher informed the commissioners when trees are cut down without permits fines are issued. The monies from those fines are put into the City tree conservation fund and used to replant more trees on public lands throughout the City of Lakewood.

Next Meeting October 7, 2015, at 6:30 p.m. in Council Chambers

Meeting Adjourned at 8:28 p.m.

Don Daniels, Chair Planning Commission 10/07/2015	Karen Devereaux, Recording Secretary Planning Commission 10/07/2015

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COMMUNITY DEVELOPMENT DEPARTMENT
STAFF REPORT

TO: PLANNING COMMISSION

FROM: DAN CATRON, PLANNING MANAGER

MEETING DATE: OCTOBER 7, 2015

SUBJECT: 2015 COMPREHENSIVE PLAN UPDATE AND AMENDMENTS

BACKGROUND

The Planning Commission received an introduction to the 2015 Comprehensive Plan Amendments and Update on June 3, 2015, and held a study session on September 2, 2015. The Planning Commission held a public hearing on the proposed amendments and update on September 23, 2015. (The hearing was originally scheduled for September 16, however the hearing was continued to September 23, 2015, because of technical difficulties with the recording equipment.)

PROPOSED AMENDMENTS AND UPDATES- DESCRIPTION

CPA 2015-01 Tower Road/ Interlaaken Drive Zoning Map Amendment

Proponent: City of Lakewood (see Planning Commission Resolution adopted April 15, 2015)

Size of Affected Area: 58.5 acres

Number of Parcels: 77

Current Comp Plan Designation: *Residential Estate*

Current Zoning: *Residential One* (R1)

Proposed Comp Plan Designation: *Residential Estate* (no change)

Proposed Zoning: *Residential Two* (R2)

Adjacent Land Uses: North: Single family residential ; West: Single family residential, and vacant land zoned *Neighborhood Commercial One (NC1)* to the southwest; East: Single-family residential; South: Lakewood Water District headquarters.

Adjacent Comp Plan Designations: North- *Residential Estate*; West- *Single Family*; East- *Residential Estate*; South- *Public /Institutional*

Adjacent Zoning Districts: North- *Residential Two* (R2); West- *Residential Three* (R3); East- *Residential One* (R1); South- *Public/Institutional* (PI)

General Description: This is a city-sponsored amendment to change the zoning from *Residential One* (R1) to *Residential Two* (R2) as a way to provide opportunities for additional single-family residential development. The minimum parcel size in the R1 district is 25,000 sq. ft. The minimum parcel size in the R2 zoning district is 17,000 sq. ft. The area is mostly built-out. Current average parcel size in the study area is 30,300 sq. ft.

CPA 2015-02 Veterans Drive/Gravelly Lake Drive Comprehensive Plan and Zoning Map Amendment

Proponent: City of Lakewood (see Planning Commission Resolution adopted April 15, 2015)

Size of Affected Area: 7 acres (approx.)

Number of Parcels: 2

Current Comp Plan Designation: *Residential Estate*

Current Zoning: *Residential One* (R1)

Proposed Comp Plan Designation: *Single Family*

Proposed Zoning: *Residential Three* (R3)

Adjacent Land Uses: North- Veterans Drive/ Single family residential; West- Single family residential; East- Gravelly Lake Drive/ Single family residential. Lakewold Gardens is located across Gravelly Lake Drive to the northeast; Southwest- Single family residential; West- the Lakeside County Club condominium development is located on the west side of Pine Street.

Adjacent Comp Plan Designations: North-*Residential Estate*; West- *Residential Estate*; The Lakeside County Club is designated *Single Family*; East- *Residential Estate;* Lakewold Gardens to the northeast is designated *Open Space and Recreation;* South- *Residential Estate*

Adjacent Zoning Districts: North- *Residential One* (R1); Lakewold Gardens located across Gravelly Lake Drive to the northeast is zoned *Open Space and Recreation Two* (OSR2); The Lakeside Country Club to the west is zoned *Residential Three* (R3); East- *Residential One* (R1); Southwest- *Residential One* (R1).

General Description: This is a city-sponsored amendment to change the comprehensive plan designation of the subject property from *Residential Estate* to *Single-Family*, and change the zoning from *Residential One* (R1) to *Residential Three* (R3) as a way to provide opportunities for additional single-family residential development. The minimum parcel size in the R1 district is 25,000 sq. ft. The minimum parcel size in the R3 zoning district is 7,500 sq. ft. There are three single-family residential structures on the property.

CPA 2015-03 Lakewood Racquet Club Comprehensive Plan and Zoning Map Amendment

Proponent: Lakewood Sports and Racquet Club

Size of Affected Area: 11.3 acres

Number of Parcels: 3

Current Comp Plan Designation: *Open Space and Recreation* and *Single Family*

Current Zoning: *Open Space and Recreation Two* (OSR2) and *Residential Three* (R3)

Proposed Comp Plan Designation: *Open Space and Recreation* and *Mixed Residential*

Proposed Zoning: *Open Space and Recreation Two* (OSR2) and Mixed *Residential One (MR1)*

Adjacent Land Uses: North- 112th Street/Single family residential; West- Single family residential; East- Single family residential; South- Single family residential.

Adjacent Comp Plan Designations: North- *Single Family*; West- *Single Family*; East- *Single Family*; South- *Single Family*

Adjacent Zoning Districts: North- *Residential Four* (R4), West- *Residential Three* (R3); East- *Residential Three* (R3); South- *Residential Three* (R3)

General Description: The Lakewood Sports and Racquet Club is proposing to change the comprehensive plan and zoning designations on the current Club property from *Open Space and Recreation/ OSR2* and *Single Family/R3* to *Open Space and Recreation/ OSR2* and *Mixed Residential/MR1* in order to redevelop approximately 5.4 acres of the 11.4 acre property with medium density residential uses. The existing Club facility would remain on the OSR portion of the property and is planned to be remodeled and expanded (under separate action).

CPA 2015-04 2015 Comprehensive Plan Updates

The Washington State Growth Management Act (GMA) requires that cities "take action to review and, if needed, revise their comprehensive plans and development regulations to ensure the plan and regulations comply with the requirements (of the GMA)". RCW 36.70A.130(4). Jurisdictions planning under the GMA (such as Lakewood) are required to review and update their comprehensive plans every eight (8) years. The state schedule requires that Lakewood update its plan by June 30, 2015; however, the City has notified the State that the Lakewood amendments are not expected to be finally adopted until the end of 2015.

The 2015 updates include the following:

Chapter 1, Introduction- Amendments to Chapter 1 consist primarily of simple updates to language and references. The Chapter 1 update also includes incorporation of conclusions from the City's 2015 Community Vision Plan. Section 1.2.1 is added to describe the 2015 Vision Plan project. The *Guiding Principles* statement in the original comprehensive plan is proposed to be replaced by the *Community Values* identified in the 2015 Vision Plan. The 2015 update also includes a series of "before and after" comparison pictures based on photos included in the original comprehensive plan. Finally, Section 1.7 is added to describe the 2015 update itself.

Chapter 4, Community Design- Amendments to Chapter 4 are also primarily simple updates and word-smithing. Substantive changes include extending the Civic-Boulevard designation to all of Bridgeport Way (instead of just Pacific Highway to Steilacoom Boulevard), adjusting the lists of "Green Streets" and "Principal Arterials", noting the potential for significant modifications of the freeway interchanges in Tillicum, and affirming the City's desire to see a commuter rail station in Tillicum.

Chapter 6, Transportation- The Transportation Element of the City's Comprehensive Plan consists of two parts- Chapter 6 of the comprehensive plan which contains general transportation goals and policies, level-of-service standards, policies regarding concurrency, and a re-assessment strategy intended to address any failure to maintain LOS standards and/or funding for transportation facilities; and, second, the City's Six-Year Comprehensive Transportation Improvement Program (6-year TIP). The 6-year TIP is a planning document that is updated every year as required by state law (RCW 35.77.010). The early years of the Program are fairly definite -it can be assumed that those projects will be constructed as scheduled. Projects in the later years of the program are more speculative, and may be accelerated, delayed or canceled as funding and conditions change.

Updates to Chapter 6 of the Comprehensive Plan include:

- Reworking some language in in the General Transportation Goals and Policies.
- Modified Policy T-2.4 to eliminate reference to the proposed Cross-base Highway, instead focusing on improvement to I-5 through Lakewood and JBLM, and connections to the Lakewood street system.

- Modified Policy T-2.5 regarding the I-5/SR 512 interchange.
- Added Policy T-4.6 to "Ensure emergency responders have efficient access to public and private properties."
- Added Policy T-7.3 to "Ensure predictable sources of income to maintain the transportation system."
- Replaced Goal T-9 regarding streetlights with goal to "Provide a balanced multimodal transportation system that supports the safe and efficient movement of people and goods." Policies are added encouraging an inclusive transportation planning process that provides for the needs of all users, and to minimize the impacts of transportation facilities on low-income, minority, and special needs populations.
- Added Policy T-10.4 to "Consider the negative effects of transportation infrastructure and operations on the climate and natural environment."
- Added Policy T-10.5 to "Support the development and implementation of a transportation system that is energy efficient and improves system performance."
- Modification of Goal T-14 and related policies to specifically reference the Non-Motorized Transportation Plan adopted in 2009.
- Changed Policy T-14.7 from "Develop a non-motorized transportation plan…" to "Consider adopting a "Complete Streets" ordinance."
- Added Policy T-16.5 to "Focus investments in downtown central business areas by promoting joint- and mixed use development and integrating shared use parking practices."
- Added Policy T-16.6 to "Incorporate *Transportation 2040* guidelines into planning for centers and high-capacity transportation station areas."
- Policy T-19.1- Recalibrated Level of Service definitions generally by adding time to the definition of each LOS level.
- Modified Policy T-19.3 to include development of multimodal concurrency standards.
- Revised Goal T-20 and related policies to revise LOS standards for specific roadways and intersections. Eliminated specific LOS standards for 5 roadway segments.
- Added new Policy T-20.4 to allow stop-controlled intersections to operate worse than the LOS standard.
- Reworked the last bullet in Section 6.7, Reassessment Strategy.

<u>Chapter 8- Public Services</u>- The chapter was last amended in 2004. The chapter outlines City policy in the following areas: fire protection, emergency medical services, police, emergency management, schools and higher education, library services, health and human services, and housing and community development programs. 2015 updates recognize the creation of West Pierce Fire and Rescue, acknowledge the discontinuance of the crime free rental housing program, update policies regarding fire protection and emergency management, and enhance policies regarding the location of schools and redevelopment of surplus school sites. The updates also refine policies regarding library services, including a policy to promote the construction of a new main library facility within the City's downtown core, provide a

reference to the Pierce County Library 2030 report, and support expansion of bookmobile services to underserved and/or isolated areas. Goals and policies regarding health and human services are also updated together with policies regarding housing and community development programs.

Chapter 9, Public Facilities and Improvements- Amendments to Chapter 9 include making explicit the references to the City's 6-year Capital Improvement Plan (CIP), the Legacy Parks Plan, and the master plan documents for private utility companies as part of the City's Capital Facilities element. The 20-year plan portion includes capital-facilities-related goals and policies; and the Capital Improvement Plan, Parks Plan, and utility master plans provide specific short term operational planning. Substantive changes include the addition of Policy CF- 2.10, which directs the City to update the CIP every two years in conjunction with approval of the city budget; update of Policy CF-7.2 to reflect the fact that the Lakewood Police Station building has been constructed; and addition of Policy CF 9.3 providing that the siting of essential public facilities is not categorically prohibited.

Chapter 10, Implementation- Amendments to Chapter 10 are primarily updates to the existing text. Substantive amendments include the explicit policy of supporting the construction of a Sounder commuter rail station in Tillicum.

DISCUSSION:

CPA15-01 Tower Road /Interlaaken Amendment

The proposed Tower Road/Interlaaken amendment would rezone approximately 77 properties from *Residential One* (R1) to *Residential Two* (R2). Both of these zoning districts are allowed within the *Residential Estate* comprehensive plan land-use designation, so a comprehensive plan amendment is not required.

This area is being considered for rezoning because of the variety of lot sizes already present in the area. The largest properties in the area are over 53,000 sq. ft. in area. There are also a number of lots along Interlaaken Drive that are approximately 15,000 sq. ft. in size, and another row of lots on Tower Road that are 9,000 sq. ft. in area. The smallest lot is approximately 5.750 sq. ft,, and the largest lot is approximately 82,000 sq. ft. The average lot size in the area is 30,300 sq. ft.

Concerns expressed by residents of the area include concerns about neighborhood compatibility, preservation of neighborhood character, traffic impacts, and impacts to trees and wildlife.

CPA 15-02 Veterans Drive/ Gravelly Lake Drive Amendment

This amendment pertains to a seven (7) acre "underdeveloped" lot in the southwest corner of the intersection of Veterans Drive and Gravelly Lake Drive. The property consists of two lots

under the same ownership, and is developed with three detached single-family residences. The proposed amendment would change the comprehensive plan and zoning designations from *Residential Estate/R1* to *Single Family/R3*. Under R1 zoning the property could potentially be developed with (1.45 du/acre X 7 acres =) 10 single-family dwelling units. Under R3 zoning, the property could potentially be developed with (4.8 du/acre X 7 acres=) 33 single-family dwelling units.

Neighbors have expressed concerns about compatibility with character of the existing neighborhood and potential traffic impacts. Some neighbors have suggested that *R2* zoning would be more appropriate than the proposed *R3* zoning.

CPA 15-03 Lakewood Racquet Club Amendment

The Lakewood Racquet Club is proposing to designate approximately one half of their 11-acre site from *Open Space and Recreation/OSR2* and *Single Family/R3*, to *Mixed Residential/ MR1* to accommodate residential development on the site. The remaining portion of the site used by the Racquet Club would remain designated for *Open Space and Recreation*. Conceptual project plans indicate a 26-unit small lot single-family development.

The project site is potentially affected by revised floodway designations currently under consideration by FEMA. If implemented, this designation and revised flood zone regulations may require the Club to take action to protect any future projects from flood damage as well as mitigate any potential impacts to salmon habitat that may be caused by flooding. The City expects these issues to be addressed at the time that specific project plans are developed.

Neighbors have expressed concerns about compatibility of the proposed *MR1* zoning with character of the surrounding neighborhood, which is zoned *R3*.

CPA 15-04 2015 Comprehensive Plan Updates

The 2015 updates use the Department of Commerce Update Checklist and the Puget Sound Regional Council (PSRC) Vision 2040 Plan and corresponding checklist to ensure that the City's plan and update comply with the State and PSRC requirements. Both of these agencies want to see that the City is accommodating its "fair share" of regional growth as determined through the Pierce County Regional Council (PCRC), and planning for corresponding growth and traffic. The checklists also track other miscellaneous requirements and directives of State law and Vision 2040.

2030 growth targets established for Lakewood include 13,200 additional population (72,000 total), 8,380 additional dwelling units (34, 284 total), and 9,285 additional jobs (38,336 total). The land use element update completed in 2014 indicates that the City has capacity for approximately 10,915 new housing units, and 23,904 in population growth. With a total population capacity of 82,304, Lakewood exceeds its 2030 target population by 10,304 persons.

REQUIRED FINDINGS

With regard to proposed zoning map amendments, Lakewood Municipal Code Section 18A.2.415 provides that:

> *At the conclusion of one (1) or more public hearings on a proposed amendment, the Planning Commission shall make a recommendation with respect to the proposed amendment and shall forward such to the City Council, which shall have the final authority to act on the amendment. The following standards and criteria shall be used by the Planning Commission and City Council to evaluate a request for an amendment. Such an amendment shall only be granted if the City Council determines that the request is consistent with these standards and criteria.*
>
> *A. The proposed amendment is consistent with the comprehensive plan.*
>
> *B. The proposed amendment and subsequent development of the site would be compatible with development in the vicinity.*
>
> *C. The proposed amendment will not unduly burden the transportation system in the vicinity of the property with significant adverse impacts which cannot be mitigated.*
>
> *D. The proposed amendment will not unduly burden the public services and facilities serving the property with significant adverse impacts which cannot be mitigated.*
>
> *E. The proposed amendment will not adversely affect the public health, safety and general welfare of the citizens of the city.*
>
> *F. The entire range of permitted uses in the requested zoning classification is more appropriate than the entire range of permitted uses in the existing zoning classification, regardless of any representations made by the petitioner as to the intended use of subject property.*
>
> *G. Circumstances have changed substantially since the establishment of the current zoning map or zoning district to warrant the proposed amendment.*
>
> *H. The negative impacts of the proposed change on the surrounding neighborhood and area are largely outweighed by the advantages to the city and community in general, other than those to the individual petitioner.*

Staff has analyzed the required findings for each proposed zoning map amendment as described below:

Required Findings- CPA 15-01 Interlaaken/Tower Road Amendment

Criteria A, Consistency with Comprehensive Plan. The proposed map amendment from *R1* to *R2* does not require amendment of the comprehensive plan land-use map. The area in question is designated *Residential Estate*, which supports both *R1* and *R2* zoning districts. However, other comprehensive plan policies potentially relevant to the proposed zoning amendment include:

- Section 2.3.1, amended in 2014, provides a description of the purposes behind the Residential Estate land-use designation. These purposes include preserving the historic identity of Lakewood's older estates, providing the community with a range of housing options, preserving significant tree stands and instilling visual open space into the urban environment. This section also notes that the low density areas west of the lakes serve to reduce traffic volumes in the highly stressed and constrained east-west arterial corridors.

- Goal LU-2: Ensure that housing exists for all economic segments of Lakewood's population

- Objective (Goal LU-2) Increase housing opportunities for upper income households, and Policies LU-2.1 thru LU -2.8:

  Policies:

  LU-2.1: Target ten (10) percent of new housing units annually through 2030 to be affordable to upper income households that earn over 120 percent of county median income.

  LU-2.2: Provide opportunities for large and medium lot single-family development.

  LU-2.3: Utilize low-density, single family areas designations to provide opportunities for upper income development.

  LU-2.4: Encourage larger lots on parcels with physical amenity features of the land such as views, significant vegetation, or steep slopes.

  LU-2.5: Encourage construction of upper income homes on larger existing parcels.

  LU-2.6: Encourage the construction of luxury condominium adjacent to the lakes.

  LU-2.7: Support site plans and subdivisions incorporating amenity features such as private recreation facilities, e.g., pools, tennis courts, and private parks to serve luxury developments.

  LU-2.8: Increase public awareness of upper income housing opportunities in Lakewood.

- Goal LU-4 Maintain, protect and enhance the quality of life of Lakewood's residents.

- Objective (Goal LU-4) Preserve and protect the existing housing stock.
- Objective (Goal LU-4) Develop and maintain livable neighborhoods with a desirable quality of life.

- Policy LU-4.18 Protect the character of existing single family neighborhoods by promoting high quality of development.

Criteria B, Neighborhood compatibility
The Department has received several letters from the owners of property within the proposed rezone area expressing concern over the impact of the proposed amendments on the character of the neighborhood. Noting that there are a number of relatively small (9,000 and 15,000 sq. ft.) parcels in the subject area, staff also observes that the average lot size for the area is over 30,000 sq. ft.. Staff has identified 30 out of 75 existing parcels that could potentially be subdivided under the proposed zoning if existing structures on the site were removed. However, a review of structure and land values for these parcels indicate that structure values are high in relation to land values, suggesting that existing development is likely to remain unchanged for the foreseeable future.

Criteria C, Transportation impacts. As noted above, the proposed rezone is not expected to result in significant numbers of new dwelling units for the area, therefore new significant impacts to the local street system are not anticipated.

Staff would note that surrounding neighborhood residents currently use Tower Road as a cut through route to gain access to I-5. This is a problem within the City's roadway system and has been exacerbated by two factors. The first is the new residential development of North Fort at JBLM. The second is the overall congestion found on I-5. Commuters frequently use the DuPont-Steilacoom Road, North Fort Road and Washington Boulevard to bypass freeway congestion. Thus, the inability of local drivers to make a left-hand turn at Interlaaken Drive and Washington Boulevard has moved a significant amount of vehicle traffic onto Tower Road as well as Lake Steilacoom Drive.

Criteria D, Public Services impact. Because the proposed rezone is not expected to result in significant numbers of new dwelling units for the area, significant impacts to public facilities are not anticipated.

Criteria E, Impacts to public health, safety, and welfare. As noted, the practical effect of the proposed rezone is expected to be minimal, therefore impacts to the public health, safety and welfare are also expected to be minimal.

Criteria F, Range of uses. The range of uses permitted in the R2 zoning district is the same as the range of uses allowed in R1, therefore no impact is expected.

Criteria G, Change in circumstances. The proposed zoning change is prompted by the desire of Lakewood residents to see more detached single-family residential development, as indicated in the recent citizen surveys conducted in connection with the City's Visioning project.

Criteria H, Balance of advantages and disadvantages. It is not clear that this criteria is met at this time. As noted above, an examination of land and structure values for the area show a relatively high structure-to-land-value ratio. This would indicate that demolition of existing residences to accommodate a small number of additional units is unlikely. It is unclear, then, what benefit is to be expected from the proposed rezone.

Required Findings- CPA 15-02 Veterans/Gravelly Lake Drive amendment

Criteria A, Consistency with Comprehensive Plan. Part of this amendment is to change the comprehensive plan land-use designation of the subject property from *Residential Estate* to *Single Family*. The comprehensive plan notes that the *Residential Estate* designation is used to lower densities around lakes and creek corridors in order to prevent additional effects from development upon the lakes, creek habitat and Lakewood Water District wellheads. The single-family designation, on the other hand, ”provides for single-family homes in support of established residential neighborhoods”.

Other comprehensive plan policies relevant to the proposed include goals and policies directing the City to provide lands to accommodate the existing and future housing needs of the community and to ensure that housing exists for all economic segments of Lakewood’s population. Policy LU-2.9 directs the City to target 65 percent of new housing units to be affordable to middle income households (that earn 80 to 120 percent of county median income).

Goal LU-4 of the comprehensive plan directs the City to “(M)aintain, protect, and enhance the quality of life of Lakewood’s residents.” One objective provided to help realize this goal is to “Recognize the unique requirements of residences located on busy arterials and other heavily used corridors.” The presence of major arterial streets on two sides of the property tend to support the idea of developing the property with somewhat higher density and more modestly scaled development than might be expected under the existing *R1* zoning.

Criteria B, Neighborhood compatibility. Properties across arterial roadways to the north and east are zoned *R1*, however these areas were already mostly developed at the time the existing *R1* zoning was applied (in 2001). These properties are also adjacent to Gravelly Lake or located in a heavily forested area. Properties to the southwest are also zoned *R1*, however these properties were also previously developed and are in close proximity to American Lake.

Property zoned *Multifamily One* (*MF1*) is located across Veterans Drive, on the northwest corner of Veterans Drive and Interlaaken Drive. Other *R3* zoned properties are located to the west across Pine Street (the Lakeside Country Club condominiums).

The subject properties are currently underdeveloped. Because of the presence of Veteran’s Drive and Gravelly Lake Drive, staff believes that demand for the property for upper income estate development is limited. For this reason, staff is recommending that the zoning of the

property be intensified, from *R1* (1.45 dwelling units/acre) to *R3* (4.8 dwelling units/acre). The properties can then be developed at an urban density in an area with existing urban services as directed by the Washington State Growth Management Act.

Criteria C, Transportation impacts.
The project site is located on a transportation corridor (Veterans Drive at Gravelly Lake) that is currently very heavily congested, and often operates at Level-of-Service F. It is expected that future development of the property will include roadway improvements in the vicinity as necessary to mitigate any additional traffic impacts caused by the development.
.
Criteria D, Public Services impacts. The proposed amendment will apply to lands located in the center city area and already served by roadways and utilities. Staff concludes that the proposed amendment will not unduly burden the public services and facilities serving the property and that any significant adverse impacts can be mitigated.

Criteria E, Impacts to public health, safety, and welfare. Development of this property with single family residential uses is not expected to be detrimental to the public health safety or welfare. Site specific issues will typically be addressed in the project permitting process for any proposed development.

Criteria F, Range of uses. The range of uses primary permitted uses allowed under *R3* is the same as the range of primary permitted uses allowed in *R1*. There are a handful of conditionally permitted uses allowed in the R3 zone that are not permitted in the *R1*, however these are not seen as particularly inappropriate for the property, given that these uses would only be permitted upon approval of a conditional use permit.

Criteria G, Change in circumstances. Circumstances surrounding the property have changed since 2000 in that the owners have indicated their interest in further developing the property, and Lakewood residents have indicated their desire for more middle income single family residential development.

Criteria H, Balance of advantages and disadvantages. On balance, increasing the allowable development density of this property would be a net advantage. Increasing the number of potential dwelling units will increase the likelihood that this property will be developed and result in the distribution of development costs among a greater number of units. Development of the property is likely to include on and off-site roadway improvements that will benefit the area as a whole.

<u>Required Findings- CPA 15-03 Lakewood Racquet Club amendment</u>

Criteria A, Consistency with Comprehensive Plan. This property was designated *Open Space and Recreation* in 2000 based on the existing land use (Lakewood Racquet Club). The proposed re-designation of a portion of the property to *Mixed Residential* is consistent with comprehensive plan policies that encourage infill development and growth in developed areas with existing transportation and utility infrastructure.

Criteria B, Neighborhood compatibility. The proposed small-lot medium density residential development can be compatible with existing older single-family neighborhoods. In-fill projects are typically at a higher density than the surrounding development because of the limited size of the undeveloped tract, and different needs of the community at the later point in time. Screening walls and buffer landscaping can be used to prevent any significant direct impacts on adjacent properties.

Criteria C, Transportation impacts. Using the conceptual development scenario of 26 small lot single-family units, traffic impacts onto 112th Street SW are not expected to be dramatic. 112th Street currently experiences approximately 6,900 vehicle trips per day. 112th Street is classified as a minor arterial street with a design capacity of 5,000 to 20,000 vehicles per day. The addition of approximately 260 vehicle trips per day is not expected to significantly impact 112th Street or nearby intersections.

Criteria D, Public Services impacts. The proposed amendment will apply to lands located in the center city area and already served by roadways and utilities. Staff concludes that the proposed amendment will not unduly burden the public services and facilities serving the property and that any significant adverse impacts can be mitigated.

Criteria E, Impacts to public health, safety, and welfare. Development of this property with single family residential uses is not expected to be detrimental to the public health safety or welfare. Staff has noted that the property is in an area being considered as a flood hazard area by the Federal Emergency Management Agency. Site specific issues, including potential flood impacts, will be addressed in the project permitting process for any proposed development.

Criteria F, Range of uses. The range of uses permitted in the *MR1* zoning district are primarily medium density residential use-types including smaller lot detached single-family, duplexes, and attached single family residences. The current *OSR2* zoning is very limited with regard to allowable uses, and is restricted almost entirely to open space and recreation use types. There are not many (if any) allowable use types that would provide for any financial return. Consideration of financial return for the Racquet Club is relevant to the question of what zoning is "appropriate" for the site. The residential use types allowed in the *MR1* zone are considered appropriate by staff, given the constraints of the site, and comprehensive plan goals and policies to provide a variety of housing options to middle income residents.

Criteria G, Change in circumstances. Circumstances surrounding the property have changed since 2000 in that the Club has indicated its' interest in further developing the property to generate revenue to renovate club facilities, and Lakewood residents have indicated their desire for more middle income single family residential development. In addition, in 2011 the Club prevailed in a court action to remove a covenant from property the property title that limited development of the property to tennis club uses. Removing this covenant allows the Club to consider alternative uses for the property (subject to a change in zoning).

Criteria H, Balance of advantages and disadvantages. On balance, allowing for residential development on a portion of the Racquet Club property would be a net advantage to the City.

Providing infill in an already urbanized area with existing utilities and transportation infrastructure is a key growth strategy for the City and the region. The Racquet Club itself is certainly an asset to the community, and development of appropriate land-uses on the expansive vacant portions of the property in order to stabilize the Racquet Club financially will help the city retain and support this community asset.

PUBLIC NOTICE AND COMMENTS

Public notice of the 2015 Updates and the 2015 city-initiated and privately-initiated amendments was issued on July 30, 2015. Notice of the September 16, 2015, public hearing was issued on August 27, 2015. Methods of notice included a legal notice published in *The News Tribune*, notice boards posted in the areas subject to the site specific map amendments, and notices mailed to the owners of properties within 300 feet of the site specific amendments.

Public Hearing

A public hearing on the proposed updates and amendments was scheduled before the Planning Commission on September 16, 2015. Because of technical difficulties with the audio recording system, the hearing was continued to September 23, 2015. Revised notices were mailed to interested members of the public and posted on the map amendment sites. On September 23rd, all members of the public wishing to speak were provided that opportunity. The Planning Commission closed the public hearing, but left the record open for written comments until the scheduled meeting on October 7th. The Planning Commission is now posed to make a recommendation to the City Council regarding the proposed amendments. Subsequent to the Planning Commission making a recommendation, the City Council is required to take final action on the proposed amendments.

STAFF RECOMMENDATION

With regard to the proposed Interlaaken/Tower Road amendments (CPA 15-01), after further analysis of land and structure values in the area, staff has concluded that the proposed rezone from *R1* to *R2* is unlikely to have much practical effect on land-use patterns; and, based on comprehensive plan policies regarding *Residential Estate* areas, further up-zone to *R3* would be inappropriate. Staff is recommending that this amendment not be pursued at this time.

With regard to the Veterans Drive/Gravelly Lake Drive amendment (CPA 15-02), staff supports a re-designation of the site from *Residential Estate* to *Single Family*, and a rezone from *R1* to *R3*. Development of the property under *R3* standards will promote infill in a strategic location within the City, in an area with existing utilities and transportation infrastructure, including direct access to principal arterial streets.

With regard to the Lakewood Racquet Club amendment (CPA 15-03), staff supports the proposed land-use designation and zoning amendments. The Lakewood Racquet Club is in a

difficult position with potential land uses very narrowly constrained by the current *OSR2* zoning. Staff believes it is appropriate to rezone a portion of the property to allow for a residential infill development project.

With regard to the proposed Comprehensive Plan updates (CPA 15-04), staff is recommending approval of the updates as proposed, subject to further adjustment and refinement by staff, the Commission, and the City Council.

EXHIBITS:

1. Staff Report
2. Draft Resolution
3. Draft Comprehensive Plan Updates
   a) Chapter 1- Introduction
   b) Chapter 4- Urban Design
   c) Chapter 6- Transportation
   d) Transportation Background report
   e) Chapter 8- Public Services
   f) Chapter 9- Capital Facilities
   g) Chapter 10- Implementation

4. Map package for CPA 2015-01- Tower Road/ Interlaaken Drive amendment (5 maps)
5. Map package for CPA 2015-02- Veterans Drive/ Gravelly Lake Drive amendment (6 maps)
6. Map package for CPA 2015-03- Lakewood Racquet Club amendment (6 maps)
7. Planning Commission Resolution dated April 15, 2015
8. Lakewood Racquet Club Comprehensive Plan/Zoning Ordinance amendment application
9. Department of Commerce Comp Plan Update Checklist (draft)
10. PSRC Comp Plan Update Checklist (draft)
11. SEPA Checklist dated July 13, 2015
12. SEPA Determination of Non-Significance issued July 30, 2015
13. Excerpts from February 4, March 4, March 18, April 15, June 3, July 15, September 2, and September 23, 2015, Planning Commission meetings and public hearing minutes

Agency Letters

14. Letter from Tacoma-Pierce County Health Dept. dated September 1, 2015
15. Letter from WA Dept. of Commerce dated September 2, 2015
16. Letter from Puget Sound Regional Council dated September 9, 2015
17. Washington State Department of Transportation dated September 15, 2015

Letters re: CPA 15-01 (Tower Road/Interlaaken)

18. Letter from Jack Tillen dated July 31, 2015
19. Letter from Marvin and Melissa Tommervik dated August 6, 2015
20. Letter from John and Marilyn Dimmer dated August 8, 2015
21. Letter from Bonnie Boyle dated August 10, 2015
22. Letter from Calvin and Katie Howard dated August 13, 2015

23. E-mail from Lorrie and Danny O'Brien dated August 14, 2015
24. Letter from Burton and Doris Johnson dated August 24, 2015
25. Letter from the Stockman family received September 15, 2015
26. Letter from Arthur Pavey dated September 15, 2015

Letters re: CPA 15-02 (Veterans Drive/ Gravelly Lake Drive)

27. Letter from Baxter Schaffer III received September 21, 2015
28. Letter from Mickey Portnoy, Gravelly Lake Association, received September 22, 2015
29. Letter from Preston and Elizabeth Carter dated August 20, 2015
30. Letter from Preston and Elizabeth Carter dated September 21, 2015
31. Letter from Brett and Patti Jacobsen dated September 15, 2015
32. Letter from Merritt Lawson Jr. received September 21,2015
33. E-mail from Alan McPherson dated September 23, 2015
34. Talking Paper from Mark Pfeiffer received September 23, 2015
35. E-mail from James Russell dated September 24, 2015

Letters re CPA 15-03 (Lakewood Racquet Club)

36. E-mail from D. Blake, Cloverdale Court HOA, dated August 10, 2015
37. Letter from Lakewood Racquet and Sport Club (A. Gernon) dated August 27, 2015
38. Letter from D. Blake, Cloverdale Court HOA, dated September 4, 2015
39. E-mail from Joe Lehman dated September 14, 2015
40. Letter from Rick Ring , Clover Park School District, dated September 14, 2015
41. Lakewood Water District received September 18, 2015
42. Letter from Bruce Dayton, Lakewood Racquet Club, received September 23, 2015

CITY OF LAKEWOOD
PLANNING COMMISSION
RESOLUTION NO. 2015-(draft)

A RESOLUTION OF THE PLANNING COMMISSION OF THE CITY OF LAKEWOOD, WASHINGTON, FORMALIZING ITS RECOMMENDATIONS REGARDING THE 2015 COMPREHENSIVE PLAN/ZONING AMENDMENT PACKAGE AND FORWARDING ITS RECOMMENDATIONS TO THE LAKEWOOD CITY COUNCIL FOR CONSIDERATION AND ACTION

WHEREAS, the Washington State Legislature, through the state Growth Management Act (GMA), intends that local planning be a continuous and ongoing process; and

WHEREAS, following public outreach and involvement, the Lakewood City Council adopted the City of Lakewood Comprehensive Plan via Ordinance No. 237 on July 10, 2000; and

WHEREAS, the Lakewood City Council adopted Title 18A, Land Use and Development Code, of the Lakewood Municipal Code (LMC) via Ordinance No. 264 on August 20, 2001; and

WHEREAS, the Lakewood City Council, based on review and recommendations of the Lakewood Planning Advisory Board following public input, has subsequently amended Lakewood's comprehensive plan annually, including a periodic review required by law in 2004; and

WHEREAS, the Lakewood City Council, based on review and recommendations of the Lakewood Planning Advisory Board following public input, has subsequently amended Title 18A LMC periodically, either in conjunction with comprehensive plan amendments or on a standalone basis; and

WHEREAS, it is appropriate for local governments to adopt needed amendments to ensure that the plan and implementing regulations provide appropriate policy and regulatory guidance for growth and development; and

WHEREAS, the Growth Management Act, which mandates that the City of Lakewood generate and adopt a Comprehensive Plan, also requires that there be in place a process to amend the Comprehensive Plan; and

WHEREAS, the amendment process for the Comprehensive Plan must be available to the citizens of this City (including corporation and other business entities) on a regular basis. In accordance with RCW 36.70A.130, Comprehensive Plan amendments can be considered "no more frequently than once a year;" and

WHEREAS, this particular amendment "cycle" was advertised on January 28, 2015, and began on or before March 13, 2015, the deadline for submission for privately initiated Comprehensive Plan amendments; and

WHEREAS, there is one (1) privately initiated Comprehensive Plan amendment, proposed by the Lakewood Sport and Racquet Club (Case # CPA 15-03, Application # LU 15-00039); and

WHEREAS, there are two (2) City-initiated Comprehensive Plan amendments, Case Nos. CPA 15-01 (Tower Road/ Interlaaken Amendment), and CPA 15-02 (Veterans Drive/Gravelly Lake Drive Amendment); and

WHEREAS, the 2015 Comprehensive Plan amendment package includes an update of the City's Comprehensive Plan as required by RCW 36.70A.130 (4) identified as CPA-2015-04;

WHEREAS, the City-initiated amendments were made pursuant to 18A.2.410; and

WHEREAS, the 2015 Comprehensive Plan/Zoning Ordinance Amendment Package (Case Nos. CPA-2015-01, CPA-2015-02, CPA-2015-03, and CPA-2015-04) is subject to the State Environmental Policy Act (SEPA); and

WHEREAS, 60-day notice has been provided to the Washington State Department of Commerce, Joint Base Lewis McChord (JBLM), state agencies, and state agencies have been afforded the opportunity to comment, per RCW 36.70A.106(1); and

WHEREAS, the Lakewood Planning Commission held a public hearing beginning on September 16, 2015, and continued to September 23, 2015, which meetings were properly noticed and open to the public, to review and amend the Lakewood Comprehensive Plan Map and Text, and the Zoning Map; and

WHEREAS, the Lakewood Planning Commission reviewed the 2015 Comprehensive Plan/Zoning Amendments and Comprehensive Plan update, cumulatively and individually, for consistency with the Growth Management Act, Chapter 36.70A RCW, the City's Comprehensive Plan, and the City's Zoning Regulations, Title 18A; and

WHEREAS, while there are no required findings relative to comprehensive plan map or text amendments, or zoning text amendments, LMC 18A.02.415 sets forth required findings for zoning map amendments.

WHEREAS, in 2014, the Lakewood City Council adopted updates to Chapters 2 (Land Use), 3 (Land Use Maps), 5 (Economic Development); and 7 (Utilities). The environmental impacts of these amendments were analyzed at that time and a Determination of Non-significance was issued on July 28, 2014. The 2015 slate of updates will reference the plans, policies and determinations made in the 2014 amendments; and,

WHEREAS, on September 8, 2014, the Washington State Department of Ecology granted final approval to the City's update of its Shoreline Master Program. By statute (RCW 36.70A.480) the goals and policies of the shoreline master program are considered to be an element of the comprehensive plan; and,

WHEREAS, in conjunction with the 2015 Comprehensive Plan Update, the Community Development Department has been conducting a community visioning program to solicit input from citizens regarding the policy direction of the city. Efforts have included preparation of a community profile document, interviews of select stakeholders, preparation, dissemination, and collection of results from a web-based community survey, meetings with existing community groups, and conducting a plenary Community Visioning Workshop. The principal findings of this effort are reflected in the *City of Lakewood Community Vision Plan* prepared by Tindale Oliver Associates dated June 2015; and,

WHEREAS, in 2015, the City has been working to update its critical areas regulations (Title 14A of the Lakewood Municipal Code). Updates include reference to the National Marine Fisheries Service (NMFS) biological opinion regarding implementation of the National Flood Insurance Program in the Puget Sound region, and updates to definitions and references regarding wetlands; and,

WHEREAS, as part of the 2015 update, the City Engineer, in conjunction with the City's transportation consultant, completed an inventory of existing transportation facilities and conditions, including a compilation of existing traffic volumes on City roadways, and an evaluation of traffic operations (i.e. level-of-service) at major intersections. The Background Report then provides a travel demand forecast and needs evaluation, a description of the City's transportation systems planning, and finally discussion of an implementation program including potential funding sources and a reassessment strategy if funding conditions change; and,

WHEREAS, the Environmental Official has concluded that the proposed comprehensive plan and zoning code updates, for the most part, simply update information and recognize the attainment of many of the goals of the original comprehensive plan. With regard to the three proposed map amendments, prospective impacts are speculative at this time and cannot be properly evaluated until specific development projects are proposed. No significant adverse environmental impacts are expected as a result of the proposed comprehensive plan updates, or the three proposed amendments; and,

WHEREAS, on July 30, 2015, the City of Lakewood Community Development Department released proposed updates to the City's comprehensive plan and related provisions of the municipal code for public review and issued a Determination of Non-Significance (DNS) for the amendments and updates on the same date; and,

WHEREAS, the Lakewood Planning Commission held a public hearing on the proposed comprehensive plan amendments and updates on September 23, 2015; and

WHEREAS, the Planning Commission closed the public hearing on September 23, 2015, but left the record open for written comments until its meeting on October 7, 2015; and,

WHEREAS, the Planning Commission closed the public record for the 2015 Comprehensive Plan Amendments on October 7, 2015, and

WHEREAS, the Planning Commission considered the public testimony received through the public hearing process, and deliberated on the proposed amendments and updates;

The City of Lakewood Planning Commission hereby makes the following findings and conclusions:

FINDINGS

The Lakewood Planning Commission makes the following findings for the 2015 Comprehensive Plan/Zoning Ordinance Amendment Package, Case Nos. CPA-2015-01, CPA-2015-02, CPA-2015-03, and CPA-2015-04, as described in the Planning Commission staff report dated October 7, 2015:

1. These four amendments, cumulatively and individually, went through a professional review at the City and State level.

2. These four amendments, cumulatively and individually, were reviewed for compliance with County-wide planning policies.

3. On September 23, 2015, a public hearing was held on the proposed amendments. The public hearing was closed after all persons were given an opportunity to speak, but the record was left open for the receipt of written testimony until October 7, 2015.

4. On October 7, 2015, the Planning Commission considered all additional written testimony.

5. The Planning Commission reviewed related environmental documents.

6. The Planning Commission reviewed and discussed the consistency of the 2015 Comprehensive Plan/Zoning Ordinance Amendment Package with the existing Comprehensive Plan and Zoning Regulations.

7. The Planning Commission reviewed and discussed comments received, and recommended to forward to the Lakewood City Council all technical and clerical comments received regarding the proposed amendments for Council review and consideration.

CONCLUSIONS:

A. The Lakewood Planning Commission concludes that the 2015 Comprehensive Plan/Zoning Ordinance Amendments, cumulatively and individually, will not have a significant impact on the environment.

B. The Lakewood Planning Commission has properly considered and deliberated the merits of the 2015 amendments.

C. The Lakewood Planning Commission has determined that the proposed amendments, cumulatively and individually, further the goals and policies set forth in the GMA and the County-Wide Planning Policies.

D. The Lakewood Planning Commission hereby affirms that it has found that each independent comprehensive plan and zoning map amendment meets the required findings in LMC 18A.02.415 as if fully set forth herein, with the exception of CPA 2015-01, where it is concluded that there has not necessarily been a material change in circumstances since the establishment of the current zoning for the area, and that the benefits of the proposed rezone do not necessarily outweigh the potential impacts to the surrounding neighborhood at this time.

E. All procedural and substantive requirements of the GMA have been satisfied.

F. A 60-day notice has been provided to state agencies, and state agencies have been afforded the opportunity to comment, per RCW 36.70A.106(1).

NOW, THEREFORE, BE IT RESOLVED BY THE LAKEWOOD PLANNING COMMISSION THAT:

Section 1:

The Planning Commission hereby recommends the following actions to the Lakewood City Council relative to the 2015 Comprehensive Plan/Zoning Amendment Package, as appended to this Resolution:

A. Dismissal of comprehensive plan/zoning amendment CPA-2015-01 (Tower Road/Interlaaken) to change the zoning designation on approximately 58.5 acres from *Residential One* (R1) to *Residential Two* (R2).

B. Approval of comprehensive plan/zoning amendment CPA-2015-02 (Veterans Drive/Gravelly Lake Drive) to change the comprehensive plan land-use designation from *Residential Estate* to *Single Family*, and to change the zoning designation for the property from *Residential One* (R1) to *Residential Three* (R3).

C. Approval of comprehensive plan/zoning amendment CPA-2015-03 (Lakewood Racquet Club) to change the comprehensive plan land use designation from *Single Family* and *Open Space and Recreation*, to *Mixed Residential* and *Open Space and Recreation*, and to change the zoning designation from *Residential Three* (R3) and *Open Space and Recreation Two* (OSR2) to *Mixed Residential One* (MR1) and *Open Space and Recreation Two* (OSR2), including adjusting the boundary between land use and zoning designations as shown on the application filed by the Lakewood Sports and Racquet Club.

D. Approval of comprehensive plan amendment CPA-2015-04 Update and amendment of Lakewood Comprehensive Plan Chapter 1 (Introduction), Chapter 4 (Urban Design), Chapter 6 (Transportation), Chapter 8 (Public Services), Chapter 9 (Capital Facilities), and Chapter 10 (Implementation).

Section 2:
The Lakewood Planning Commission hereby directs staff to transmit its recommendations as contained herein to the Lakewood City Council in a timely manner to enable its action prior to December 31, 2015.

Section 3:
This resolution shall take effect immediately upon its passage.

PASSED AND ADOPTED at a regular meeting of the City of Lakewood Planning Commission this ____ day of October, 2015, by the following vote:

AYES: BOARDMEMBERS:

NOES: BOARDMEMBERS:

ABSENT: BOARDMEMBERS:

ATTEST:

Don Daniels, Chairman	***M. David Bugher***
Lakewood Planning Commission	Community Development Director/ Assistant City Manager for Development

1.0 INTRODUCTION

1.1 What is the Purpose of this Plan?

Incorporated in 1996, the City of Lakewood is engaged in the process of defining itself, articulating a vision of its future, and shaping its physical substance. This process is ongoing, taking place in City Council meetings, in letters to the editor, in permit requests, in dinner-table discussions, and many other venues. The ultimate blueprint of this vision is this comprehensive plan, which will guide Lakewood's growth and development ~~over the next 20 years~~.

The City of Lakewood has prepared and updated this comprehensive plan~~,~~ as required by the Washington State Growth Management Act (GMA). Per GMA, comprehensive plans are intended to plan for a 20-year time horizon. The plan will shape Lakewood's growth for the next two decades by:

- defining the level, intensity, and geographic distribution of employment and residential growth;
- identifying the needed improvements to public facilities, transportation, and utility infrastructure to service the projected levels of population and employment, along with proposed methods of finance;
- identifying the housing needs and requirements for the community; and
- defining the desired physical development patterns and urban design treatments.

1.2 How Was this Plan Created?

This comprehensive plan is a reflection of the community's values and an expression of its vision for the future. Community-wide visioning sessions held early in the plan's development (prior to original adoption in 2000) identified characteristics in Lakewood held dear by the participants, and those they thought needed to be changed. A summary of strengths and weaknesses is given in Table 1.1 below, based on the initial visioning sessions and refined during the 2004 review process.

Table 1.1: Lakewood's Strengths and Weaknesses (updated 2004).

	Strengths	Weaknesses
1	Abundant natural beauty	Despite intermediate improvements, perception of Lakewood as a high–crime area perpetuates
2	High quality of City officials and staff	Older, substandard retail development
3	Good economic potential and business climate	Unattractive gateways to the city
4	Strong civic involvement	Legacy of poor land-use planning
5	Good schools, libraries, and higher education opportunities	Poor quality or non-existent streets, sidewalks and bike paths

The original visioning exercise went further to identify specific actions the City should take in relationship to some of the issues facing Lakewood. The principal role of these visioning sessions in the comprehensive planning process was to provide City officials and staff a sense of Lakewood's current state and where it should be headed, from the public's perspective. During the period between city incorporation and the initial adoption of a comprehensive plan, the following priorities have lent guidance to City officials in prioritizing public actions (Table 1.2). Throughout the lengthy comprehensive planning process, these visions have remained as a touchstone for accomplishment. They mark one standard against which the comprehensive plan and a constantly evolving city environment can be measured in years ahead.

Table 1.2: Goals and Recommended Actions Emerging from 1999 Visioning.

Action Area	Goal	Prioritized Actions
Capital Facilities	Lakewood has attractive, well designed civic facilities that are a source of pride to the community.	• Acquire land base for civic functions • • Build a Civic Center • Conduct capital facilities planning
Economic Base	Lakewood supports a strong, diverse employment base.	• Make Lakewood 'Lakewood' –more grass, trees, and water • Create a broad economic base through a variety of creative tools
Environment	Lakewood continues to cherish and protect the natural environment including its lakes, woods, and natural amenities.	• Cleanse stormwater entering lakes • Protect and make accessible the lakes and woods

Table 1.2: Goals and Recommended Actions Emerging from 1999 Visioning. (cont)

Action Area	Goal	Prioritized Actions
Government	City government in Lakewood functions to preserve and protect the values of its diverse population.	• Monitor implementation of zoning code • Amend the zoning process where necessary • Formalize dealing with military bases • Complete the conversion of police services from County contract • Engage the diverse populations in conversations around what is needed in their neighborhoods in order to improve their health and overall livability.
Human Services	Lakewood has paid close attention to the needs of all its citizens and provides excellent human services.	• Promote youth services • Promote neighborhood interaction
Land Use – Residential	Lakewood has preserved its existing single-family neighborhoods while creating an urban center that supports multi-family residential in planned areas with high levels of public services.	• Maintain character of single-family detached neighborhoods • Promote compact urban center well served by public services • Diversify housing types for emerging markets • Promote mixed use
Land Use – Commercial	Lakewood has both thriving community centers and a downtown. Downtown has become not only the "heart" of the city, but a regional urban center where commerce, culture, and government flourish.	• Encourage quality design in commercial construction
Land Use – Amenities	Lakewood is a beautiful city marked by an abundance of parks, open spaces, and attractive, landscaped corridors.	• Emphasize open space and preservation of wildlife habitat • Preserve natural area within Ft. Steilacoom Park
Transportation	Lakewood has an excellent, integrated transportation system that supports all modes of transportation – private vehicles, public transportation, bicycles, and walking.	• Upgrade streets with sidewalks and landscaping • Add bicycle trails/lanes, especially between residential areas and parks ~~areas~~ • Continue to pursue development of Sound Transit station

		• Seek funding for 512/100th intersection • Support Cross-Base Highway
Urban Design	Lakewood is now a city with a "heart." Friendly, diverse neighborhoods with distinct character are now linked to a dynamic unique city center that is truly a blending of lakes and woods.	• Encourage more pleasant human environment around development • Encourage contemporary design in redevelopment
Utilities	Utilities have been extended throughout the majority of the city to provide citizens with efficient and reliable services.	• Extend sewers to Tillicum & American Lake Gardens • Pursue undergrounding of above-ground utilities city-wide at appropriate level

Representative photos reflecting the strengths and weaknesses that citizens observed during the visioning process (prior to initial adoption of the Comprehensive plan) are presented at the end of this chapter as Figures 1.1 and 1.2. The prioritized actions developed during the 1999 visioning sessions served as a basis for many of the original policies established in Chapter 3.0. At the beginning of each chapter are additional photographs depicting the character of the city at the start of this ~~20-year~~ plan (in 2000). Both the citizen photos and the additional character photos serve as benchmarks documenting the city at the start of the comprehensive planning process, against which future change can be measured. "Before and After" photo comparisons are added in 2015 to show progress since the initial adoption of this plan. As of 2015, it is clear that a significant amount of change has occurred since incorporation, and the City has made great strides in realizing the values and goals articulated in the original visioning effort.

1.2.1 2014-15 Community Vision Project

In 2014 the City prepared an updated Community Vision Plan based on a broad community survey and meetings with a variety of community groups and organizations. This information was used to craft an aspirational vision statement, define a set of community values, and articulate a set of actions intended to further those values as the City moves into the future.

The 2015 Vision Plan includes the following Vision Statement:

> *Lakewood is a safe, culturally diverse, and beautiful city. As Lakewood grows, we will continue to be one of Washington's premier places to live, raise a family, and cultivate a business. Our picturesque parks, scenic lakes, protected open spaces, and abundant natural amenities make Lakewood the undiscovered gem of the Puget Sound region. The foundation for Lakewood's future lies in the outstanding K-12 and higher education institutions within our city and the core values our community is built upon, including family, service, community engagement, and protection of the natural environment. Active and on-going support for America's service members at Joint Base Lewis-McChord is an explicit mission of the city. Lakewood's strategic location, robust economy, high-quality public services, and parks and recreation facilities round out the reasons that the City of Lakewood is the perfect place to call home.*

Not surprisingly, the 2015 Vision Plan reinforces many of the themes identified in the 1999 visioning exercise such as creation of a broad and diverse economic base, provision of high quality public facilities, and protection of the environment. The 2015 Vision Plan acknowledges the core values of family, service, community engagement and protection of the natural environment. However, the 2015 Vision Plan goes even farther and organizes the community's goals and aspirations around five Community Values. These Community Values are:

Lakewood Community Values

- Friendly and Welcoming Community
- High Quality Public Services, Educational Sytems, Parks and Facilities
- Vibrant Connected Community Places Unique to Lakewood
- Strong Local Economy
- Sustainable and Responsible Practices

The 2015 Vision Plan discusses each of these community values and sets forth over 65 action items intended to move the community toward its vision for the future. Progress on the the realization of these community values is intended to be measured in an annual "report card" using milestones, benchmarks, and metrics set forth in the Community Vision Plan.

1.3 What Principles Guide This Plan?

Lakewood is a place where values that increase our ability to form community are honored and proclaimed: integrity, honesty, rights with responsibility, respect for law and order, mutual respect and care for all citizens, cooperation, and volunteerism. These values were augmented in 2015 with the 5 community values noted above.

As Lakewood continues to ~~coalesce~~ develop as a city, the City seeks to ensure a more successful future for Lakewood's people by working together with vision, focus, and cohesion to provide opportunities for all people to meet their needs and fulfill their aspirations.

~~City staff and the Planning Advisory Board (PAB), an advisory body to the City Council, used the core values expressed by those participating in the initial visioning process to develop the set of guiding principles for the comprehensive plan, presented on the following page. These principles were developed to serve as a framework, giving structure to and containing the proces. They do not identify specific actions that should be taken, but they are a measuring device against which to gauge decisions. Ultimately, each of the goals and policies contained in the plan relates back to these guiding principles.~~

~~GUIDING PRINCIPLES~~

~~People are Lakewood's most vital asset.~~

~~A city's livability and prosperity are found in the collective spirit of those who live and work there. Lakewood's community development goals are not merely related to buildings, roads, and such, but to people's quality of life and their pride in and individual contributions to the community.~~

~~A sense of place helps define the city.~~

~~Putting Lakewood's comprehensive plan to work will help support its most functional areas and continue to improve the physical and social conditions that have resulted in its compromised standing in the regional eye.~~

~~Lakewood must be a safe community.~~

~~A city and its neighborhoods are underpinned by caring people who watch after each other. Ensuring that there are adequate resources in place to foster public safety will help create a quality place for everybody.~~

~~Variety in the built environment helps sustain Lakewood.~~

~~Combining land uses that encourage people to live, work, and play in the "new downtown" and the Lakewood Station area will help create a more vibrant life and economy in the city's dominant commercial areas.~~

~~Connectivity and movement are essential.~~

~~Urban life is improved by facilitating movement, access, and connection for freight, private vehicles, pedestrians, public transportation, and bicycles. Developing a connecting network of streets, sidewalks, and land uses will keep Lakewood's people and products mobile.~~

~~Lakewood's urban ecology is important.~~

~~A city's natural spaces help make it a desirable place to live. Actively identifying and pursuing opportunities to reestablish a balance between Lakewood's urban and natural systems and restore such natural spaces as creek channels, oak stands, and "rails-to-trails" possibilities will help overcome past encroachment by development.~~

~~New development must contribute.~~

~~Holding new development responsible for providing functional infrastructure will offset its impacts on the community and ensure healthy neighborhoods for new residents.~~

~~The City must contribute.~~

~~Lakewood's public lands and infrastructure -- streets, sidewalks, and other public areas -- set the stage for life in the city. Targeting public investments into infrastructure and other public projects will create clean, safe, inviting, and well-connected and -maintained facilities for a maximum number of people.~~

1.4 What Does this Plan Do?

As a community, Lakewood has been around for a long time, but it was not until incorporation in 1996 that the City began the ambitious effort of charting its own destiny for the first time. The course charted by the City's plan ~~will take~~continues Lakewood on a deliberate new direction in clear departure from the incremental approach to planning that prevailed prior to incorporation. Adoption of this plan represents the City's commitment to that new direction, ~~allowing~~ helping -Lakewood to create a community that reflects the values of all its inhabitants.

Development of this plan was a long, complex effort involving the contributions and reflections of members of the community, the PAB, elected officials, and outside experts. The result is a cohesive policy structure to guide the innumerable decisions facing this community as it forges ahead over the next two decades. Because all City regulations are legally required to be consistent with this plan, it gives City government~~, for the first time,~~ a common starting point for developing regulations, reviewing legislation and proposed projects, and making crucial spending decisions.

A review of this plan was required under state law in 2004. Because the plan was only a little more than three years into its implementation at that time, this was not viewed as an opportunity to deviate from the course set following the arduous process leading up to Lakewood's initial comprehensive plan.

Because every effort was made to make this plan a vital, living document that is relevant in the day-to-day activities of the City moving forward ~~over the next 20 years~~, the required review process focused on evaluating the plan against statutory requirements and making adjustments where needed. To achieve this objective, the goals and policies that comprise the foundation of the plan must be specific enough to direct real actions while remaining sufficiently far-reaching to apply to the unforeseeable future. This is no simple task. The plan's edicts vary in specificity from the details of urban design in the Lakewood Station district to the much more general, longer range transition of ~~American Lake Gardens~~ the Woodbrook area from residential to industrial use.

Above all, this plan seeks to make Lakewood the kind of community where people are proud to live and work. This defining objective will be achieved through a variety of approaches, characterized into three broad themes: **controlling sprawl**, **creating place**, and **protecting the environment**.

1.4.1 Controlling Sprawl

Land use in Lakewood is characterized by sprawl—that all too common pattern of low intensity land use, where housing, businesses, and other activities are widely scattered with no focus. Sprawl, often the result of lax land use controls, results in inefficient use of infrastructure, over-dependence on the automobile ~~dependency~~, lack of spatial organization, and urban development that most people perceive as ugly. This plan will reverse this trend through the following:

- ~~New l~~Land use designations custom tailored to resolving Lakewood's existing land use problems.

In contrast to generic land use controls, each of the land use designations was developed to specifically address the land use issues facing Lakewood. To be applied through new zoning developed in response to this plan, the land use designations address specific types of uses as well as housing and employment densities. The mosaic of designations will direct development intensity and determine where living, working, shopping, and relaxing will occur for the next two decades.

- Limiting the surplus of commercial land.

Commercial activity has traditionally been distributed throughout Lakewood in a relatively random pattern. Not only is this an extremely inefficient use of land, it ~~contributes to a weak~~ weakens the local economy. This plan restricts new commercial development to specialized nodes and corridors for regional commerce and neighborhood commercial areas as a service to nearby residents and businesses.

- Targeted residential growth in specific neighborhoods.

A number of residential areas will be rejuvenated as high-density neighborhoods supported by public open space, neighborhood commercial centers, and other amenities. The neighborhood targeted for maximum growth is Springbrook. Along with its name change from McChord Gate, this neighborhood will undergo substantial redevelopment at land-efficient densities. With its proximity to employment opportunities at JBLM ~~McChord Air Force Base (AFB)~~ and the central business district (CBD), as well as excellent access via I-5 and commuter rail at Lakewood Station, Springbrook is a natural candidate for high density residential development. Construction of new townhouses and apartments has been ~~will be~~ catalyzed through provision of amenities such as new parks, open space, and improved infrastructure (including a new water main installed in 2012).~~.~~ Other neighborhoods with substantial growth capacity slated for redevelopment under this plan include the Custer neighborhood in north central Lakewood, the northern portion of Tillicum, and the area around the Lakewood commuter rail station.

- Focused investment.

Public investment will be focused on the areas of the city where major change is desired such as the City's designated Regional Growth Center. ~~Future s~~Spending will be prioritized to achieve the coherent set of goals established in this plan. As required by law, capital expenditure will be consistent with the comprehensive plan, providing a rational basis for fiscal decision-making. Specifically, public investment will be tied to growth; thus, areas targeted for increased housing and employment density will have top priority for City spending. The City has spent over $24 million on projects in the Springbrook, Woodbrook and Tillicum areas since 2004, including extension of sanitary sewer service to Tillicum and Woodbrook, extension of water service to Springbrook, and substantial roadway improvements in these areas.

1.4.2 Protecting the Social, Economic, and Natural Environments

While much of the emphasis of this plan is to transform the city, preserving and enhancing its best attributes are also underlying directives. From a broad perspective, Lakewood's environment consists of viable neighborhoods, healthy economic activity, and functioning natural systems. This plan recognizes that to be sustainable, the inter-relationships between these elements must be recognized. ~~each of these environments is interrelated:~~

- Preserve existing neighborhoods.
-

One of Lakewood's greatest strengths is its established residential neighborhoods. This plan protects these valuable assets through careful management of growth, provision of adequate services, and stewardship of the physical environment.

- Attracting new jobs through a variety of economic development incentives.

To balance residential growth, Lakewood needs to significantly increase its employment base. This will be achieved by protecting existing employment resources and by creating new opportunities. In addition to a

host of economic development initiatives, the plan seeks to cultivate~~protects~~ industrial resources through designation of the City's two~~an~~ industrial areas- Lakewood Industrial Park and Woodbrook, as ~~/manufacturing~~ C~~c~~enters of Local Importance. New jobs will be facilitated by designating new areas for industrial, commercial, warehousing and distribution , and related uses ~~office, and high tech growth~~.

- Addressing public safety in a responsible manner.

Since incorporation, much of Lakewood's budget has been spent on police protection. Under this plan, crime prevention and effective response will remain ~~the City's~~ a ~~top~~ priority of the City.

- Provide access to adequate and affordable housing, medical and community services and safety nets, healthy food and alternative transportation in all areas of the city.

- Application of environmental protection measures.

Environmental protection is a major, integral theme of this plan. Environmental values and actions underlie and drive the majority of goals and policies comprising each chapter of the plan. Examples range from land use provisions such as riparian protection to transportation demand management.

- Conversion of a part of Woodbrook (American Lake Gardens) to industrial use.

Woodbrook ~~American Lake Gardens~~ currently provides substandard housing served by failing septic systems. With this plan targeting residential growth in other neighborhoods, ~~American Lake Gardens~~ Woodbrook is a promising opportunity for job creation. This plan envisions a new state-of-the-art industrial area ~~park~~. ~~Over the 20-year life of the plan, this~~ The assortment of aging and substandard housing and other land uses will be transformed to a major destination for manufacturing, corporate headquarters, and other employment-generating uses making use of excellent access to I-5 and ports in Tacoma and Olympia ~~and the Cross-Base Highway~~.

1.4.3 Creation of Place

"There's no there, there" is a common criticism of many American localities, and Lakewood has been no exception. The traditional icon of place is a recognizable downtown. While many of the basic ingredients for a downtown are already in place in Lakewood, they currently do not work together to create an active, multi-faceted core. This plan is focused on creating a viable, functioning, and attractive community center.

- Continue development of the~~a~~ ~~c~~Central ~~b~~Business ~~d~~District (CBD).

The CBD is ~~will become~~ the center of commercial and cultural activity for the city. It encompasses both the Lakewood Towne Center and Colonial Center. The area in and around the Towne Center is envisioned as a magnet for intensive mixed use urban development including higher density office and residential uses. At the north end of the CBD, the Colonial Center will serve as the hub of Lakewood's cultural activity. Higher quality, denser urban redevelopment is expected within ~~will dominate~~ the D~~d~~istrict, noticeably increasing social, cultural, and commercial activity. Streetscape and other urban design improvements will make this area more accessible and inviting to pedestrians.

- Development of a special district around Lakewood Station.

The Lakewood Station area is intended to ~~will~~ become a new high density employment and residential district catalyzed by station-area development opportunities. A dense concentration of urban development with a major concentration of multi-unit housing, health care services, and ~~employment~~, shopping~~, and services~~ will be developed within walking distance of the Lakewood commuter rail station. A significant high density, multi-

unit residential presence in the center of this area will be encouraged. There will be special emphasis placed on design to enhance the pedestrian environment and create a diverse new urban neighborhood. New open space opportunities consistent with the desired urban character will be prioritized to attract development. A new pedestrian bridge connection the Lakewood Station to the neighborhood to the north was completed in 2013.

- Increased emphasis on making Lakewood accessible and convenient for pedestrians and bicycle riders.

This plan offers transportation choice by putting walking and bicycling on an equal footing with the automobile. New linked systems of sidewalks, crosswalks, trails, and pathways will not only make alternatives to driving viable for those unable to drive, but a desirable option for those who choose to walk or ride.

- New urban design approaches to raise the aesthetic standards throughout the city.

Lakewood citizens are overwhelmingly in favor of instilling a sense of place for their community by making it more attractive. This plan addresses this sentiment with an entire chapter devoted to urban design. The policies in the Urban Design~~is~~ chapter will improve the quality of place through specific design treatments both at the city-wide context level as well as at the level of specific targeted neighborhoods.

1.5 How Will this Plan Be Used?

Following adoption in 2000, ~~the~~ this -comprehensive plan ~~will be~~ was implemented in large part ~~by~~ through adoption of a number of programs, plans, and codes. Some of these additional documents include:

- A zoning code that ~~will ensure that the City's zoning i~~is consistent with the comprehensive plan land use designations;
- Sub-area, corridor, and gateway plans for specific portions of Lakewood. Sub-area plans have been prepared for Tillicum and the Woodbrook Industrial Park;
- A critical areas ordinance, as defined by the GMA (LMC Title 14A, adopted March 2004); and
- A shoreline master program, as defined by the State Shoreline Management Act (adopted December 2014); and,
- ~~a~~A 6-year capital improvement program (CIP), updated on a regular basis.

Because the GMA requires that these programs and regulations be consistent with the City's comprehensive plan, the plan is particularly important in determining the City's future capital expenditures and how they relate to specific plan goals and policies.

This plan also directs evaluation of specific development proposals in Lakewood. Development regulations that apply to development proposals are driven by the goals and policies contained in this plan. When reviewing and commenting on a proposed development project, the planning staff and the decision-making body need to be able to evaluate the proposal's conformance with specific planning goals and applicable policies. Since many planning issues, such as land use and transportation, are inextricably interrelated, the goals and policies of one element are very likely to pertain to other elements as well.

Central to the plan is an official land use map, presented in Chapter 2, that delineates the type and intensity of all land uses within the city. This map is accompanied by definitions for all land use designations it includes. Chapter 2 also includes a discussion of Lakewood's urban growth area (UGA) and identifies UGA boundaries. The remaining chapters contain the individual plan elements and their various goals and policies that guide decisionmaking on how Lakewood will grow, look, and function into the future.

1.6 How Does this Plan Relate to GMA and Other Requirements?

Comprehensive plans are intentionally broad and far-reaching. This plan does not address the specifics of individual land uses, localized urban design treatments, or specific programs. Instead, it lays the framework for how such issues will be addressed by City policies and programs in the future.

Under GMA, local comprehensive plans must address certain planning elements including land use, transportation, housing, capital facilities, and utilities. This plan contains a number of chapters that correspond to or otherwise address the GMA's required planning elements. Lakewood has also chosen to prepare several optional elements, addressing the topics of urban design, economic development, and public services.

Tables 1.3 through 1.8 identify the locations of required and optional elements under GMA within this plan. Each chapter generally contains goals and policies, accompanied by explanatory text. Information required by GMA is also contained in a background report, which documents existing conditions and trends in detail; an environmental impact statement (EIS), which analyzes potential environmental impacts as required by SEPA; and the CIP, the City's prioritized list of planned capital expenditures for the next 6 years.

1.6.1 Land Use

The GMA land use requirements are addressed in several locations. The majority of issues related to land use are addressed in Chapters 2 and 3. Chapter 2 discusses land use designations and locations, while Chapter 3 consists of goals and policies related to the land use designations. In addition, some physical characteristics such as building intensities are addressed at greater detail in Chapter 4 (Urban Design). Future population is estimated according to a development capacity model included in Section 3.3 of the EIS.

Table 1.3: Relationship Between GMA Requirements for Land Use and the Lakewood Comprehensive Plan.

RCW Section & GMA Requirement	Location where Lakewood Comprehensive Plan Complies with Requirement
36.70A.070(1) Population densities (land use element)	• comp. plan Section 2.3: Land Use Designations
36.70A.070(1) Building intensities (land use element)	• comp. plan Section 2.3: Land Use Designations • comp. plan Section 4.2: Relationship Between Urban Design and Land Use Designations
36.70A.070(1) Estimates of future population growth (land use element)	• comp. plan Section 3.2: Residential Lands and Housing ~~2.3: Land Use Designations~~
36.70A.070(1) Protection of groundwater quality/quantity (land use element)	• comp. plan Section 3.11: Environmental Quality
36.70A.070(1) Drainage/flooding/stormwater runoff (land use element)	• comp. plan Section 3.11: Environmental Quality

1.6.2 Housing

Housing issues are addressed in the land use chapter and several other locations. The comprehensive plan land use designations and map (Chapter 2) identify areas of the city targeted for different housing types. The land use chapter (Chapter 3) addresses goals and policies related to a variety of housing issues. Technical analysis of needs and capacity is contained in the background report and the EIS.

Table 1.4: Relationship Between GMA Requirements for Housing and the Lakewood Comprehensive Plan.

RCW Section & GMA Requirement	Location where Lakewood Comprehensive Plan Complies with Requirement
36.70A.070(2)(a) Inventory/analysis of existing/projected housing needs (housing element)	• Housing section of background report • EIS Section 3.5 Housing
36.70A.070(2)(b) Statement of goals/policies/objectives/ mandatory provision for the preservation/improvement/ development of sufficient land for housing (housing element)	• comp. plan Section 3.2: Residential Lands and Housing
36.70A.070(2)(c) Sufficient land for housing, including government-assisted, low-income, manufactured, multi-family, group homes, & foster care (housing element)	• comp. plan Section 3.2: Residential Lands and Housing • comp. plan Section 2.3: Land Use Designations
36.70A.070(2)(d) Provisions for existing/projected needs for all economic segments (housing element)	• comp. plan Section 3.2: Residential Lands and Housing

1.6.3 Capital Facilities

Capital facilities are addressed in Chapter 9 of the comprehensive plan, background report, EIS, and Lakewood 2010~~0~~5-2012~~1~~0 CIP. The required capital facilities issues are addressed in the capital facilities chapter. Technical analysis of needs and capacity is contained in the background report and the EIS.

Table 1.5: Relationship Between GMA Requirements for Capital Facilities and the Lakewood Comprehensive Plan.

RCW Section & GMA Requirement	Location where Lakewood Comprehensive Plan Complies with Requirement
36.70A.070(3)(a) Inventory of existing capital facilities owned by public entities, showing location and capacities (capital facilities element)	• background report utilities section • EIS Section 3.8: Public Services and Utilities
36.70A.070(3)(b) Forecast of future needs for capital facilities (capital facilities element)	• background report utilities section • EIS Section 3.8: Public Services and Utilities
36.70A.070(3)(c) Proposed locations and capacities of expanded/new capital facilities (capital facilities element)	• Lakewood 201~~0~~5-2021~~0~~0 CIP
36.70A.070(3)(d) At least a 6-year plan to finance capital facilities (capital facilities element)	• Lakewood 201~~0~~5-2021~~0~~0 CIP
36.70A.070(3)(e) Requirement to reassess land use element capital facilities funding falls short (capital facilities element)	• comp. plan Section 9.4: General Goals and Policies

1.6.4 Utilities

The most detailed discussion of utility capacity, needs, and locational issues is contained in the utilities section of the background report. The utilities section of the EIS also contains relevant information, especially pertaining to impacts and proposed mitigation associated with this plan. Although the comprehensive plan chapter on utilities includes summary level review of how the plan will accommodate land use changes, the chapter is primarily comprised of goals and policies.

Table 1.6: Relationship Between GMA Requirements for Utilities and the Lakewood Comprehensive Plan.

RCW Section & GMA Requirement	Location where Lakewood Comprehensive Plan Complies with Requirement
36.70A.070(4) General/proposed locations of utilities (utilities element)	background report utilities section EIS Section 3.8: Public Services and Utilities comp. plan Chapter 7.0: Utilities
36.70A.070(4) Capacity of existing/proposed utilities (utilities element)	background report utilities section EIS Section 3.8: Public Services and Utilities comp. plan Chapter: 7.0 Utilities

1.6.5 Transportation

The transportation chapter of the comprehensive plan establishes the overall transportation framework for Lakewood's transportation planning through long-range goals and policies.

Table 1.7: Relationship Between and GMA Requirements for Transportation and the Lakewood Comprehensive Plan.

RCW Section & GMA Requirement	Location where Lakewood Comprehensive Plan Complies with Requirement
36.70A.070(6)(a)(i) Land use assumptions used in estimating travel (transportation element)	• comp. plan Section 2.3: Land Use Designations
36.70A.070(6)(ii) Estimated traffic impacts to state transportation facilities (transportation element)	• EIS Section 3.6: Transportation
36.70A.070(6)(iii)(A) Inventory of air/water/ground transportation & services (transportation element)	• background report transportation section • EIS Section 3.6: Transportation
36.70A.070(6)(iii)(B)&(D) Level of service standards (LOSs) for locally owned arterials & transit routes & actions/requirements for bringing those that don't meet LOSs into compliance (transportation element)	• comp. plan Section 6.5: Level of Service Standards and Concurrency
36.70A.070(6)(iii)(C) Level of service standards for state highways (transportation element)	• comp plan. Section 6.5: Level of Service Standards and Concurrency
36.70A.070(6)(iii)(E) Traffic forecasts for at least ten years (transportation element)	• EIS Section 3.6: Transportation
36.70A.070(6)(iii)(F) Identification of state/local system needs to meet current/future demands (transportation element)	• EIS Section 3.6: Transportation
36.70A.070(6)(iv)(A) Analysis of funding capability (transportation element)	• Lakewood 2005-2010 CIP (transportation section)
36.70A.070(6)(iv)(B) Multi-year financing plan based on needs identified in comp. plan (transportation element)	• Lakewood 2005-2010 CIP (transportation section)
36.70A.070(6)(iv)(C) Discussion of how funding shortfalls will be handled (transportation element)	• EIS Section 3.6: Transportation
36.70A.070(6)(v)	• comp. plan Section 6.1: Introduction and

Intergovernmental coordination efforts (transportation element)	Purpose (Transportation) • comp. plan Section 6.1.1: General Transportation Goals and Policies
36.70A.070(6)(vi) Demand management strategies (transportation element)	• comp. plan Section 6.2: Transportation Demand Management

This plan also designates arterial street classifications, identifies bicycle and pedestrian trails, and establishes level of service (LOS) standards. Analysis of traffic, safety, and LOS impacts; road improvements proposed by the state and county; and funding options are contained in the EIS. Specific transportation projects led by the City are listed in the CIP.

1.6.6 Optional Elements

Lakewood opted to include chapters addressing urban design, economic development, and public services, along with the five required elements discussed above. In addition, other issues such as parks and recreation and environmental quality are addressed in the land use chapter. (Economic development and parks and recreation have been added to the GMA as required elements; however, that requirement is currently not in effect per RCW 36.70A.070(9) so still are considered to constitute optional elements being addressed under this plan.

Table 1.8 Relationship Between GMA Optional Elements and the Lakewood Comprehensive Plan.

RCW Section & GMA Requirement	Location where Lakewood Comprehensive Plan Complies with Requirement
36.70A.080(1) Optional elements at City's discretion	• comp. plan Chapter 4.0: Urban Design • comp. plan Chapter 5:0: Economic Development • comp. plan Chapter 8:0: Public Services

1.6.7 Regional Planning Policies

In addition to the GMA, this plan is required to comply with VISION 204~~2~~0, the multi-county policies, and Pierce County's County-Wide Planning Policies (CWPP). This plan shares many of the VISION 204~~2~~0 goals, especially expanding housing choice and increasing job opportunities for community residents. Urban scale neighborhood redevelopment proposed for the Lakewood Station district, Springbrook, Tillicum, and elsewhere exemplifies the type of urban growth envisioned by these regional policies. Numerous other features, including improved pedestrian and bicycle networks, compact urban design types, and balanced employment and housing, further demonstrate this consistency. The goals and policies comprising Lakewood's comprehensive plan also reflect the emphasis of each of the major CWPP issue areas. In particular, the Future Land-Use Map is based on the CWPP's land-use principles. This is reiterated in the corresponding goals and policies associated with the map, which comprise the land-use chapter.

1.6.7.1 Compliance with Vision 2040

The Lakewood Comprehensive Plan supports a sustainable approach to growth and future development. The Plan incorporates a systems approach to planning and decision-making that addresses protection of

the natural environment. The plan commits to maintaining and restoring ecosystems, through steps to conserve key habitats, clean up polluted waterways, and reduce greenhouse gas emissions. The plan includes provisions that ensure that a healthy environment remains available for future generations in Lakewood.

Lakewood's comprehensive plan has been updated based on residential and employment targets that align with Vision 2040. Through the targeting process the City has identified the number of housing units in the city for the year 2031. We have also established an affordable housing goal for this planning period. (See Policies LU-2.20 and LU-2.21).

The comprehensive plan addresses each of the policy areas outlined in VISION 2040. Lakewood has policies that address habitat protection, water conservation, air quality, and climate change. The City's land-use codes incorporate environmentally friendly development techniques, such as low-impact landscaping. The plan calls for more compact urban development and includes design guidelines for mixed-use and transit-oriented development. There are directives to prioritize funding and investments to our regional growth center. The housing (sub)element commits to expanding housing production at all income levels to meet the diverse needs of both current and future residents. The plan includes an economic development element that supports creating jobs, investing in all people, creating great communities, and maintaining a high quality of life. The transportation element advances cleaner and more sustainable mobility, with provisions for complete streets, green streets, context-sensitive design, and a programs and strategies that advance alternatives to driving alone. The City coordinates its transportation planning with neighboring jurisdictions, including our level-of-service standards and concurrency provisions. The City is committed to resource conservation in the provision of public services.

The comprehensive plan also addresses local implementation actions in VISION 2040, including identification of underused lands, mode-split goals for the City's designated center, and housing targets.

1.6.7.2 Six Principles of Livability

The U.S. Department of Transportation (DOT), in conjunction with the U.S. Department of Housing and Urban Development (HUD) and the US Environmental Protection Agency (EPA) have developed "six principles of livability" to emphasize coordinated, place-based policies and investments that increase transportation choices and access to public transportation services for communities. The six principles are as follows:

- Provide more transportation choices to decrease household transportation costs, reduce our dependence on oil, improve air quality and promote public health.
- Expand location- and energy-efficient housing choices for people of all ages, incomes, races and ethnicities to increase mobility and lower the combined cost of housing and transportation.
- Improve economic competitiveness of neighborhoods by giving people reliable access to employment centers, educational opportunities, services and other basic needs.
- Target federal funding toward existing communities – through transit-oriented and land recycling – to revitalize communities, reduce public works costs, and safeguard rural landscapes.
- Align federal policies and funding to remove barriers to collaboration, leverage funding and increase the effectiveness of programs to plan for future growth.

- Enhance the unique characteristics of all communities by investing in healthy, safe and walkable neighborhoods, whether rural, urban or suburban.

The policies contained in the City of Lakewood Comprehensive Plan intend to see Lakewood developed as a "livable community" through its robust public transportation network, affordable housing programs, emphasis on creating local jobs, and aggressive pursuit of non-motorized transportation facilities and public transit options. Areas around the City's downtown Transit Center, as well as the Lakewood Sounder Station on Pacific Highway, are zoned to allow for high-density residential and mixed-use development. The City supports two community colleges, both of which are served by public transportation. The City has also provided for nodes of commercial activity within otherwise residential areas in order to provide access to basic goods and service without the need to travel to more intensive commercial areas. Implementation of this plan, as well as future amendments, should work to provide people access to affordable and environmentally sustainable transportation options.

1.7 2015 Update

A substantial update to this plan was completed in 2015. The 2015 updates acknowledged goals that had been met since the plan's initial adoption in 1996, and also took into account the recommendations resulting from a Visioning project in 2014-15. The 2015 updates intend to implement the provisions of Vision 2040, the regional growth strategy put forth by the Puget Sound Regional Council (PSRC).

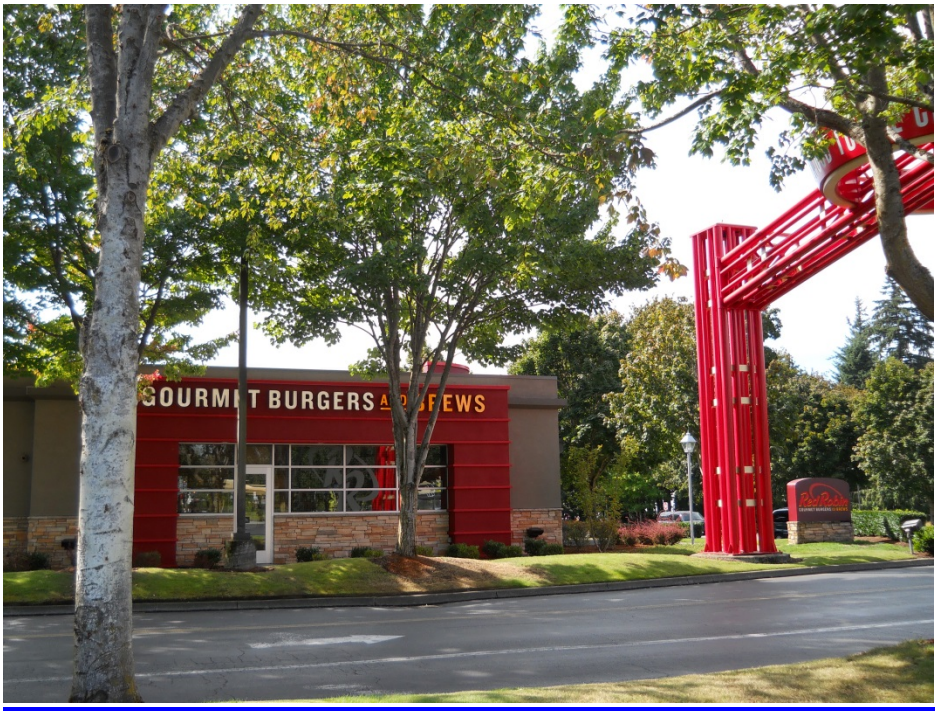
The primary concept of the PSRC regional growth strategy is that development is to be focused into urban areas and "centers". The City of Lakewood is classified as a "core city" and designated as a *Regional Growth Center*, and, as such, is expected to accommodate a large share of the region's growth.

In 2014 the City designated eight (8) Centers of Local Importance (COLIs). These COLIs were adopted in Section 2.5 (Land Use Maps chapter) of this comprehensive plan. Centers of Local Importance are designated in order to focus development and funding to areas that are important to the local community. COLIs are intended to promote compact, pedestrian oriented development with a mix of uses, proximity to diverse services, and a variety of appropriate housing options. COLIs may also be used to identify established industrial areas. The Centers of Local Importance identified for the City of Lakewood include:

A. Tillicum
B. Fort Steilacoom/Oakbrook
C. Custer Road
D. Lakewood Industrial Park/CPTC
E. South Tacoma Way
F. Springbrook
G. Woodbrook
H. Lake City West

The City of Lakewood is also working with Pierce County and the Puget Sound Regional Council (PSRC) to develop an appropriate Centers policy for Joint Base Lewis McChord (JBLM). The base has a significant impact and influence on the region, the State, and the City of Lakewood. PSRC and Pierce County are seeking an appropriate and equitable way to account for JBLM within the regional Centers framework and the Growth Management Act.

Figure 1.1 Lakewood Strengths



Creating a sense of place at the Lakewood Towne Center.

ier 1 imports
Office Depot

Figure 1.2 Lakewood Weaknesses

This corner is improved, but no interest in landscaping.

4.0 URBAN DESIGN AND COMMUNITY CHARACTER

4.1 Introduction

This chapter describes the community's vision for the development of Lakewood's physical environment. It presents a framework of priority roads, gateways, open space connections, and focus areas, followed by the goals and policies to achieve the vision.

Upon incorporation, Lakewood ceased to be a small part of a larger entity and instead became its own place. With the status of cityhood has come a need for identity and sense of place. Lakewood's citizens have strongly expressed the need for the community to take control of its image, to grow into a recognizable city with a strong civic center, and to eliminate the negative aspects of its past.

In the citizens' visioning sessions that took place at the beginning of the comprehensive planning process, urban design was identified as the most urgent planning issue before the City. This was a significant occurrence, as it is somewhat unusual for urban design to achieve such a high profile when compared to other pressing civic issues such as transportation, public safety, and human services. Participants expressed a desire for a plan that develops a foundation for building a "heart of the city," creates beautiful entrances to the city ("gateways"), creates a legacy of interconnected parks and green spaces, and identifies and preserves the best natural and built features that Lakewood has to offer. They wanted a more pedestrian-oriented city with attractive streets and an environment that helps orient and guide visitors.

This chapter begins the process of fulfilling a community vision of Lakewood as a fully evolved city that combines a defined sense of place and a collective unity of spirit as evidenced by an appealing, functional environment. Five major urban design building blocks are defined in this chapter to work toward this goal. First, urban design needs related to specific land-use categories are discussed. Secondly, the relationship of urban design to transportation planning is presented, and some street classifications related to urban design are presented. Next, a physical framework plan identifies the key elements that define the city's physical structure in terms of its open space network, civic boulevards, and major gateways. Urban design strategies for specific focus areas are presented, along with specific actions for implementation. Finally, overall urban planning goals and policies are identified to guide development of Lakewood's physical environment.

The three urban design focus areas that are singled out for special attention are: the CBD, Lakewood Station district, and Tillicum. These three focus areas are crucial to the city's image and are parts of the city where substantial change is planned that will create a rich mixture of land uses in a pedestrian oriented environment. To achieve this level of change, substantial public investment and standards for private development will be needed.

There are limitations as to how urban design can be addressed at the comprehensive planning level. For this reason, this chapter recommends the future preparation of subarea plans to address priority areas at a scale allowing for the necessary attention to detail. Pending these detailed studies, adherence to the goals and policies shown here will assist the City in carrying out some of its most pressing development priorities such as City Hall construction, continued redevelopment of the Lakewood Mall into Lakewood Towne Center, development of transit oriented residential projects around the Sound Transit commuter rail station, and preservation of strong single-family neighborhoods.

4.2 Relationship Between Urban Design and Land–Use Designations

Particularly desirable urban design features accompany many of the land–use designations discussed in Chapter 2. These features are identified here in relationship to the specific land–use designations, except the CBD and Lakewood Station district, which are presented separately.

4.2.1 Residential Lands

Urban design is especially important in multi-family residential areas to create satisfying and aesthetic places for residents. The following factors should be considered in developing multi-family properties:

Mixed Residential and Multi-Family: Encourage infill development along key pedestrian streets and in proximity to public transit routes or centers. Use design to create a pedestrian scale along key pedestrian streets. Locate parking behind residential buildings with access off alleys, where possible, and limit driveways and curb cuts along key pedestrian streets. Building faces should typically be oriented parallel to the street with setbacks aligned with adjacent buildings. Architectural variety should be encouraged, as should building modulation, emphasis on semi-public, semi-private, and private open space. Building scale, especially in mixed residential areas, should respect physical context. Above all, livability over the long term should be a prime consideration during the project review process.

High-Density Multi-Family: Encourage the development of high-density multi-family residential neighborhoods in proximity to public transit and the commuter rail station. Neighborhood character should reinforce a pedestrian orientation along key pedestrian streets and linkages to commuter rail or public transit. Below grade parking or garages behind buildings, with access from alleys where possible, should be encouraged. Driveways and curb cuts along key pedestrian streets should be limited. Encourage the incorporation of design elements characteristic of older single-family residential areas such as pitched roofs, roof dormers, modulation of building facades, articulated building materials and finishes, and human-scale massing. The result should be an attractive, urban residential neighborhood with wide sidewalks, street trees, and numerous public seating/gathering spots in a combination of private and open space.

4.2.2 Commercial Lands

Urban design is particularly important in commercial areas to create vibrant and interesting places for people to shop, dine, and meet. The following factors should be considered in developing commercial areas:

Corridor Commercial: New commercial development within this designation is likely to continue to be predominantly auto-oriented. Encourage the redevelopment of streets, bicycle paths, transit stops, street trees, and sidewalks along these commercial corridors, and reduce the number of curb cuts and surface parking lots fronting onto streets. Establish building design and signage standards and guidelines to provide a unified, attractive character to these commercial corridors. Visually, these areas are to appear dedicated to commerce but should not be unduly cluttered or chaotic looking. Individual character in areas such as the International District should be promoted.

Neighborhood Business District: Development within this designation serves the immediate surrounding neighborhood with goods and services. These are pedestrian-scaled business districts within close walking distance to medium and high-density residential areas. New development should have a strong pedestrian orientation with improved sidewalks along key pedestrian streets. On-street parking should be provided to assist in slowing traffic through the business district and providing a sense of pedestrian safety. The design of the neighborhood business district should reflect the scale of adjacent residential areas. Streetscape design may emphasize a special neighborhood character and a richer palette of materials, including public artworks. Green

street connections emphasizing pedestrian safety should link neighborhood business districts to surrounding residential neighborhoods. These districts should have the feel of a small village hub which serves as the focus of community life.

4.2.3 Industrial Lands

Industrial areas require less extensive urban amenities, but urban design is still important to create economically viable and attractive industrial sites. The following factors should be considered in developing industrial properties:

Emphasis is on employment-generating uses, including light manufacturing, warehousing and distribution, and business park activities. Perimeter buffer areas should clearly define the site's geographic boundaries, minimizing visual, acoustic, or other impacts to adjacent users, reducing the nuisance potential of these land uses. Sources of noise, dust, light, or other potential nuisances should be sited properly to shield adjacent land uses. Entryways to industrial sites should be visually attractive, as they tend to be the only public expression of design for these uses.

Way-finding is ~~also~~ critical ~~due to the transient nature of those~~ for persons making pickups and deliveries at industrial sites. Consequently, signage should clearly identify principal entrances and loading docks for each business. Resistance to theft, vandalism, and personal crimes should also be a prime design consideration. Freight traffic must be accommodated through use of proper turning radii, consolidated access points, adequate turning lanes, turning pockets and sight distances, and clear freeway access routes. The needs of rail access should be accounted for, and conflicts with pedestrians and vehicles minimized. Minimum landscaping standards adequate to prevent large areas of parking from dominating the landscape should be required. Stormwater detention basins should be developed as attractive features of the natural landscape, with attention to appearance, landscaping, biofiltration, and potential for providing wildlife or open space ~~values~~ resources.

4.3 Relationship Between Urban Design and Transportation

Transportation networks, together with open space, typically form a framework of public lands that set the stage for city life. While private lands arrayed within this framework account for the bulk of human activity, it is the public networks which often form our deepest image of a city. These networks also typically contain much of the lands in public ownership, giving the city a measure of control over how they appear, how they are used, and what functions they perform. These networks can help fulfill the citizens' desire for a better regional image, more attractive gateways and entrances into the city, better accommodations for foot and bicycle traffic, and increased access to natural and recreation areas.

To help implement the City's aspirations for an attractive and well-ordered streetscape environment, urban design classifications have been identified related to the transportation network. The intent is to identify key features in the city for improvement with regards to civic image, orientation, and pedestrian functioning, rather than create an universal system into which all public rights-of-way (ROW) fit. The principal urban design concepts related to transportation are shown in Table 4.1. Only certain critical streets and intersections have been selected for special attention. These civic boulevards, green streets, and gateways are discussed in the following section.

Table 4.1: Urban Design Street Classifications.

Urban Design Classification	Primary Function	Design Characteristics
Civic Boulevards	To provide a positive civic image and sense of identity along key arterials functioning as entranceways into the city or key commercial areas of the city while maintaining adequate levels of service for high traffic volumes.	Should include full sidewalks with planting strips , curb ramps, crosswalks, and traffic control at all intersections; street trees, attractive street furniture, special attention to bus shelter areas; and decorative lighting. May include planted medians, decorative pavements, on-street parking, and special signal mounting. Should be considered an opportunity for public art.
Green Streets	To provide for a high level of pedestrian function, protect pedestrians from conflicts with vehicles, and provide pedestrian amenities. Some Green Streets may act as "urban linear parks".	Full sidewalks or sidewalks with planting strips; curb ramps, crosswalks, and traffic control at all intersections; street trees; street furniture including seating in appropriate locations; bike lanes and facilities, and pedestrian oriented lighting.
Internal Gateways	To create a positive sense of entry into a district, create a sense of neighborhood identity, and provide way-finding and orientation functions.	Significant landscaping, way-finding and orientation devices, public art, special pavements, street furnishings. Finer scale, greater emphasis on pedestrians than with external gateways.
External Gateways	To create a positive sense of entry into the city, as well as providing way-finding and orientation functions.	Significant landscaping, way-finding and orientation devices, public art, special pavements, street furnishings. Larger scale, greater emphasis on vehicular experience than with internal gateways.

Civic Boulevards: These are the key vehicular routes people use to travel through or to districts and neighborhoods. These road corridors should be a priority for improvements to vehicular and pedestrian functioning and safety, and for general streetscape improvements such as street trees, street lighting, landscaping, signage and pedestrian sidewalks, building orientation, and the location of on-street parking. They have been identified as civic boulevards due to the prominent role they play in carrying people into the city and therefore creating an image of the city. The urban design framework plan identifies the following arterials as civic boulevards: the full length of Bridgeport Way ~~from I-5 to Steilacoom Boulevard~~, Gravelly Lake Drive from Nyanza Boulevard to Steilacoom Boulevard, 100th Street from South Tacoma Way to Gravelly Lake Drive, and the entirety of S. Tacoma Way and Pacific Highway Southwest, the entire length of Steilacoom Blvd., Veterans Drive from Vernon Ave. to Gravelly Lake Drive, Washington Blvd. from Military Road to Gravelly Lake Drive, and Military Road from 107th Ave. to Washington Blvd, as well as N. Thorne Lane and~~,~~ Union Avenue~~, and Spruce Street~~ in Tillicum (Table 4.2).

Table 4.2: Civic Boulevards.

Civic Boulevards	Locations
Bridgeport Way	Full length
Gravelly Lake Drive	from Nyanza Boulevard to Steilacoom Boulevard
100th Street	from South Tacoma Way to Gravelly Lake Drive

S. Tacoma Way/ Pacific Hwy SW	All (except So. Tac. Way extension)
N. Thorne Lane	from I-5 to Union Avenue
Union Avenue	from N. Thorne Lane to Berkeley Street
Veterans Drive	Vernon Ave SW to Gravelly Lake Drive
Steilacoom Blvd SW	South Tacoma Way to Far West Drive
Washington Blvd.	Military Road to Gravelly Lake Drive
Military Road	107th Avenue to Washington Blvd.

Key Pedestrian Streets or Trails ("Green Streets"): This term identifies streets that function as preferred pedestrian routes between nodes of activity, trails that link open space areas, or streets with a distinctive pedestrian oriented character, such as a shopping street. Key pedestrian streets should have wide sidewalks; streetscape features such as street trees, benches, way-finding signage, and pedestrian-oriented street lighting; and safe street crossings. The framework plan identifies pedestrian-friendly green streets in several areas including the CBD where they are important to create a downtown atmosphere. Lastly, Lakewood's Legacy P~~p~~arks ~~p~~Plan identifies a system of off-street trails to be developed that link the city's major open spaces.

Table 4.3: Key Pedestrian Routes.

Green Streets	Neighborhood	Extents
83rd Ave.	Oakbrook	Steilacoom Blvd. to Garnett
Onyx Drive	Oakbrook	Oakbrook Park to 87th Ave.
Phillips Road	Oakbrook	Steilacoom Blvd. to 81st St.
87th Ave SW	Oakbrook	Onyx Drive to Fort Steilacoom Park
Hipkins Road		104th to Steilacoom Blvd.
Lakewood Town Center	CBD	Various pedestrian links within LTC property
Lakewood Drive	CBD	Bridgeport Way to Steilacoom Blvd.
Steilacoom Blvd.	CBD	Lakeview Drive to 63rd Ave.
63rd Ave.	CBD	Steilacoom Blvd. to Motor Ave.
Motor Avenue	CBD	Gravelly Lake Dr. to Whitman
72nd Ave.	Lakewood Center	Steilacoom Blvd. to Waverly Dr.
Waverly Drive	Lakewood Center	72nd Ave. to Hill Grove Lane
Hill Grove Lane	Lakewood Center	Waverly Drive to Mt. Tacoma Drive

Mt. Tahoma Drive	Lakewood Center	Dekoven to Bridgeport Way
108th Street	Lakeview	Pacific Hwy. to Davisson Road
Kendrick Street	Lakeview	Entire length
San Francisco Ave.	Springbrook	Bridgeport Way to 49th Ave.
49th Ave.	Springbrook	San Francisco Ave. to 127th St.
127th St.	Springbrook	49th Ave. to 47th Ave.
Bridgeport Way	Springbrook	123rd St. to McChord Gate
123rd St.	Springbrook	Entire length
47th Ave.	Springbrook	From Pacific Hwy. SW to 127th St.
Washington Ave.	Tillicum	W. Thorne Lane to N. Thorne Lane
Maple Street	Tillicum	Entire length
Custer Road	Flett	Bridgeport Way to Lakewood Drive

Gateways: Gateways are the major access points and entrances to a city. They contribute to the public's mental image of a city and provide people with clues to wayfinding and orientation. This function can be strengthened by making them more memorable and identifiable through special design features such as landscaping, signage, lighting, paving patterns, and architectural treatment. A summary of proposed internal and external gateways is identified in Table 4.4. Most external gateways in the plan are along I-5, with several located at the city's northern and western boundaries. Three internal gateways are recognized in the area of the CBD: the intersections of 100th Street and Lakewood Boulevard at Bridgeport Way; 100th Street at Gravelly Lake Boulevard; and most importantly, Gravelly Lake Boulevard at Bridgeport Way.

Table 4.4: Gateways.

Internal Gateways	Locations
Gravelly Lake Drive	At Bridgeport Way
Intersections of 100th Street and Lakewood Boulevard	At Bridgeport Way
100th Street	At Gravelly Lake Drive
External Gateways	
Union Ave	Fort Lewis Gate
Union Ave	Thorne Lane
Bridgeport Way	Pacific Highway SW
South Tacoma Way/ Pacific Highway SW	SR 512 Interchange
84th Street	I-5 Interchange
Bridgeport Way	Leach Creek (University Place border)

Steilacoom Blvd.	Town of Steilacoom border
South Tacoma Way	80th Street (Tacoma border)
Nyanza Boulevard	I-5 Interchange

4.4 Citywide Urban Design Framework Plan

With incorporation, Lakewood inherited an established system of transportation and open space networks. With improvement, they can help fulfill the citizens' desire for a better regional image, more attractive gateways into the city, better pedestrian and bicycle accommodations, and better access to natural and recreation areas. A citywide urban design framework plan illustrating these design components is shown in Figure 4.1. This framework plan focuses on the following main elements.

Landmarks: Landmarks are reference points in or outside the city. They help orient people and create the city's identity. Lakewood landmarks identified in this plan include:

- Colonial Center
- Flett House
- Boatman-Ainsworth
- Settlers Cemetery
- Fort Steilacoom
- Thornewood Manor House
- Lakewood Mall
- Lakewold Gardens
- Lake Steilacoom Bridge
- City Hall*
- Lakewood Station*

* potential future landmarks

Although they have no official protected status at this time, landmarks serve as important catalysts for neighborhood building. The plan also shows the opportunity to create several new landmarks with the recent~~careful~~ development of a new~~the~~ City Hall and ~~future development of~~ Lakewood Station.

Activity Nodes: Activity nodes are key destinations that attract human activity such as employment, shopping, civic functions, and public open spaces such as parks. These areas are usually memorable places in the minds of residents. No attempt was made to identify activity nodes in the framework plan, as they are widespread and varied in nature. However, among the most prominent are the three identified as urban design focus areas (the Central Business District, Lakewood Station, and Tillicum)~~,~~ which are shown on Figure 4.1, and discussed in depth in Section 4.5. Activity nodes should be distributed to provide residents with access to personal services and groceries within reasonable walking/biking distance in their own neighborhoods.

Open Space/Parks/Landscape Buffers: Open spaces, parks, and landscaped buffers contribute to a city's image, provide a public amenity, and offer visual relief from the built environment. Major open spaces such as Seeley Lake, the Flett Wetlands, or the beach park at Harry Todd Park in Tillicum are existing open space areas that contribute to the quality of Lakewood's urban environment. New open space amenities should be developed as part of new commercial development and public facilities to add to the network of parks and open spaces within the city. These may be small pocket parks, civic plazas, green corridors, buffers, or habitat restoration.

Figure 4.1

(insert Figure 4.1)

4.5 Focus Area Urban Design Plans

Three areas of the city were selected for a focused review of urban design needs: the CBD, the Lakewood Station district, and Tillicum. These areas were singled out for their prominence, for the degree of anticipated change, and for the rich mixture of land uses within a limited space, calling for a higher level of urban design treatment. Each area is discussed in terms of a vision for that area, its needs, and proposed actions to fulfill those needs and realize the vision. A graphic that places those identified needs and proposed actions in context accompanies the discussion.

4.5.1 Central Business District

A major goal of this comprehensive plan is to create a downtown in the CBD, redeveloping it into a rich urban area with civic amenities, walkable streets, and a mix of uses including housing, entertainment, restaurants, and retail. The CBD has significant economic assets such as the Lakewood Towne Center~~Mall~~, historic and cultural assets such as the Colonial Center, nearby open space assets such as Seeley Lake, civic assets such as Clover Park High School and ~~the future~~ City Hall, and other major retail and entertainment assets. There is a strong street pattern, including the intersection of three of the city's major civic boulevards: Bridgeport Way, Gravelly Lake Drive, and 100th Street.

To create a downtown atmosphere, a number of land use and infrastructure changes will be needed, including:

- intensification of land use within the CBD, including some higher density residential infill;
- development of more urban civic amenities, including park space, civic plazas, and recreation opportunities;
- establishment of pedestrian linkages between the Colonial Center and Lakewood Towne Center~~the Mall~~; and
- creation of an urban streetscape with pedestrian-oriented spaces, buildings that define street edges, and high quality design in the streetscape.

Key to this vision for the CBD is continuation of the successful and creative evolution of ~~the~~ Lakewood ~~Mall~~Towne Center. Specific actions the City can take in support of ~~Mall~~ this redevelopment include ~~appropriate design of the new City Hall within the Mall site;~~ assistance with strengthening the street grid within the CBD, including specific streetscape improvements along major civic boulevards; good transportation planning, including a strong transit link between the CBD and the new commuter rail station; and good land-use planning, working with the development community to promote residential growth within the CBD where it is close to available jobs and services.

The urban design framework plan depicting some of the potential land-use and urban design changes in the CBD is shown in Figure 4.2. Some of the specific urban design actions shown in that figure that may occur as the CBD develops are as follows:

Landmarks/Activity Nodes: Streetscape enhancements to the intersection of Gravelly Lake Drive and Bridgeport Way would create a positive image of the city, with new landscaping, crosswalks, signal poles, central island, signage, and other treatments. ~~The new City Hall could include an integrated park/plaza with useable performance space.~~

Civic Boulevards: The framework plan identifies various safety and image-oriented streetscape improvements to Bridgeport Way, Gravelly Lake Drive, and 100th Street, including the use of landscaped medians in the current turning lanes, crosswalks, undergrounding of utilities, and general aesthetic improvements. Improvements to the intersection of Bridgeport Way with Lakewood Boulevard and 100th Street would improve visibility and access to the ~~Mall~~Towne Center.

Green Streets: For the network of pedestrian-oriented streets identified in between the Colonial Center and the ~~Lakewood Mall~~Towne Center, improvements would be made to increase pedestrian interest and safety, such as curb ramps, street trees, crosswalks, and lighting.

Open Space: Improved access and recreational opportunities are shown for Seeley Lake Park. ~~A new park/plaza could be developed in conjunction with City Hall, providing new open space in the CBD.~~ The development of smaller urban parks within the CBD could occur through density bonuses to private developers in exchange for development of public open space. Integrated park/plaza spaces are a priority in the CBD, particularly in the Towne Center and Colonial Center areas. Such spaces should provide for the display of public art, other cultural and festive celebration, and for visitors and workers to relax and enjoy.

{Insert Figure 4.2}

4.5.2 Lakewood Station District

Development of the Sound Transit commuter rail station ("Lakewood Sounder Station") on Pacific Highway Southwest represents a major investment of public funds in Lakewood. It also presents the potential for major land use change as the private market responds to the opportunities presented by increased transportation options. The comprehensive plan defines the Lakewood Station district as a transit-oriented neighborhood with higher density residential uses, medically oriented businesses, and other commercial uses responding to increased transportation access in the area.

The commuter rail station ~~will~~ combines a ~~Pierce Transit~~substantial park-and-ride lot and transit transfer center ~~along~~ with the rail station to create a multi-modal transportation hub. ~~The station's design must be harmonious with development of an adjacent high-density residential neighborhood separated by only the railroad tracks and a minor street. The design should include an attractive streetscape and incorporate features that make it a good neighbor.~~ Parking for a large number of vehicles, as well as improved transit and pedestrian access, will assist in the transformation and redevelopment potential for the commercial corridor along Pacific Highway Southwest. ~~Design features should include such elements as street-level commercial uses integrated into the façade of the parking structure, safe pedestrian connections across the tracks, as well as through the extensive parking lots associated with the rail station, and attractive open spaces containing significant landscaping.~~ A newly constructed pedestrian bridge and pedestrian amenities on Kendrick Street to the north of the Sounder Station, together with high-density multi-family residential zoning set the stage for redevelopment of the area with transit –oriented residential development. ~~Features such as wet stormwater detention ponds for parking lot runoff and preservation of the existing Garry oak stands north of the planned station location can become part of the public open space structure.~~ New sidewalks and streetscape elements such as lighting and landscaping will improve the visual quality and public safety of the area around the station.

Other changes envisioned within the Lakewood Station district include:

- the strengthening and completion of the street grid north of St. Clare Hospital and east of Bridgeport Way;
- development of an open space corridor adjacent to the railroad tracks as part of a greater citywide system; and
- expansion of the street grid in Springbrook to allow for connections between 47th Street and Bridgeport Way.
- Provide for enhanced bicycle routes and facilities as part of this multi-modal transportation hub.

The urban design framework plan graphic depicting some of the potential land-use and urban design changes in the Lakewood Station area is shown in Figure 4.3. Some of the specific urban design actions shown which may occur as the Lakewood Station district develops over the next 20 years are as follows:

Landmarks/Activity Nodes: The Bridgeport Way intersection with I-5, arguably the most important and visible access point into the city, would be redeveloped and landscaped into a graceful entrance on both sides of Pacific Highway Southwest. The commuter rail station and related architecture, including the garage structure, could present a memorable regional image, while simultaneously functioning to mediate the transition in scale between the station and the neighborhood to the north.

Civic Boulevards: Bridgeport Way, Pacific Highway Southwest, and 112th Street would receive various safety and image-oriented streetscape improvements, including the use of landscaped medians in the current turning lanes, improved crosswalks, undergrounding of utilities, and general aesthetic improvements. The intersection of Bridgeport Way with Pacific Highway Southwest in particular is suited for potential improvements related to creating a positive gateway image for Lakewood.

Green Streets: Several important pedestrian connections would be made along existing streets to increase pedestrian interest and safety, including curb ramps, street trees, crosswalks, lighting, and other improvements. A pedestrian connection along Kendrick Street, which acts as a spine connecting the commuter rail station to Lakeview School, would facilitate use of the playground as a neighborhood park. Another important connection between the station area and Springbrook could be made through improvements along 47th Avenue, including the bridge, which could become a significant second access point to Springbrook.

Open Space: A number of significant public open space opportunities could be realized in the course of station area development. Stormwater retention facilities developed in conjunction with the station ~~park-and-ride lots~~ would provide open space, as would the proposed linear park developed adjacent the Burlington Northern ROW. One or more small pocket parks could be developed in conjunction with future development. Freeway buffers along the I-5, primarily on the east side, would create additional green space.

{Insert Figure 4.3}

4.5.3 Tillicum

The Tillicum neighborhood functions as a separate small village within Lakewood. Accessible only by freeway ramps at the north and south end of the area, it has its own commercial sector; moderately dense residential development; and an elementary school, library, and park. Tillicum is a very walkable neighborhood with a tight street grid and relatively low speed traffic. Harry Todd Park is one of the largest City-owned parks, and Tillicum is one of the few neighborhoods in the city with public waterfront access.

In public meetings discussing alternative plans for the city, Tillicum emerged as a neighborhood viewed as

having significant potential for residential growth over the next 20 years. With a traditional street grid, significant public open space and lake access, and strong regional transportation connections, there is a major opportunity for Tillicum to evolve into a more urban, pedestrian and bicycle-oriented community. This is further enhanced by the long-range potential for a commuter rail station and new highway connection to the east.

~~A significant constraint to realizing this vision is the lack of sewers in Tillicum. Extension of the sewer to Tillicum would be very expensive, with the cost of the distribution system through the streets being the most costly aspect. The City is committed to the sewering of Tillicum by 2017; however, sewer extension is dependent on the successful redevelopment of American Lake Gardens as an industrial area, including private development of sewers east of I-5. T~~ Because of recent extension of sewer service to the area, the development of multi-family housing in Tillicum ~~will not be~~ is now possible ~~until sewer hookups are available~~. In addition to sewer development, there are other actions the City can take in support of the development of multi-family housing in Tillicum including: development of a long-range plan for Harry Todd Park and implementation of specific improvements to expand ~~its~~ sewer capacity;

- development of a pedestrian connection between the park and commercial district along Maple Street, with sidewalks, curb ramps, crosswalks, lighting, and other improvements;
- improvements at the I-5 interchanges to create attractive, welcoming gateways; and
- a pedestrian/bikeway easement north along the railroad or through the country club to other portions of Lakewood.

The proposal by Amtrak to locate high-speed passenger rail service through the area (the Point Definace Bypass project) will result in significant modifications to the freeway interchanges in Tillicum. These modifications should be designed in conjunction with improvements to I-5 to address congestion.

The urban design framework plan for Tillicum is shown in Figure 4.4. Some of the specific urban design actions which could be undertaken in Tillicum include:

Landmark/Activity Nodes: The northern entrance into Tillicum, as well as the only entrance into ~~American Lake Gardens~~ Woodbrook, is at the Thorne Lane overpass and I-5. It would be improved as a civic gateway, with landscaping, road improvements, signage, and other elements as needed. This interchange may be significantly redesigned in conjunction with the Point Defiance Bypass and I-5 congestion management projects.

Civic Boulevards: As the main entrance road into Tillicum and the perimeter road embracing multi-family development, Thorne Lane would be improved as a civic boulevard. Development intensification in Tillicum would occur east of Thorne Lane, with W. Thorne Lane marking the initial southern boundary of the sewer extension to keep costs in check. Potential improvements of Union Street in support of commercial functions would include such elements as pedestrian improvements, parking, landscaping, lighting, and other functional items. Long-range planning would also identify site requirements for the ~~potential~~ planned future commuter rail stop and propose~~s~~ a strategy~~ies~~ to fulfill ~~these~~ this need ~~needs~~.

Green Streets: Maple Street would be improved as a green street to provide a pedestrian-oriented connection between ~~the lake~~ American Lake and Harry Todd Park at one end, and the commercial district/future rail station at the other. In between, it would also serve the school and the library. It would serve as a natural spine, gathering pedestrian traffic from the surrounding blocks of multi-family housing and providing safe access to recreation, shopping, and public transportation.

Open Space: Harry Todd Park would be improved by upgrading existing recreation facilities and constructing additional day use facilities such as picnic shelters and restrooms. A ~~regional biking/hiking trail connecting~~ local connection between Tillicum ~~to~~ and the Ponders Corner area could be built along an easement granted by various landowners, principally the Tacoma Country and Golf Club and Sound Transit/ Burlington Northern Railroad.

{Insert Figure 4.4}

4.6 Goals and Policies

GOAL UD-1: Design streets and associated amenities so that they are an asset to the city.

Policies:

UD-1.1: Provide attractive streetscapes with street trees and sidewalks, planting strips, shelters, benches, and pedestrian-scale lighting in appropriate locations.

UD-1.2: Clearly define and consistently apply a reasonable threshold for requiring developer improvements in development regulations.

UD-1.3: Require sidewalks on both sides of all new streets, except local access streets in industrially designated areas that are not on existing or planned transit routes and where there is a low projected level of pedestrian traffic.

UD-1.4: Design intersections to safely accommodate both pedestrian and vehicular traffic. Construct intersections with the minimum dimensions necessary to maintain LOSs and to meet emergency services needs, discouraging the construction of turning lanes where they would deter pedestrians.

UD-1.5: Develop and apply appropriate traffic-calming tools to control traffic volume and speed through identified neighborhoods.

UD-1.6: Work with transit providers to incorporate transit stops and facilities at appropriate intervals along transit routes.

UD-1-7: Include curb ramps for sidewalks at all intersections to assist wheelchairs, strollers, and cyclists.

GOAL UD-2: Establish a system of gateways and civic boulevards to provide identity to the city, foster appropriate commercial uses, and enhance the aesthetic character of the city.

Policies:

UD-2.1: Identify streets to be treated as civic boulevards and provide appropriate design improvements.

UD-2.2: Identify intersections to be treated as major gateways and provide appropriate design improvements.

GOAL UD-3: Employ design standards to ease the transition of scale and intensity between abutting residential uses and between residential areas and other uses.

Policies:

UD-3.1: Use buffers, landscaping, and building design and placement to ease the transition of scale and intensity between abutting residential uses of different densities and between residential areas and other uses.

UD-3.2 Work with WSDOT to identify solutions to buffering the visual and acoustic impacts of I-5 and the railroad on sensitive neighborhoods.

GOAL UD-4: Employ design standards to improve the auto-dominant atmosphere that dominates commercial corridors.

UD-4.1 Encourage the redevelopment of streets, bicycle paths, transit stops, street trees, and sidewalks along commercial corridors.

UD-4.2 Reduce the number and width of curb cuts and surface parking lots fronting on commercial streets.

UD-4.3 Establish building design and signage standards and guidelines to provide a unified, attractive character to commercial corridors.

UD-4.4 Promote individual neighborhood character in areas such as the International District.

GOAL UD-5: Establish a system of gateways and civic boulevards to provide identity to the city, foster appropriate commercial uses, and enhance the aesthetic character of the city.

Policies:

UD-5.1: Provide appropriate design improvements to treat the following streets as civic boulevards:

- the full length of Bridgeport Way ~~from I-5 to Steilacoom Boulevard~~;
- Gravelly Lake Drive from Nyanza Road to Steilacoom Boulevard;
- 100th Street from Gravelly Lake Drive to S. Tacoma Way;
- S. Tacoma Way and Pacific Highway Southwest from the Tacoma city limits to Ponders Corner;
- 112th Street from Nyanza Road to Bridgeport Way;
- N. Thorne Lane from I-5 to Portland Street;
- W. Thorne Lane between Portland Street and Union Avenue;
- Portland Street between N. Thorne Lane and W. Thorne Lane;
- Union Avenue from Berkeley Avenue to Spruce Street; and
- Spruce Street from Union Avenue to Portland Avenue.

UD-5.2: Provide appropriate design improvements to treat the following intersections as major gateways:

- South Tacoma Way at Tacoma city limits;
- 84th Street at I-5;
- SR 512/I-5 at South Tacoma Way;
- Bridgeport Way at South Tacoma Way/I-5;
- Nyanza Boulevard at I-5;
- N. Thorne Lane at I-5;
- Steilacoom Boulevard at city limits;
- Berkeley Avenue SW at I-5;
- Bridgeport Way at University Place city limits;
- Bridgeport Way at Gravelly Lake Drive;
- 100th Street at Gravelly Lake Drive; and
- 100th Street at Bridgeport Way.

GOAL UD-6: Create distinct districts for commercial activity and promote character and improved aesthetic standards.

Policies:

UD-6.1: Establish design standards for commercial districts implemented through a design review process and design guidelines to reinforce a distinct character for individual commercial districts.

UD-6.2: Develop and enforce parking lot design standards, identifying requirements for landscaping, walkways, runoff treatment, parking area ratios, and other elements as needed.

GOAL UD-7: Promote pedestrian-oriented development patterns within designated mixed-use commercial districts.

Policies:

UD-7.1: Foster pedestrian-oriented site design measures including items such as pedestrian amenities, pedestrian-oriented lighting, traffic calming devices, signage, and related measures.

UD-7.2: Encourage the development of office and housing uses above retail in appropriate land-use designations to permit living and working in the same neighborhood.

UD-7.3: Encourage the development of appropriately scaled commercial development that creates consistent street walls and limits parking on the primary street frontage.

UD-7.4: Encourage pedestrian connections between buildings and across streets to public open space, and to adjoining areas.

UD-7.5: Promote pedestrian linkages between mixed use districts and related neighborhoods through development of a green streets program.

UD-7.6: Promote pedestrian linkages between mixed use districts and the existing open space network.

GOAL UD-8: Develop the design of the CBD to support its role as Lakewood's downtown.

Policies:

UD-8.1: Develop a sub-area plan for the entire CBD area, paying attention to the integration of Lakewood Towne Center with the remainder of the CBD. ~~partnership arrangement with the Lakewood Mall to reestablish its viability, in recognition of its importance to the city and its economy.~~

UD-8.2: Continue to f~~F~~oster transformation of the former mall to provide better public visibility; create additional public rights-of-way; and potentially develop entertainment, housing, visitor-serving, and open space uses.

UD-8.3: Promote design elements that ~~reinforce and~~ enhance the distinctive character of the Colonial Center ~~and~~while enabling contemporary urban design in the CBD overall.

UD-8.4: Maintain a pedestrian-orientation in building, site, and street design and development in the CBD.

UD-8.5: Promote urban amenities throughout the CBD and on individual sites.

GOAL UD-9: Create a livable, transit-oriented community within the Lakewood Station district through application of urban design principles.

Policies:

UD-9.1: Provide for pedestrian and bicycle connectivity within the Lakewood Station district to the commuter rail station.

UD-9.2: Identify the opportunities for additional public/semi-public green space in the Lakewood Station district. (see Policy LU25.3 regarding bonus densities).

UD-9.3: Improve identified civic boulevards, gateways, and green streets within the Lakewood Station district to provide a unifying and distinctive character.

UD-9.4: Establish the intersection of Pacific Highway Southwest and Bridgeport Way as a major gateway into the city and develop a landscaping treatment to enhance the city's image at this gateway.

UD-9.5 Develop a sub-area plan to serve as the framework plan for developing the Lakewood Station district. Incorporate site and architectural design measures to coordinate consistency of private and public development.

GOAL UD-10: Promote the evolution of Tillicum into a vital higher density pedestrian-oriented neighborhood through application of urban design principles.

Policies:

UD-10.1: Identify opportunities for additional public/semi-public green space in Tillicum.

UD-10.2: Provide opportunities for pedestrian and bicycle connections from Tillicum to other portions of Lakewood.

UD-10.3: Improve identified civic boulevards, gateways, and green streets within Tillicum to provide a unifying and distinctive character.

GOAL UD-11: Reduce crime and improve public safety through site design and urban design.

Policies:

UD-11.1: Reduce crime opportunities through the application of crime prevention through environmental design (CPTED) principles.

UD-11.2: Consolidate parking lot access onto major arterials where appropriate to promote public safety.

GOAL UD-12: Facilitate implementation of gateway enhancement programs in Tillicum, Springbrook, and Woodbrook ~~American Lake Gardens~~.

Policies:

UD-12.1: Establish a program to design and implement a gateway enhancement plan at the entrances to each

neighborhood.

UD-12.2: Work with private and public property owners and organizations to create and implement the gateway plans.

UD-12.3: Work with the WSDOT or successor agency to facilitate the future incorporation of sound barriers adjacent to these communities along I-5 to reduce noise impacts to residential areas.

GOAL UD-13: Provide funding for urban design and open space improvements necessary for maintenance and improvement of the quality -of life in Lakewood.

Policies:

UD-13.1: Identify and seek potential outside funding sources such as grants, regional and state partnerships, and others to implement identified urban design and open space improvements.

UD-13.2: Develop a strategy to partially fund urban design and open space improvements from local sources, which may include sources such as local improvement districts, developer impact fees, bond measures, and others.

GOAL UD-14: Recognize the value of scenic views and visual resources as contributors to Lakewood's character and the quality of life.

Policies:

UD-14.1: Develop a program to identify and protect sensitive views, view corridors, and/or visual resources.

UD-14.2: Make views of Mt. Rainier, the lakes, wetlands and creeks, Ft. Steilacoom, Flett Wetlands, and historic landmarks from public sites a priority for protection.

GOAL UD-15: Substantially increase walking and cycling activity while at the same time reducing collisions involving cyclists and pedestrians. The federal government and the State of Washington seek to double walking and cycling activity over the planning horizon, while at the same time reducing collisions involving cyclists and pedestrians by 5% per year.

Policies:

UD-15.1 Refer to the National Association of City Transportation Officials (NACTO) *Urban Street Design Guide* and *Urban Bikeway Design Guide* in the design of streets and non-motorized pathway projects.

UD15.2 Consider endorsement or adoption of the NACTO Urban Street and Urban Bikeway design guides.

6.0 TRANSPORTATION

Note: The goals and policies contained in this section are based upon technical information contained in the Transportation Background Report. The Background Report provides transportation information on existing transportation facilities, travel forecast data, transportation systems plans, and options for implementation. The Background Report is supplementary to the Transportation Element (this document) which contains the City's transportation goals and policies.

6.1 Introduction and Purpose

By the year 2030, traffic congestion on freeways and arterial roadways within the region is projected to be far more extensive, resulting in longer travel delays. Lakewood shares the region's transportation woes since it is part of the regional transportation system and integrally connected to systems of adjacent jurisdictions. Lakewood currently experiences traffic congestion around its freeway interchanges and some principal arterial streets.

There are many causes of increased traffic congestion within Lakewood, including:

- Annual vehicle miles traveled growing at a faster rate than population or employment growth.
- An increase in the number of two-wage-earner households.
- An historical decline in transit use as a percentage of overall trips.
- Road improvements have not kept pace with traffic volume for environmental, financial, and community character reasons.

To correct some of the problems contributing to these conditions, Lakewood must develop and maintain a balanced multimodal transportation system that integrates the local transportation network with the regional transportation system and supports land use goals and policies.

This chapter addresses the connection between transportation and land use; establishes means to increase travel options; describes desirable characteristics of transportation facility and design; and addresses connectivity, access, traffic management, maintenance, and amenities for transportation improvements. The general principles underlying the transportation chapter include:

- Promote safe, efficient, and convenient access to transportation systems for all people.
- Recognize transit, bicycling, and walking as fundamental modes of transportation of equal importance compared to driving when making transportation decisions.
- Create a transportation system that contributes to quality of life and civic identity in Lakewood.
- Reduce mobile source emissions to improve air quality.
- Integrate transportation-oriented uses and facilities with land uses in a way that supports the City's land use as well as transportation goals.
- Increase mobility options by actions that diminish dependency on SOVs.
- Focus on the movement of both people and goods.

This chapter covers all areas within Lakewood's city limits and will be expanded to ensure that consideration is given to urban growth areas as they are brought into the city. The transportation goals and policies included here are based on local priorities but are also coordinated with the comprehensive plans of neighboring cities such as University Place and Tacoma, and that of Pierce County. The proposals within this transportation chapter are consistent with neighboring jurisdiction plans and will positively contribute to the region's transportation system.

Travel forecasts and financial strategies are included in the Transportation Background Report.

The challenge of developing Lakewood's future transportation system will be to strike a balance between accommodating increased traffic demand and maintaining community character. Developing a transportation system that enhances Lakewood's neighborhoods while providing effective mobility for people, goods, and services through multiple travel modes is a primary focus of this chapter. There are a number of considerations related to transportation in Lakewood:

Physical Features. Natural obstacles, especially American Lake, Gravelly Lake, and Lake Steilacoom, constrict traffic flow between the east and west halves of the city to a few arterial connections.

Existing Patterns. Lakewood's road network has evolved in a pattern typical of suburban sprawl. A few principal roadways connect a network largely composed of otherwise unconnected cul-de-sacs. Because of the city's geographic location and presence of natural features and military reservations, I-5 and SR 512 form primary connections with the rest of the region.

Alternative Modes. There are few realistic alternatives to driving for most people in Lakewood. The City's incomplete bicycle and pedestrian network does not provide safe links between most commercial areas, schools, community facilities, and residential neighborhoods. Alternative motorized modes include local and regional transit connections provided by Pierce Transit. Intercity Transit and Sound Transit systems will improve connectivity as commuter rail service is established.

6.1.1 Arterial Street Classifications

Street classifications are defined in Figure 6.1.

6.2 General Transportation Goals and Policies

GOAL T-1: Apply the street functional classification system and transportation design standards in the construction of new or upgraded transportation infrastructure.

Policy:

T-1.1: Define all streets according to the following criteria:

- Principal arterials are roadways that provide access to principal centers of activity. These roadways serve as corridors between principal suburban centers, larger communities, and between major trip generators inside and outside the plan area. Service to abutting land is subordinate to travel service to major traffic movements. The principal transportation corridors within the City of Lakewood are principal arterials. These roadways typically have daily volumes of 15,000 vehicles or more.

- Minor arterials are intra-community roadways connecting community centers with principal arterials. They provide service to medium-size trip generators, such as commercial developments, high schools and some junior high/grade schools, warehousing areas, active parks and ballfields, and other land uses with similar trip generation potential. These roadways place more emphasis on land access than do principal arterials and offer lower traffic mobility. In general, minor arterials serve trips of moderate length, and have volumes of 5,000 to 20,000 vehicles per day.

- Collector arterials connect residential neighborhoods with smaller community centers and facilities as well as provide access to the minor and principal arterial system. These roadways provide both land access and traffic circulation within these neighborhoods and facilities. Collector arterials typically have volumes of 2,000 to 8,000 vehicles per day.

- Local access roads include all non-arterial public city roads and private roads used for providing direct access to individual residential or commercial properties. Service to through traffic movement usually is deliberately discouraged.

Figure 6.1 – Arterial Street Classification

T-1.2: Design transportation facilities to fit within the context of the built or natural environments in which they are located.

T-1.3: Adopt a street light placement policy that establishes the level and type of lighting that must be provided in conjunction with new development and redevelopment, including pedestrian-oriented lighting in targeted areas.

GOAL T-2: Maintain maximum consistency with state, regional, and local plans and projects.

Policies:

T-2.1: Coordinate with the state, county, adjacent jurisdictions, and transit providers to ensure consistency between transportation improvements, land-use plans, and decisions of the City and other entities, consistent with PSRC's Regional Growth Strategy. Priority shall be given to funding for transportation infrastructure and capital facilities investments in the City's designated Regional Growth Center and in designated Centers of Local Importance.

T-2.2: Continue to participate in regional transportation planning to develop and upgrade long-range transportation plans.

T-2.3: Periodically review the street classification system with adjacent jurisdictions to ensure consistency.

T-2.4: Support and actively participate in improvements to I-5 through Lakewood and JBLM, and pursue safe connections to the local community.

T-2.5: Work with WSDOT to identify and implement improvements to the I-5/SR 512 interchange.

GOAL T-3: Maximize transportation connections without negatively impacting residential areas.

Policies:

T-3.1: Delineate key street connections through undeveloped parcels to ensure that connections are made as development occurs.

T-3.2: Where practical, connect public streets to enable local traffic to circulate efficiently and to reduce impacts elsewhere in the transportation network.

T-3.3: Where practical, require new development to "stub out" access to adjacent undeveloped parcels to ensure future connectivity, indicating the future connection on the face of the plat, and (when possible) connect with existing road ends.

T-3.4: Accommodate pedestrian and bicycle connections where grades, right-of-way (ROW) widths, or other natural or built environment constraints have precluded street connections from being implemented.

GOAL T-4: Balance the need for property access with safety considerations.

Policies:

T-4.1: Limit access as necessary to maintain safe and efficient operation of the existing street system while allowing reasonable access to individual parcels.

T-4.2: Limit direct access onto arterials when access opportunities via another route exist.

T-4.3: Provide for full access to parcels abutting local residential streets, except where adequate alley access exists to individual lots.

T-4.4: Discourage abandonment of alleys.

T-4.5: Work with adjacent jurisdictions to establish consistent access limitations to arterials and highways of regional transportation importance.

T-4.6: Ensure emergency responders have efficient access to public and private properties.

GOAL T-5: Manage traffic to minimize its impact on neighborhoods, mobility, and enterprise.

Policies:

T-5.1: Maintain optimal traffic signal timing and synchronization along arterials and other principal transportation routes to ensure smooth traffic flow as well as pedestrian safety at crossings.

T-5.2: Prior to any street reclassifications, conduct an analysis of existing street configurations, land uses, subdivision patterns, location(s) of structure(s), impact on neighborhoods, and transportation network needs.

T-5.3: Upgrading residential streets to collector and arterial classifications will be discouraged and will occur only when a significant community-wide need can be identified.

GOAL T-6: Reduce the impact of freight routing on residential and other sensitive land uses.

Policies:

T-6.1: Designate truck routes for freight.

T-6.2: Require new development and redevelopment to provide for freight loading and unloading on-site or in designated service alleys rather than in the public ROWs.

GOAL T-7: Sustain and protect the City's investment in the existing transportation network.

Policies:

T-7.1: Maintain streets at the lowest life cycle cost (the optimum level of street preservation required to protect the surfaces).

T-7.2: Maintain sidewalks to ensure continuous and safe connections.

T-7.3: Ensure predictable sources of income to maintain the transportation system.

GOAL T-8: Minimize visual and noise impacts of roadways on adjacent properties and other users.

Policies:

T-8.1: Create and apply standards for planting strips, including street trees, between road edges and sidewalks to be applied to various road classifications.

T-8.2: Create and apply standards for landscaped islands and medians to break up linear expanses.

GOAL T-9: Provide a balanced, multimodal transportation system that supports the safe and efficient movement of people and goods.

Policies:

T-9.1: Provide for the needs of drivers, public transportation vehicles and patrons, bicyclists, and pedestrians of all ages and abilities in the planning, programming, design, construction, reconstruction, operations, and maintenance of the City's transportation system.

T-9.2: Minimize the negative impacts of transportation improvement projects on low-income, minority, and special needs populations.

T-9.3: Ensure mobility choices for people with special transportation needs, including persons with disabilities, the elderly, the young, and low-income populations.

6.3 Transportation Demand and Systems Management

Transportation demand management (TDM) techniques include various mechanisms intended to influence people's choices about how they get from one place to another, with the goal of reducing vehicular travel demand on the road network, which subsequently reduces pollution and greenhouse gas emissions. Within Washington State, there is a statewide commute trip reduction (CTR) program that was initiated in 1991 to work with and assist employers in instituting TDM programs for their employees. These programs include measures such as parking management (making parking more difficult or expensive to obtain) ridesharing, telecommuting, and alternative work schedules. In addition, local governments can establish land-use regulations that foster the use of bike/pedestrian and transit modes.

Transportation systems management (TSM) refers to strategies that improve facility operations, traffic flow, or safety without adding lanes to increase capacity. TSM strategies are generally lower-cost improvements that do not typically involve major construction of new or expanded capital facilities.

GOAL T-10: Minimize the growth of traffic congestion to meet state, regional, and local environment and sustainability goals.

Policies:

T-10.1: Require TDM improvements serving pedestrians, bicyclists, and transit riders as impact mitigation for new development.

T-10.2: Where practical, retrofit existing streets to link neighborhoods and disperse neighborhood access to services.

T-10-3: Interconnect traffic signals to provide green light progressions through high-volume corridors to maximize traffic flow efficiency during peak commute periods.

T-10-4: Consider the negative effects of transportation infrastructure and operations on the climate and natural environment.

T-10-5: Support the development and implementation of a transportation system that is energy efficient and improves system performance.

GOAL T-11: Reduce dependence on SOV use during peak commute hours.

While the WSDOT, the State Department of General Administration (GA), and Pierce Transit have shared responsibility for implementing and managing the state and regional CTR programs, the City of

Lakewood can actively support and promote these programs. Beyond supporting the state's and Pierce Transit's work to implement CTR programs, the City of Lakewood should work closely with Pierce Transit, Pierce County and/or the GA to cooperatively implement CTR programs

Policies:

T-11.1: Establish CTR programs within major employer worksites as required by state law.

T-11.2: Work with Pierce Transit, Pierce County and major employers and institutions to coordinate and publicize CTR efforts.

T-11.3: Encourage employers not affected by the CTR law (less than 100 employees) to offer CTR programs to their employees on a voluntary basis and assist these employers with tapping into larger employers' ridematching/ridesharing and other HOV/transit incentive programs, where possible.

T-11.4: Encourage large employers to institute flex-hour or staggered-hour scheduling and compressed work weeks to reduce localized congestion during peak commute times.

T-11.5: Implement a local public awareness and education program designed to promote the environmental and social benefits of TDM strategies.

T-11.6: Work with local high schools to educate students about the social benefits of walking, biking, carpooling and riding transit to school.

T-11.7: Plan and implement arterial HOV improvements such as HOV lanes or transit-signal priority improvements at intersections to connect high-density employment centers with bus transit centers and commuter rail stations.

GOAL T-12: Decrease dependence on single-occupant vehicles (SOVs) as a primary means of transportation.

Policies:

T-12.1: Prevent automobiles from dominating neighborhood and central business districts, while still accommodating their use.

T-12.2: Maximize the availability of non-SOV transportation options to encourage people to use different modes.

T-12.3: Work with Pierce Transit to implement transit signal-priority systems that enhance the reliability of transit as an alternative transportation mode.

T-12.4: For the Lakewood Regional Growth Center, reduce the work-related SOV trip mode share from 83 percent (year 2010) to 70 percent by 2030 through coordinated improvements to HOV, transit, and non-motorized facilities within this area.

GOAL T-13: Develop and maintain collaborative working relationships with outside agencies to improve the transportation system.

Policies:

T-13.1: Involve appropriate agencies in the early review of development proposals to assess opportunities for transit-oriented design and amenities.

T-13.2: Support regional and high-capacity transit systems (e.g., buses and rail) that reliably and efficiently connect to local transit services.

T-13.3: Coordinate with transit agencies to provide facilities and services supportive of HOV use such as ridematching, provision of vanpool vehicles, on-demand services, shuttles, etc.

T-13.4: Coordinate with transit agencies to determine and respond to emerging routing and frequency needs, particularly in residential neighborhoods.

T-13.5: Work with transit agencies to develop design and placement criteria for shelters so that they best meet the needs of users and are a positive amenity.

T-13.6: Work with WSDOT to pursue HOV lanes on I-5 and SR 512 serving the city and regional transit operations.

T-13.7: Allocate staff resources to work with other transportation government agencies in drafting and submitting joint applications for state and federal transportation grants to support projects that benefit multiple jurisdictions.

T-13.8: Work with the Burlington Northern Santa Fe Railway, Sound Transit and other appropriate agencies to pursue funding for a grade separation at the 100th Street SW rail crossing.

T-13.9: Explore local shuttle service between high density areas within the urban center such as the Lakewood Station district, Lakewood Towne Center, the Sound Transit commuter rail station, the Colonial Center, and other high-density developments with high transit ridership potential.

T-13.10: Encourage ridesharing through requirements for parking reserved for carpool and vanpool vehicles in the zoning code.

T-13.11: Coordinate with service providers and other utilities using rights-of-way on the timing of improvements to reduce impacts to communities and to lower the cost of improvements.

T-13.12: Work with Sound Transit and WSDOT to pursue expansion of the existing SR-512 park-and-ride facility.

T-13.13: Work with Pierce Transit to monitor transit service performance standards and to focus service expansion along high-volume corridors connecting high-density development centers with intermodal transfer points.

GOAL T-14: Provide safe, convenient, inviting routes for bicyclists and pedestrians (see adopted Non-Motorized Transportation Plan).

Policies:

T-14.1: Implement and place a high importance on projects identified in the City's Non-Motorized Transportation Plan that serve and connect high density areas, major employers, schools, parks, shopping areas, and other popular destinations.

T-14.2: Promote and improve public bicycle and pedestrian connections to achieve greater connectivity.

T-14.3: Balance the desirability of breaking up large blocks with midblock crossings with the safety needs of pedestrians.

T-14.4: Require the incorporation of non-motorized facilities including bicycle parking, pedestrian-scale lighting, benches, and trash receptacles into new development designs.

T-14.5: Work with transit providers to provide bike racks and/or lockers at key transit stops and require them as condition of new development.

T-14.6: Coordinate with adjacent jurisdictions to design for coherent bike and pedestrian corridors.

T-14.7: Adopt a “Complete Streets” ordinance.

T-14.8: Take positive steps to improve traffic safety at high accident and/or injury locations.

6.4 Parking

Parking in Lakewood primarily exists in surface parking lots to support commercial, office, light industrial, and multi-family residential areas. There is an abundant supply of parking in most of these areas. While adequate parking is critical to any type of development, an oversupply of parking wastes resources and encourages a continuation of auto-oriented travel. Therefore, the parking goals and policies balance these two conflicting outcomes.

GOAL T-15: Provide adequate parking that serves Lakewood's needs but does not encourage a continuation of auto-oriented development and travel patterns.

Policies:

T-15.1: Develop and implement reasonable and flexible parking standards for various types of land uses that balance the need for providing sufficient parking with the desirability of reducing commute traffic.

T-15.2: Consider parking standards that support TDM efforts.

T-15.3: Allow adjacent or nearby uses that have different peak parking demands such as employment and housing to facilitate shared parking spaces.

T-15.4: Recognize the capacity of transit service in establishing parking standards.

T-15.5: Develop and enforce parking lot design standards, identifying requirements for landscaping, walkways, runoff treatment, parking area ratios, lighting, and other elements as needed.

GOAL T-16: Foster the evolution of a central business district that is compact and walkable and not defined by large expanses of parking lots.

Policies:

T-16.1: Consider maximum parking requirements for higher density areas to encourage alternative transportation modes.

T-16.2: Confine the location of parking areas to the rear of properties to increase pedestrian safety and minimize visual impact.

T-16.3: Identify places where on-street parking can be added adjacent to street-facing retail to encourage shopping and buffer sidewalks with landscaping to create a pleasant walking environment..

T-16.4: Encourage the use of structured or underground parking to use land more efficiently.

T-16.5: Focus investments in downtown central business areas by promoting joint- and mixed use development and integrating shared-use parking practices.

T-16.6: Incorporate Transportation 2040 guidelines into planning for centers and high-capacity transportation station areas.

GOAL T-17: Expand park-and-ride capacity to serve rail as well as other transit uses and accommodate growth.

Policies:

T-17.1: Work with transit providers to establish additional park-and-ride facilities to serve Sound Transit operations and to facilitate ridesharing and express bus connections.

T-17.2: Encourage commercial development on major transit routes to dedicate unused parking area to park-and-ride facilities where feasible.

6.5 Freight Mobility

Movement of goods is critical to Lakewood's economic activity. Supplies and products must be able to move into, out of, and throughout the commercial parts of the city. The following goals and policies address the specific needs of freight mobility in Lakewood.

GOAL T-18: Plan for location of freight routing in conjunction with placement of industrial, commercial, and other land uses to maintain and improve commercial transportation and mobility access.

Policies:

T-18.1: Install directional signage for truck routes through key areas of the city.

T-18.2: Consider potential freight movement needs of new development as part of SEPA review.

T-18.3: Create development standards for freight access to commercial uses likely to possess such needs.

T-18.4: Examine the potential of unused or underutilized rail lines in Lakewood for freight rail.

T-18.5: As industrial uses concentrate into certain areas, identify ways to eliminate the conflict among freight users this may tend to create.

T-18.6: Promote the continued operation of existing rail lines to serve the transportation needs of Lakewood businesses.

T-18.7: Support reconstruction of the I-5/SR 512 interchange to improve access to the Lakewood Industrial Park.

T-18.8: Support new access and infrastructure improvements to American Lake Gardens that facilitate industrial development.

T-18.9: Explore future opportunities to grade separate rail traffic from street arterials where significant safety hazards or traffic congestion warrant.

6.6 Level-of-Service Standards and Concurrency

6.6.1 Definitions

The GMA requires the adoption of Level-of-Service (LOS) standards for arterial streets and intersections to serve as a gauge to judge the quality and performance of the transportation system. The LOS standards for arterial streets and intersections are based on the peak hour LOS and are applied consistently throughout the City except for selected roadway links designated on Figure 6.2.

Level-of-service standards required by the GMA are closely related to the issue of concurrency. The GMA requires transportation improvements to be made concurrent with development. Once a street or intersection exceeds its LOS standard, improvements must be planned within six years to improve the street's performance to a level that does not violate the standard. If planned improvements were to exceed the six-year time frame, new development that would add traffic to the street could not be approved.

The most common approach to LOS for roads is the ratio of traffic volume to the design capacity of a facility while intersection LOS is based on the average delay experience by drivers. Both roadway and intersection LOS are typically evaluated during the peak hour travel and are typically converted to letter grades "A" through "F," as described in the Transportation Research Board's *Highway Capacity Manual.* The LOS A represents the least amount of congestion, while LOS F represents the highest level of congestion.

Level-of-service standards can be chosen for different arterials within a city. Levels of service should desirably be the same on both sides of a city/county boundary; however, different goals on either side of a boundary can be legitimate reasons for two jurisdictions to establish different standards.

6.6.2 Goals and Policies

GOAL T-19: Apply standardized performance measurement criteria to monitor transportation LOS.

Policies:

T-19.1: Monitor road performance using the Highway Capacity Manual's standardized LOS criteria:

- LOS A is defined as representing a free flow condition. Travel speeds are typically at or near the speed limit and little to no delay exists. Drivers have the freedom to select their desired speeds and to make turns and maneuver within the traffic stream.

- LOS B is defined as representing stable flow. Drivers still have some freedom to select their travel speed. Average delays of 10-20 seconds per vehicle are experienced at signalized intersections.

- LOS C is defined as falling within the range of stable flow, but vehicle travel speeds and maneuverability are more closely controlled by higher traffic volumes. The selection of speed is not affected by the presence of others, and maneuvering within the traffic stream requires vigilance on the part of the driver. Longer average delays of 20-35 seconds per vehicle are experienced at signalized intersections.

- LOS D is defined as approaching unstable flow. Travel speed and freedom to maneuver are somewhat restricted, with average delays of 35-55 seconds per vehicle at signalized intersections. Small increases in traffic flow can cause operational difficulties at this level.

Figure 6.2 – Designated LOS Thresholds

- LOS E is defined as representing operating conditions at or near the capacity of the roadway. Low speeds (approaching 50 percent of normal) and average intersection delays of 55-80 seconds per vehicle are common. Freedom to maneuver within the traffic stream is extremely difficult. Any incident can be expected to produce a breakdown in traffic flow with extensive queuing.

- LOS F is defined as forced flow operation at very low speeds. Operations are characterized by stop-and-go traffic. Vehicles may progress at reasonable speeds for several hundred feet or more, then be required to stop in a cyclic fashion. Long typical delays of over 80 seconds per vehicle occur at signalized intersections.

T-19.2: Collaborate with adjacent jurisdictions to develop appropriate LOS standards where roadway centerlines serve as a jurisdictional boundary.

T-19.3: Work toward developing multimodal LOS and concurrency standards to include performance criteria for transit, pedestrian, and bicycle facilities.

T-19.4: Manage arterial operations and improvements such that transit LOS standards, as defined by the local and regional transit providers, can be maintained.

T-19.5: Seek multimodal mitigation measures as part of the development review to improve or construct multimodal facilities to address LOS impacts.

GOAL T-20: Adopt the following arterial and intersection LOS thresholds for maintaining transportation concurrency on arterial streets in Lakewood.

Policies:

T-20.1: Maintain LOS D with a V/C ratio threshold of 0.90 during weekday PM peak hour conditions on all arterial streets and intersection in the city, including state highways of statewide significance except as otherwise identified.

T-20.2: Maintain LOS D during weekday PM peak hour conditions at all arterial street intersections in the city, including state highways of statewide significance except as otherwise identified.

T-20.3: Maintain LOS F with a V/C ratio threshold of 1.10 in the Steilacoom Boulevard corridor between 88th Street SW and 83rd Avenue SW.

T-20.4: Maintain LOS F with a V/C ratio threshold of 1.30 on Gravelly Lake Drive between I-5 and Washington Boulevard SW and Washington Boulevard SW, west of Gravelly Lake Drive.

T-20.5: The City may allow two-way and one-way stop-controlled intersections to operate worse than the LOS standards. However, the City requires that these instances be thoroughly analyzed from an operational and safety perspective.

GOAL T-21: Use traffic management strategies and land use regulations to protect street and network LOS standards.

Policies:

T-21.1: Establish mitigation requirements for new development where LOS is expected to fall below acceptable standards as a result of that development.

T-21.2: Limit new development to areas where LOS standards can be maintained and restrict development in areas where they cannot be maintained.

T-21.3: Use road widening only as a last resort to address LOS deficiencies, except in areas where roadways are substandard and improving them to standards would increase their contribution to overall LOS.

T-21.4: Ensure that comprehensive plan amendments, rezones, master plans, conditional uses, and other significant land use proposals are reviewed with consideration of the proposal's impact on street LOS standards.

6.7 Reassessment Strategy

The arterial level of service thresholds established above will be monitored over time. For locations that may exceed the level of service threshold in the future, a different threshold would need to be established or a specific facility improvement would need to be identified and programmed for funding within six years.

While the future of transportation financing from state and federal sources remains uncertain at present, there are mechanisms available to municipalities to generate revenue for, or otherwise encourage private investment in, transportation facilities. If the above proactive policies fail to maintain future levels of service within the established LOS thresholds, the City of Lakewood will resort to some combination of the following TDM/TSM and land-use strategies to bring any LOS deficiencies back into compliance under GMA concurrency requirements:

- Coordinate timing of new development in LOS-deficient areas with fully-funded improvements identified in the required six-year transportation improvement plan.
- Provide for routing traffic to other roads with underutilized capacity to relieve LOS standard deficiencies, but taking into consideration the impact of additional traffic on the safety and comfort of existing neighborhoods.
- Aggressively pursue the following TDM strategies, including parking management actions in dense commercial centers:
    - Install parking meters on streets within and adjacent to commercial centers;
    - Develop public parking facilities and use cost pricing to discourage SOV commuting;
    - Institute a municipal parking tax;
    - Set maximum parking space development standards and reduce over time to further constrain parking supply;
    - Support charging for employee parking and providing monetary incentives for car and vanpooling;
    - Partner with Pierce Transit to identify public and/or private funding for expanded transit service during peak and off-peak times along LOS-deficient corridors.
- Aggressively pursue federal and state grants for specific transportation improvements on LOS deficient roadway segments.
- Make development density bonuses available to developers who provide additional transit, bicycle, and pedestrian-friendly amenities beyond the minimum requirements.

- Reassess commercial and residential development targets by planning area and make adjustments to channel development away from LOS-deficient locations.
- If the actions above are not sufficient, consider changes in the LOS standards and/or limit the rate of growth, revise the City's current land use element to reduce density or intensity of development, and/or phase or restrict development to allow more time for the necessary transportation improvements to be completed.

Transportation Background Report

CITY OF LAKEWOOD COMPREHENSIVE PLAN

Prepared for:
City of Lakewood

September 2015

Prepared by:

transpogroup
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Inventory of Existing Transportation Facilities & Conditions

Travel needs within the City of Lakewood are met by a range of transportation facilities and services. These facilities and services provide for travel within the City and also connect Lakewood with the rest of the region. The City's existing transportation system is comprised of a state highway, arterials, collectors, and local roads as well as facilities for pedestrians, bicycles, and transit. The following summarizes key elements of the existing transportation system serving the City. The inventory provides input for identifying and prioritizing the City's transportation improvement projects and programs.

Street & Highway System

The backbone of the City's transportation system is the street and highway system. The street and highway system provides mobility and access for a range of travel modes and users. Roadways are classified by their intended function and desired service. The City's roadway functional classification is identified in the Transportation Systems Plan section and is based on existing and future transportation needs.

To provide background for identifying the transportation improvement projects and programs, a summary of existing conditions of the City roadway system is presented. This includes the number of lanes and existing traffic controls, traffic volumes and operations, transportation safety conditions, and the freight system. Non-motorized and transit facilities and services, which use the roadway system, are described in the subsections that follow.

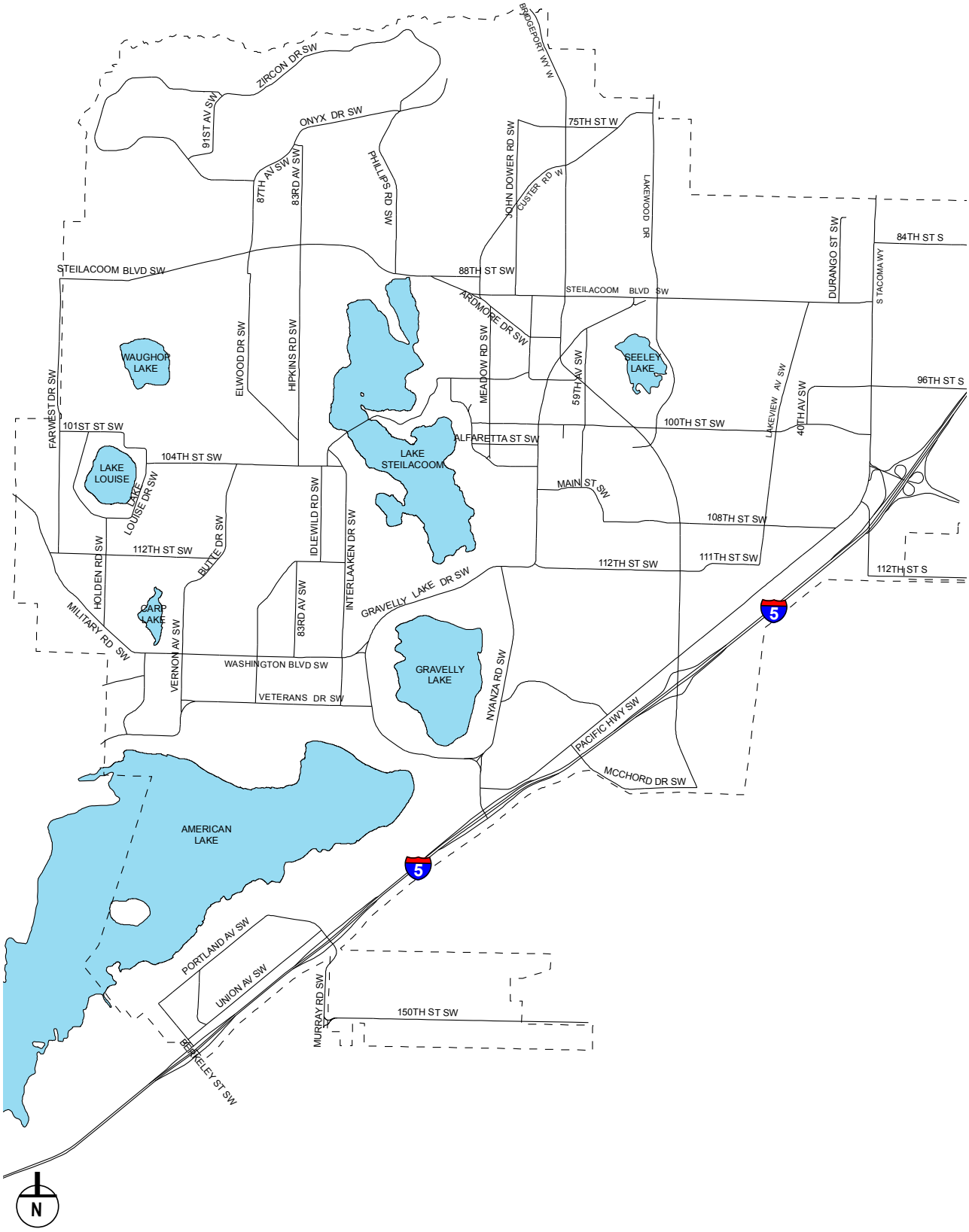
Street Network

The existing state highway and arterial street system serving Lakewood is shown in Figure 1. The City is served by several highways and major, minor, and local streets include Interstate 5 (I-5), State Route (SR) 512, South Tacoma Way, Pacific Highway SW, Steilacoom Boulevard, Bridgeport Way, a portion of Gravelly Lake Drive, Custer Road, 100th Street SW, Lakewood Drive, Washington Boulevard, Military Road, and a small segment of 112th Street SW. Existing intersection traffic control devices are shown on Figure 2. All major arterial street intersections are signalized.

Existing Traffic Volumes

Recent traffic counts were assembled from a variety of sources to determine current vehicle demands on City roadways. Daily vehicle volumes were obtained from the City of Lakewood and as needed, were adjusted based on historically observed growth rates to reflect existing (2014) conditions. Weekday PM peak hour volumes were also assembled for major intersections throughout the City through a combination of planning studies conducted in the City and new counts collected in 2014. The weekday PM peak hour is typically the period when traffic volumes are the highest within the City.

Existing (2014) average daily traffic volumes are summarized in Figure 3 and existing weekday PM peak hour traffic volumes are summarized in Figure 4. As shown, high daily traffic volumes are generally experienced along principal arterials, which carry volumes ranging from approximately 13,000 to as high as 41,000 trips per day. Traffic volumes are the highest in the vicinity of interchanges with I-5, with the highest daily volume occurring at South Tacoma Way north of the I-5/SR 512 interchange (about 41,400 vehicles per day). Volumes are generally lower in the southern and western areas of the city, where many of the residential neighborhoods are located.



0 2,000 4,000 Feet

Figure 1
Existing Street Network

Source: Transpo Group

May 2015

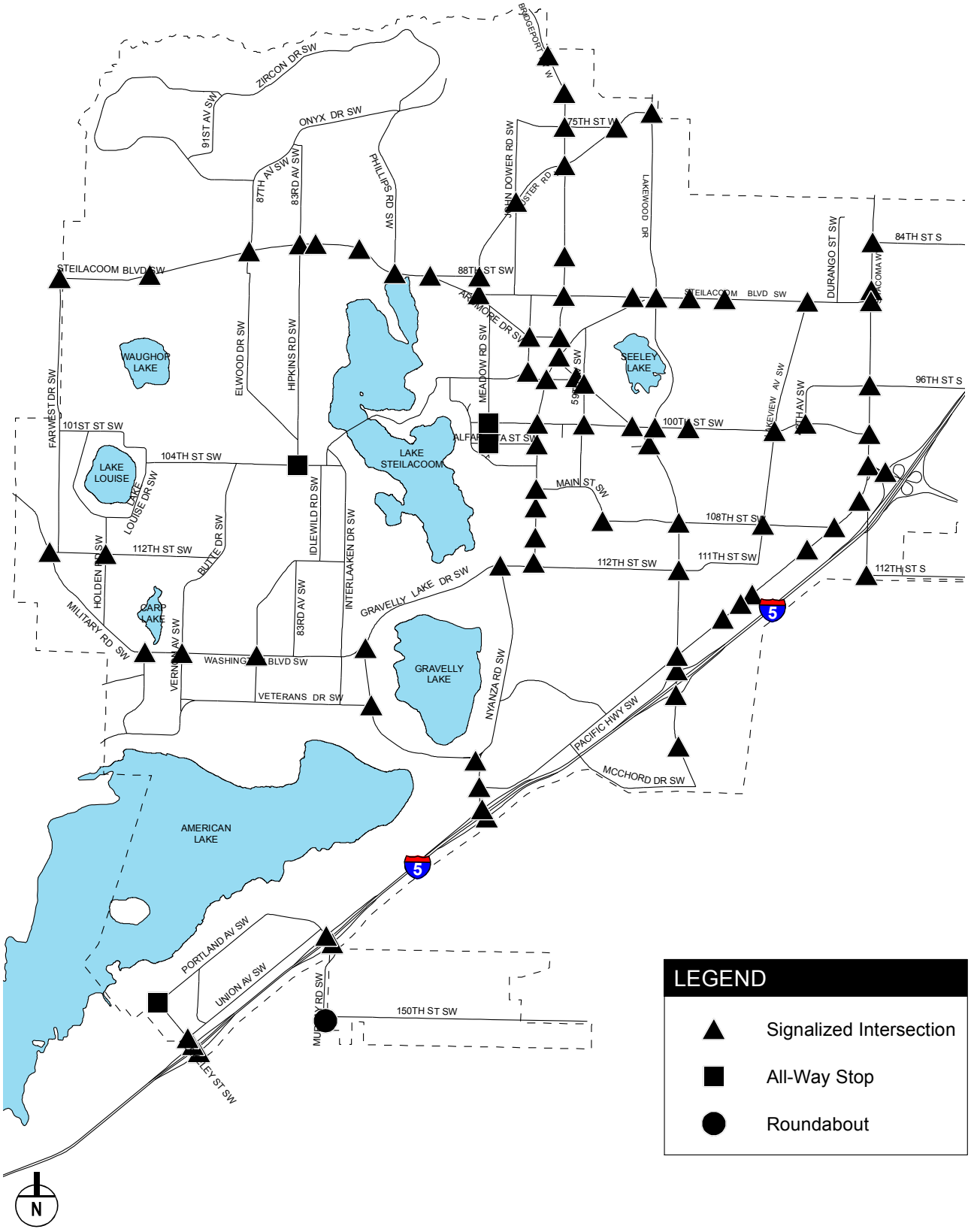
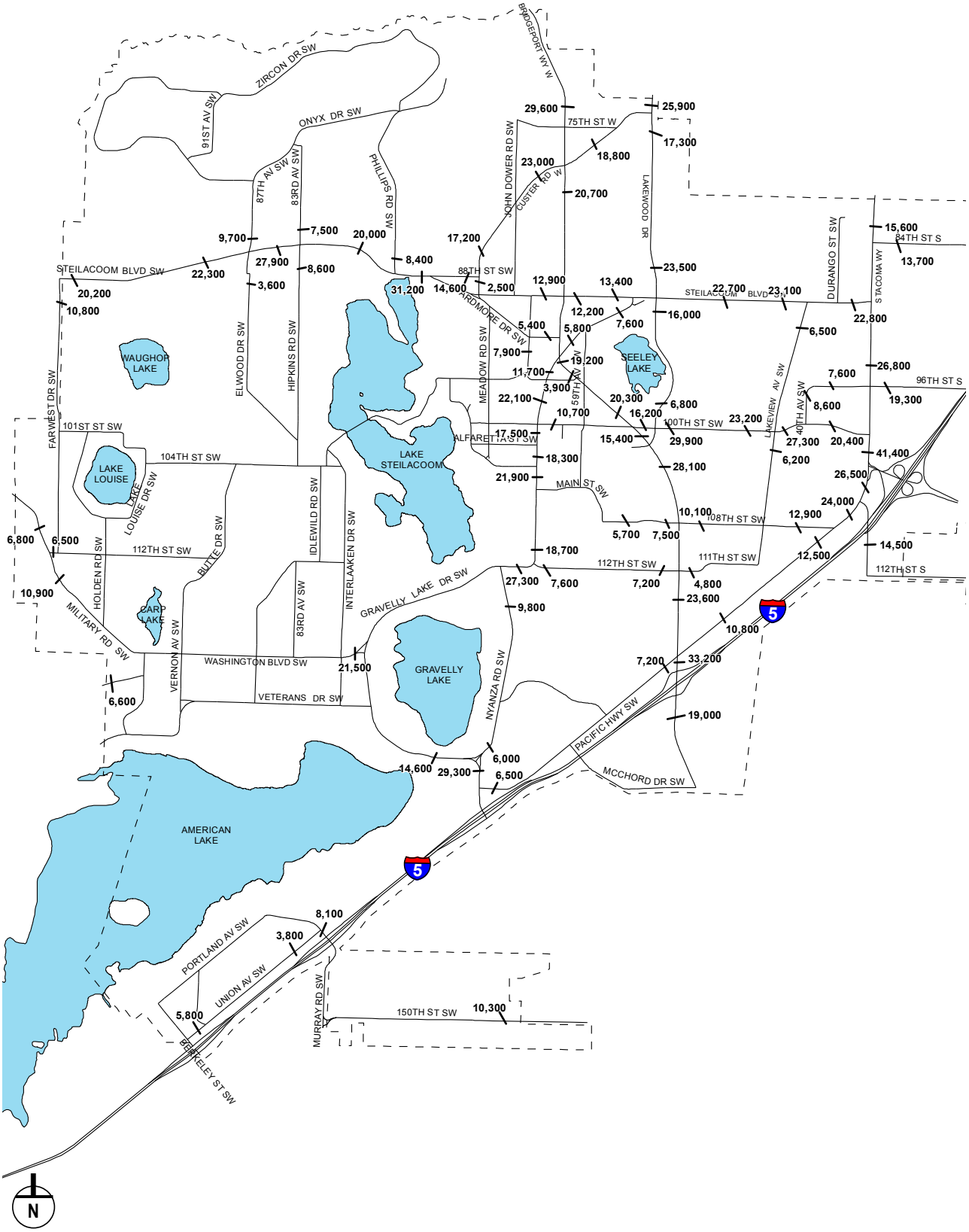


Figure 2
Existing Traffic Control

Source: Transpo Group

May 2015



0 2,100 4,200 Feet

Source: Transpo Group

May 2015

Figure 3
Existing (2014) Weekday Daily Traffic Volumes

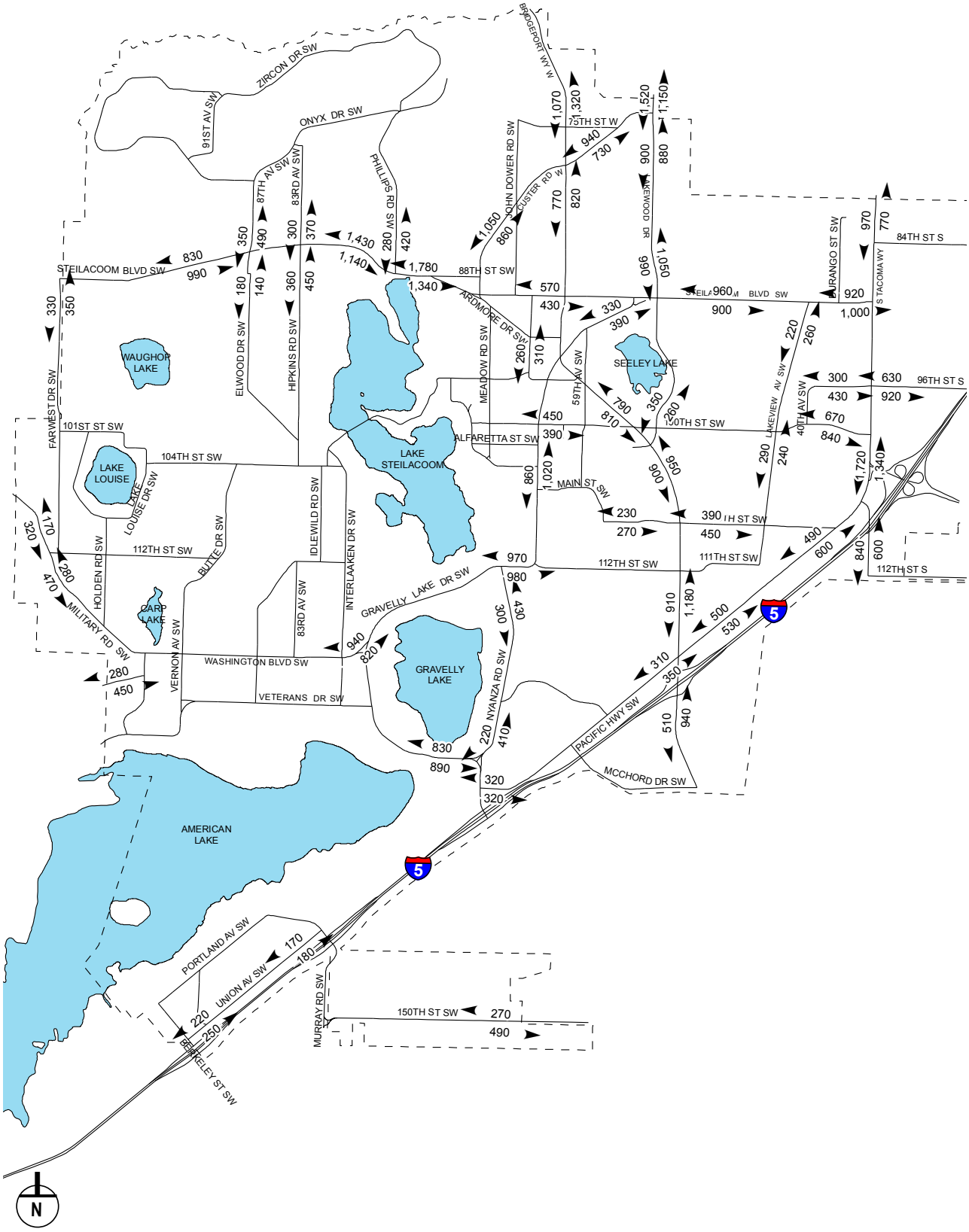


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Figure 4
Existing (2014) Weekday PM Peak Hour Traffic Volumes

Source: Transpo Group

May 2015

Existing Traffic Operations

Traffic volumes were used to evaluate existing traffic operations in Lakewood through the evaluation of levels of service (LOS) as defined in the later Travel Forecasts and Needs Evaluation section. Major intersections throughout the City were evaluated based on the latest level of service methodologies defined in the *Highway Capacity Manual (HCM)*, 2010.

Level of service (LOS) is an estimate of the quality and performance of transportation facility operations in a community. According to the HCM, the degree of traffic congestion and delay is rated using the letter "A" for the least amount of congestion to the letter "F" for the highest amount of congestion (i.e., LOS A through LOS F). LOS for intersections is based on the overall delay for all drivers at an intersection while LOS for roadway segments is based on the volume-to-capacity ratio (V/C) for roadway segments.

An LOS standard of LOS D is generally applied for all arterial street intersection in Lakewood, and WSDOT facilities within the City are also under an LOS D standard. An average delay of 35 seconds or less for drivers at stop-controlled intersection is equivalent to LOS D or better. At signalized intersections this threshold is 55 seconds or less and for roadway segments it is a V/C ration of 0.90 or less.

Table 1 summarizes the level of service at each of the major intersections while roadway operations are described later.

Table 1. Existing (2014) Weekday PM Peak Hour Intersection Traffic Operations Summary

Intersection	LOS[1,2]	Delay[3]
Berkeley Ave/NB I-5 Ramps[2]	D	52
Berkeley Ave/SB I-5 Ramps[2]	C	27
Berkeley Ave/Union Ave	B	12
Bridgeport Way/San Francisco Ave	A	9
Bridgeport Way/NB I-5 Ramps[2]	C	21
Bridgeport Way/SB I-5 Ramps[2]	B	19
Bridgeport Way/Pacific Hwy	D	45
Bridgeport Way/112th St	B	17
Bridgeport Way/108th St	B	20
Bridgeport Way/Lakewood Dr[2]	C	30
Bridgeport Way/100th St	C	32
Bridgeport Way/59th Ave	B	12
Bridgeport Way/Mt. Tacoma Dr	A	8
Bridgeport Way/Gravelly Lake Dr[2]	C	27
Bridgeport Way/93rd St	B	10
Bridgeport Way/Steilacoom Blvd	C	22
Bridgeport Way/Custer Rd	C	27
Bridgeport Way/75th St	B	16
Bridgeport Way/Meadow Park Rd	D	43
Gravelly Lake Dr/NB I-5 Ramps[2]	E	70
Gravelly Lake Dr/SB I-5 Ramps[2]	D	47
Gravelly Lake Dr/Pacific Hwy[2]	B	16
Gravelly Lake Dr/Nyanza Rd S[2]	A	10
Gravelly Lake Dr/Veterans Dr	B	11
Gravelly Lake Dr/Washington Blvd	B	18
Gravelly Lake Dr/Nyanza Rd N[2]	A	8

Intersection	LOS[1,2]	Delay[3]
Gravelly Lake Dr/112th St	C	30
Gravelly Lake Dr/Main St[2]	C	27
Gravelly Lake Dr/Avondale Rd	E	50
Gravelly Lake Dr/Alfaretta St	B	11
Gravelly Lake Dr/100th St	B	19
Gravelly Lake Dr/Mt. Tacoma Dr	B	13
Gravelly Lake Dr/Steilacoom Blvd	B	12
Pacific Hwy/108th St[2]	C	22
Pacific Hwy/S Tacoma Way[2]	C	24
Steilacoom Blvd/Sentinel Dr	A	10
Steilacoom Blvd/Western State Hospital[2]	A	7
Steilacoom Blvd/87th Ave	B	19
Steilacoom Blvd/83rd Ave	C	26
Steilacoom Blvd/Custer ES	B	14
Steilacoom Blvd/Briggs Ln	B	18
Steilacoom Blvd/Phillips Rd[2]	B	10
Steilacoom Blvd/88th St[2]	B	16
Steilacoom Blvd/Custer Rd[2]	A	7
Steilacoom Blvd/Lakewood Dr	C	26
Steilacoom Blvd/Hageness Dr	A	3
Steilacoom Blvd/Lakeview Dr	A	8
Steilacoom Blvd/Durango St	D	33
Steilacoom Blvd/S Tacoma Way	C	30
S Tacoma Way/Pacific Hwy[2]	C	24
S Tacoma Way/SR 512-Perkins Ln[2]	D	35
S Tacoma Way/100th St[2]	B	10
S Tacoma Way/96th St	C	28
S Tacoma Way/92nd St	F	60
S Tacoma Way/84th St[2]	B	14
SR 512/I-5 SB Off-Ramp	E	62
Thorne Ln/NB I-5 Ramps[2]	D	51
Thorne Ln/SB I-5 Ramps[2]	D	48
Thorne Ln/Union Ave	B	11
100th St/Lakewood Dr	C	21
Motor Ave/Whitman Ln	A	6
Ardmore Dr/Whitman Ln	B	11
Custer Rd/Lakewood Dr	D	46
Interlaaken Dr/Washington Blvd	D	34
75th St/Custer Rd	B	14
75th St/Lakewood Dr	C	17
108th St/Lakeview Dr	A	8
John Dower Rd/Custer Rd	A	6
88th St/Custer Rd[2]	A	5
112th St/Old Military Rd	A	6
112th St/Holden Rd	A	7
100th St/Lakeview Dr	B	17
100th St/59th Ave	B	15

Intersection	LOS[1,2]	Delay[3]
108th St/Main St	B	11
100th St/David Ln	A	5
Murray Rd/150th St[4]	B	0

1. Level of service based on *Highway Capacity Manual (HCM) 2010* methodology unless otherwise noted.
2. Level of service based on *HCM 2000* methodology due to limitation of the *HCM 2010* methodology,
3. Average delay in seconds per vehicle.
4. Level of service based on Sidra roundabout methodology.
5. When comparing these calculated performance measures to field observations and real-world driver experience, it is important to note that these calculations are based on the volume of vehicles that travelled through each intersection and may not fully capture the actual travel demand; some locations such as S Tacoma Way/100th Street or S Tacoma Way/SR 512-Perkins Lane may operate worse than reported in this table.

As shown in Table 1, all study intersections currently operate at LOS D or better with the exception of the State Route (SR) 512/I-5 Southbound Off-Ramp traffic signal which operates at LOS E primarily due to long vehicle delays on the southbound off-ramp approaching SR 512.

Although all study intersections are calculated to meet City and WSDOT level of service standards, when comparing these calculated performance measures to field observations and real-world driver experience, it is important to note that these calculations are based on the volume of vehicles that travelled through each intersection and may not fully capture the actual travel demand. This is demonstrated by observed congestion at the two SR 512 intersections where calculated delays may be shorter than those experienced in the field. However, the calculated results do illustrate similar patterns of performance and relative congestion to those observed in the field, which indicates that the methodology is useful in evaluating the performance of potential improvements.

Roadway V/C ratios and LOS were calculated for mid-block arterial roadway sections throughout the City of Lakewood, based on and on the HCM methodology and current PM peak hour traffic volumes. The results are shown in Table 2.

Table 2. Existing (2014) Weekday PM Peak Hour Roadway Traffic Operations Summary

	Existing (2014) Volume			Existing (2014) V/C	
Street Name/Section	NB/EB[1]	SB/WB[1]	Existing Capacity[2]	NB/EB	SB/WB
Ardmore Dr SW					
southeast of Steilacoom Blvd SW	480	480	720	0.67	0.67
northwest of Whitman Ave SW	370	460	720	0.51	0.64
Bridgeport Way W					
north of 75th St W	1,320	1,070	2,050	0.64	0.52
north of Custer Rd W	920	900	2,050	0.45	0.44
south of Custer Rd W	820	770	2,050	0.40	0.38
north of Gravelly Lake Dr SW	1,070	890	2,050	0.52	0.43
south of Gravelly Lake Dr SW	740	680	2,050	0.36	0.33
north of 100th St SW	790	810	2,050	0.39	0.40
south of 100th St SW	570	620	2,050	0.28	0.30
south of Lakewood Dr SW	950	900	2,050	0.46	0.44
north of 112th St SW	880	760	2,050	0.43	0.37
north of Pacific Highway SW	1,180	910	2,050	0.58	0.44
south of Pacific Highway SW	1,250	990	2,050	0.61	0.48
at Clover Creek bridge south of I-5	940	510	2,050	0.46	0.25
Custer Rd SW/ W					
northeast of Bridgeport Way SW	730	940	1,825	0.40	0.52

Street Name/Section	Existing (2014) Volume NB/EB[1]	Existing (2014) Volume SB/WB[1]	Existing Capacity[2]	Existing (2014) V/C NB/EB	Existing (2014) V/C SB/WB
southwest of Bridgeport Way SW	790	1,040	1,825	0.43	0.57
north of 88th St SW	860	1,050	1,825	0.47	0.58
south of 88th St SW	120	180	2,050	0.06	0.09
Far West Dr SW					
south of Steilacoom Blvd SW	350	330	2,050	0.17	0.16
Gravelly Lake Dr SW					
southwest of Steilacoom Blvd SW	390	330	2,050	0.19	0.16
northeast of Bridgeport Way SW	280	290	1,825	0.15	0.16
southwest of Bridgeport Way SW	670	560	2,050	0.33	0.27
south of Mount Tacoma Dr SW	960	740	2,050	0.47	0.36
south of 100th St SW	950	790	2,050	0.46	0.39
south of Alfaretta St SW	920	670	2,050	0.45	0.33
north of Wildaire Rd SW	1,020	860	2,050	0.50	0.42
north of 112th St SW	920	870	2,050	0.45	0.42
west of 112th St SW	980	970	2,050	0.48	0.47
west of end Nyanza Rd SW (S)	890	830	975	0.91	0.85
north of Pacific Highway SW	1,380	1,070	2,050	0.67	0.52
south of Pacific Highway SW	1,330	1,020	2,050	0.65	0.50
Hipkins Rd SW					
south of Steilacoom Blvd SW	450	360	720	0.63	0.50
Lakeview Ave SW					
south of 100th St SW	240	290	1,825	0.13	0.16
south of Steilacoom Blvd SW	260	220	1,825	0.14	0.12
Lakewood Dr SW					
north of 74th St W	1,150	1,520	2,050	0.56	0.74
south of 74th St W	880	900	1,825	0.48	0.49
north of Steilacoom Blvd SW	1,050	990	1,825	0.58	0.54
south of Steilacoom Blvd SW	690	680	2,050	0.34	0.33
north of 100th St SW	260	350	2,050	0.13	0.17
Military Rd SW					
south of 112th St SW	470	280	975	0.48	0.29
northwest of 112th St SW	320	170	975	0.33	0.17
Mount Tacoma Dr SW					
west of Bridgeport Way	200	170	975	0.21	0.17
west of Gravelly Lake Dr	390	410	975	0.40	0.42
Murray Rd SW					
north of 146th St SW	1,040	530	1,825 NB / 975 SB	0.57	0.54
N Gate Rd SW					
northeast of Nottingham Rd SW	450	280	720	0.63	0.39
N Thorne Ln SW					
southeast of Union Ave SW	270	450	720	0.38	0.63
Nyanza Rd SW (N)					
north of Gravelly Lake Dr SW	410	220	975	0.42	0.23
south of Gravelly Lake Dr SW	430	300	975	0.44	0.31

Street Name/Section	Existing (2014) Volume NB/EB[1]	Existing (2014) Volume SB/WB[1]	Existing Capacity[2]	Existing (2014) V/C NB/EB	Existing (2014) V/C SB/WB
Pacific Highway SW					
north of 108th St SW	1,050	850	2,050	0.51	0.41
southwest of 108th St SW	600	490	2,050	0.29	0.24
northeast of Bridgeport Way SW	530	500	2,050	0.26	0.24
southwest of Bridgeport Way SW	350	310	975	0.36	0.32
east of Gravelly Lake Dr SW	320	320	720	0.44	0.44
Phillips Rd SW					
north of Steilacoom Blvd SW	420	280	720	0.58	0.39
South Tacoma Way					
north of 84th St SW	770	970	2,050	0.38	0.47
north of Steilacoom Blvd	1,000	1,240	2,050	0.49	0.60
south of Steilacoom Blvd SW	990	1,310	2,050	0.48	0.64
north of 96th St S	910	1,300	2,050	0.44	0.63
north of 100th St SW	780	950	2,050	0.38	0.46
south of SR 512	1,060	1,190	2,050	0.52	0.58
southeast of Pacific Highway SW	600	840	2,050	0.29	0.41
Steilacoom Blvd SW					
east of Farwest Dr SW	830	840	1,825	0.45	0.46
west of 87th Ave SW	990	830	1,825	0.54	0.45
west of 83rd Ave SW/Hipkins Rd SW	960	1,190	2,050	0.47	0.58
west of Phillips Rd SW	1,140	1,430	1,825	0.62	0.78
east of Phillips Rd	1,340	1,780	2,050	0.65	0.87
southeast of 88th St SW	710	1,040	1,825	0.39	0.57
west of Bridgeport Way SW	430	570	1,825	0.24	0.31
east of Bridgeport Way SW	470	580	1,825	0.26	0.32
west of Gravelly Lake Dr SW	500	600	1,825	0.27	0.33
east of Lakewood Dr SW	900	960	2,050	0.44	0.47
west of Lakeview Ave SW	940	930	2,050	0.46	0.45
west of South Tacoma Way	1,000	920	2,050	0.49	0.45
Union Ave SW					
northeast of Berkeley St SW	250	220	720	0.35	0.31
southwest of North Thorne Ln SW	180	170	720	0.25	0.24
Washington Blvd SW					
west of Gravelly Lake Dr SW	820	940	975	0.84	0.96
Whitman Ave SW					
south of Ardmore Dr SW	310	260	975	0.32	0.27
40th Ave SW					
north of 100th St SW	360	390	975	0.37	0.40
74th St					
west of Lakewood Dr	960	1,010	2,050	0.47	0.49
83rd Ave SW					
north of Steilacoom Blvd SW	370	300	975	0.38	0.31
84th St S					
east of South Tacoma Way	540	570	2,050	0.26	0.28

Street Name/Section	Existing (2014) Volume NB/EB[1]	Existing (2014) Volume SB/WB[1]	Existing Capacity[2]	Existing (2014) V/C NB/EB	Existing (2014) V/C SB/WB
87th Ave SW					
south of Steilacoom Blvd SW	140	180	720	0.19	0.25
north of Steilacoom Blvd SW	490	350	975	0.50	0.36
88th St SW					
east of Steilacoom Blvd SW	780	840	1,825	0.43	0.46
93rd St SW					
east of Whitman Ave SW	180	220	975	0.18	0.23
96th St S					
west of South Tacoma Way	430	300	975	0.44	0.31
east of South Tacoma Way	920	630	1,825	0.50	0.35
100th St SW					
west of South Tacoma Way	840	670	1,825	0.46	0.37
east of Lakeview Ave SW	1,180	930	2,050	0.58	0.45
west of Lakeview Ave SW	980	810	2,050	0.48	0.40
east of Lakewood Dr SW	1,130	1,040	2,050	0.55	0.51
east of Bridgeport Way	730	710	2,050	0.36	0.35
east of Gravelly Lake Dr	390	450	1,825	0.21	0.25
108th St SW					
west of Pacific Highway SW	550	460	720	0.76	0.64
east of Bridgeport Way SW	450	390	975	0.46	0.40
west of Bridgeport Way SW	300	270	975	0.31	0.28
east of Davisson Rd SW	270	230	975	0.28	0.24
112th St SW/S					
between Military Rd SW & Farwest Dr S	200	210	720	0.28	0.29
east of Gravelly Lake Drive	310	350	975	0.32	0.36
east of Bridgeport Way SW	180	190	975	0.18	0.19
west of Bridgeport Way SW	290	310	720	0.40	0.43
150th St SW					
east of Woodbrook Rd SW	490	270	720	0.68	0.38

1. Volumes shown are for northbound and southbound (NB and SB) when the roadway is oriented NB-SB or eastbound and westbound (EB and WB) when oriented EB-WB.
2. When roadway capacity differs between a roadway's two directions of travel, each direction's capacity is shown (e.g. NB / SB or EB / WB).

Figure 5 highlights the one arterial segment within the City of Lakewood that currently operates at LOS D (v/c > 0.90) or worse under existing (2014) conditions: westbound Washington Boulevard SW west of Gravelly Lake Drive SW. Although operating at LOS F with a v/c of 1.22, this roadway segment does not currently exceed its adopted LOS F and 1.30 v/c standard.

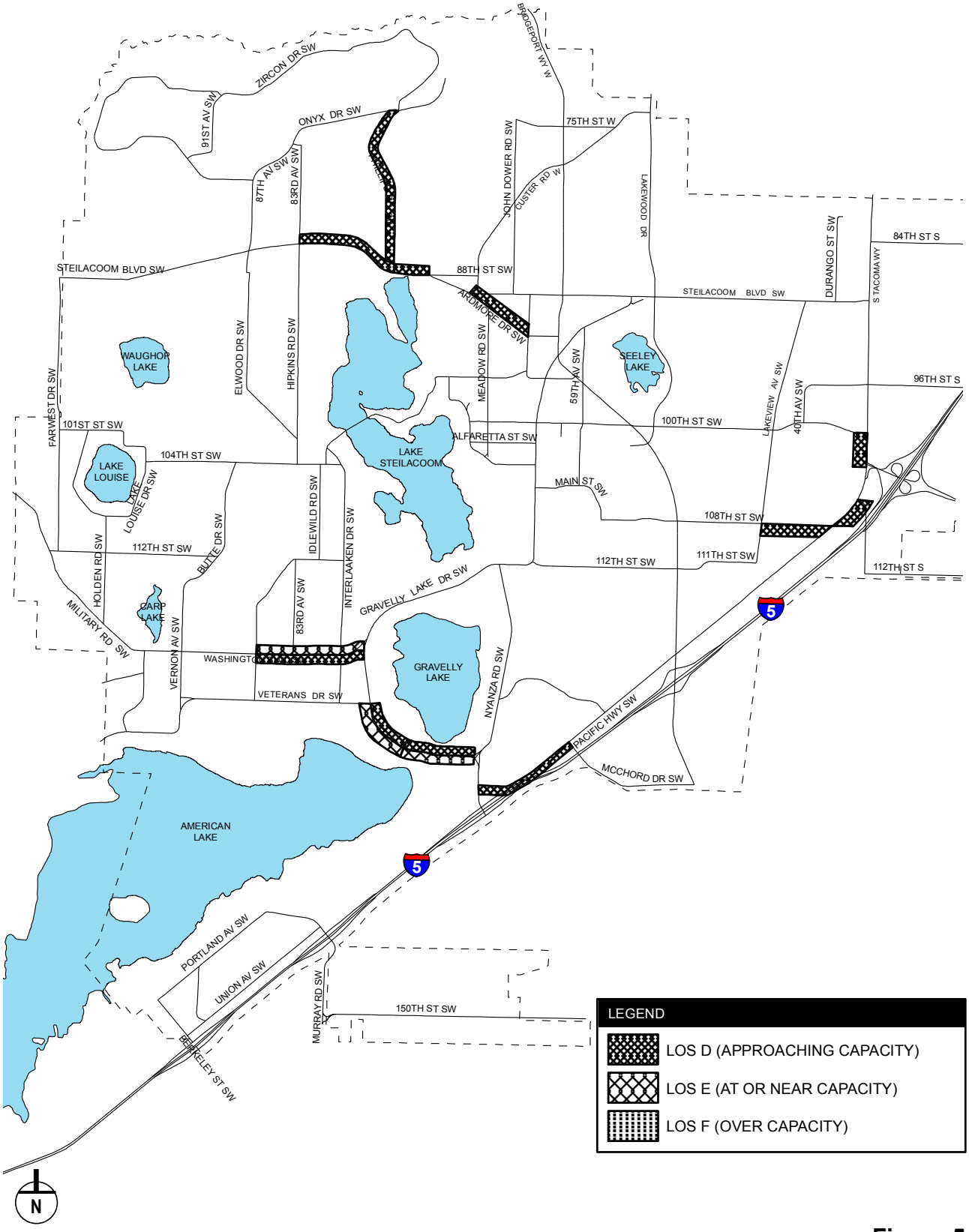


Figure 5
Existing (2014) Weekday PM Peak Hour Roadway LOS Where LOS D or Worse

Source: Transpo Group

May 2015

Freight System

The Washington State Freight and Goods Transportation System (FGTS) is used to classify state highways, county roads, and city streets according to average annual gross truck tonnage they carry as directed by RCW 47.05.021. The FGTS establishes funding eligibility for the Freight Mobility Strategic Investment Board (FMSIB) grants and supports designations of HSS (Highways of Statewide Significance) corridors, pavement upgrades, traffic congestion management, and other state investment decisions.

The FGTS classifies roadways using five freight tonnage classifications, T-1 through T-5. Routes classified as T-1 or T-2 are considered strategic freight corridors and are given priority for receiving FMSIB funding. Within the City of Lakewood, the western terminus of SR 512 up to Pacific Highway SW has the highest classification at T-1, which reflects this state route's connectivity to I-5 and the broader Puget Sound region freeway system. The City of Lakewood also classifies all principal arterials as truck routes and designs these roadways to serve fright movement. Industrial areas throughout the City served by these routes include the Lakewood Industrial Park, the areas southeast of the SR 512/I-5 interchange, and other designated industrial areas throughout the City

Non-Motorized System

Pedestrian and bicycle facilities play a vital role in the City's transportation environment. The non-motorized transportation system is comprised of facilities that promote mobility without the aid of motorized vehicles. A well-established system encourages healthy recreational activities, reduces travel demand on City roadways, and enhances safety within a livable community. Pedestrian and bicycle facilities also provide access to/from transit facilities. Good transit access can increase the use of non-automobile travel modes, and vice versa.

The City of Lakewood has developed a Non-Motorized Transportation Plan (NMTP, June 2009). The NMTP provided an inventory of the City's pedestrian and bicycle facilities, evaluated deficiencies and needs, and identified projects and strategies to enhance the non-motorized system. Figures 6 and 7 show the existing pedestrian and bicycle facilities as well as the priority pedestrian and bicycle improvements as identified in the NMTP.

Transit System

Three transit providers operate within the City of Lakewood: Pierce Transit, Intercity Transit, and Sound Transit. Pierce Transit provides bus service throughout Lakewood and all three transit agencies provide service to areas outside of Lakewood.

Pierce Transit provides transit service within the City of Lakewood and throughout Pierce County. There are currently ten local routes serving the City of Lakewood, offering connections to McChord AFB, Parkland Transit Center, Tillicum, Steilacoom, Tacoma Mall, and downtown Tacoma. Nine of these routes connect at the Lakewood Transit Center, adjacent to the north side of Lakewood Towne Center.

In addition to the local transit routes, regional express routes to Seattle and Olympia operated by Sound Transit and Intercity Transit also serve the SR 512 Park and Ride located at the junction of SR 512 and South Tacoma Way, and the Lakewood Sounder Station. Sound Transit operates three bus routes that serve the City of Lakewood as well as the Lakewood-Seattle Commuter Train. Intercity Transit operates four daily commuter routes that serve Lakewood and one weekend route. Table 3 lists Pierce Transit, Sound Transit, and Intercity transit routes currently serving the City of Lakewood.

Figure 6
Pedestrian System Plan

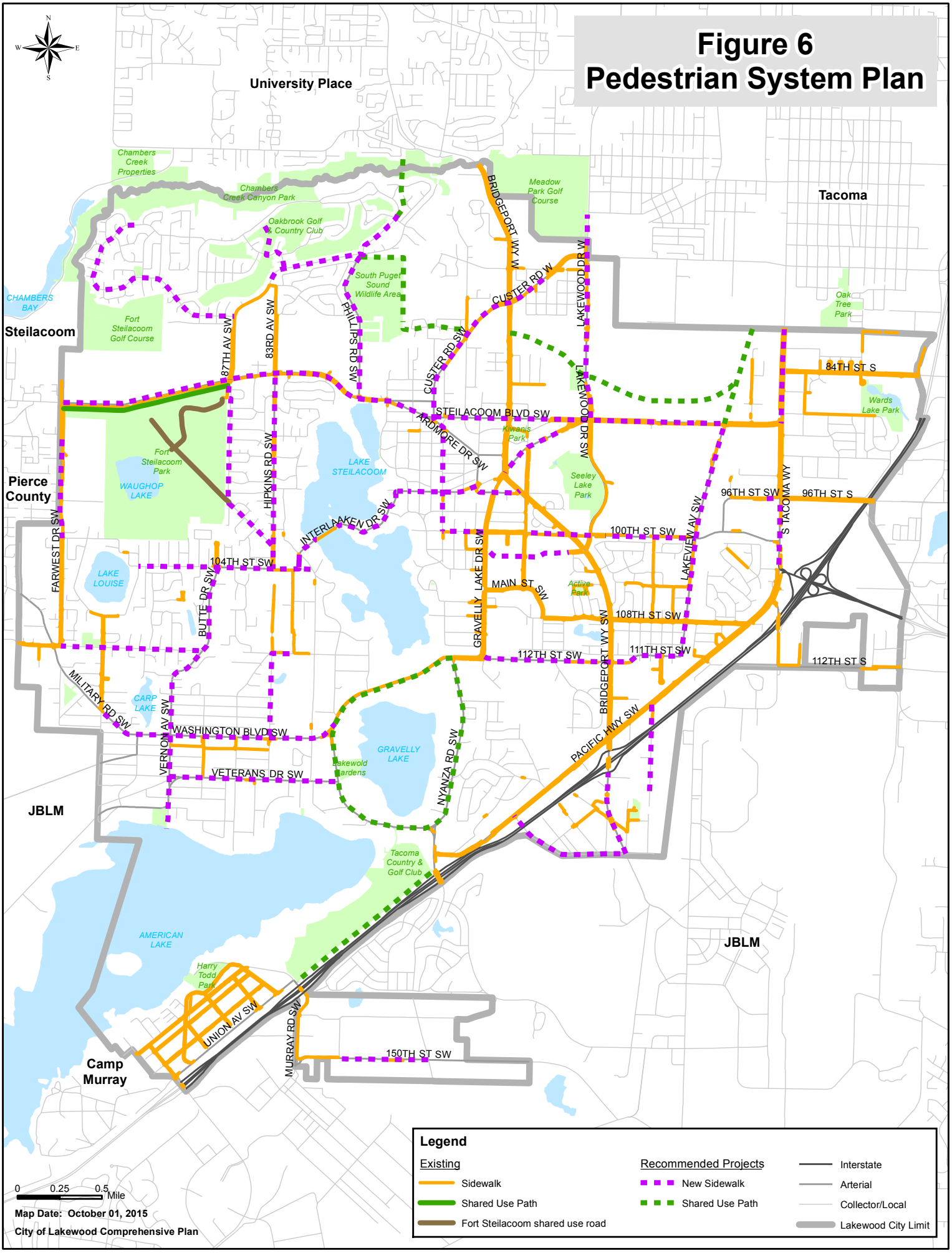
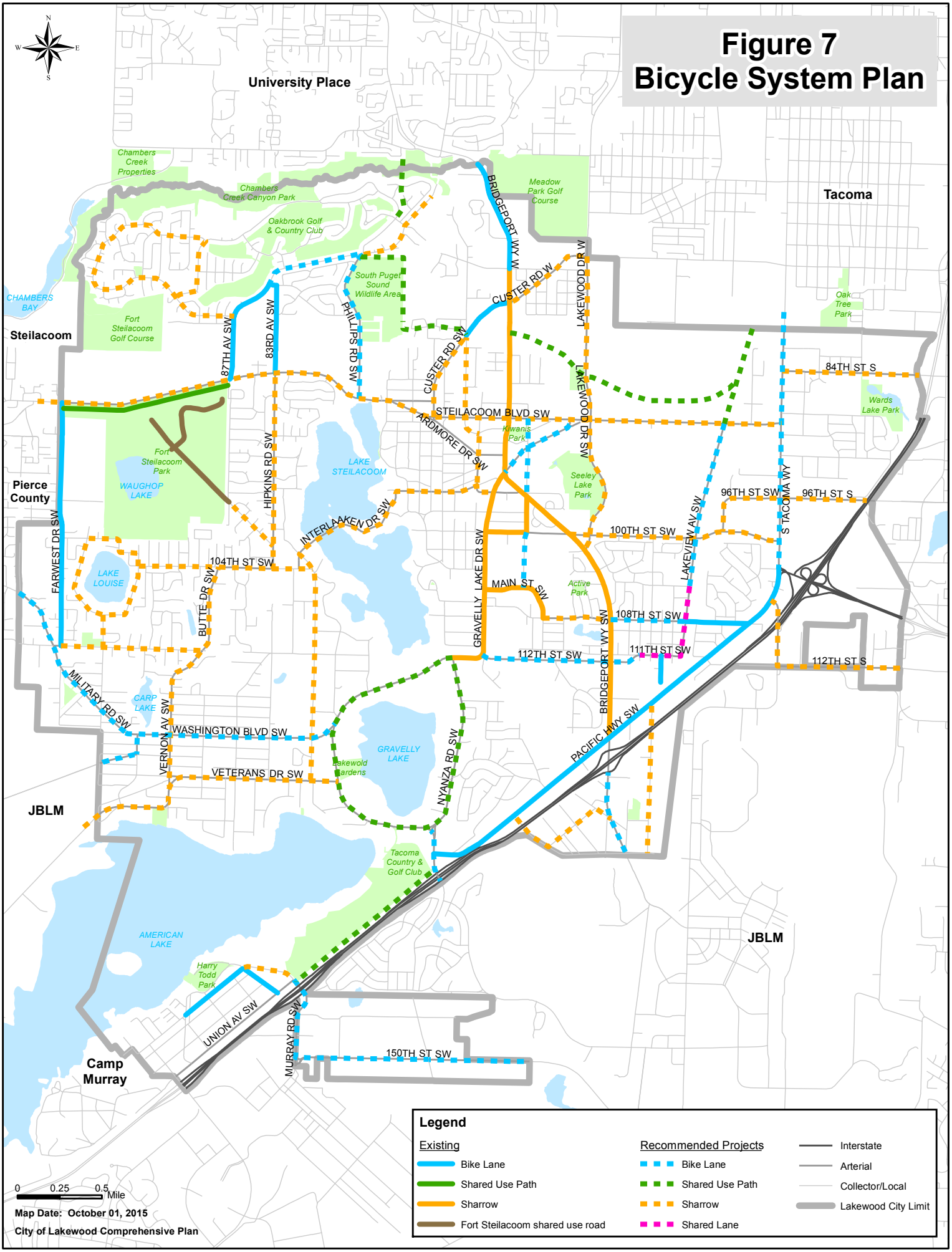


Figure 7
Bicycle System Plan



Map Date: October 01, 2015

City of Lakewood Comprehensive Plan

Table 3. Transit Service Routes

Route No.	Operator	Description	Service Area	Schedule
2	Pierce Transit	S 19th St – Bridgeport	Downtown Tacoma to Lakewood Mall	Weekdays – every 30 minutes Sat/Sun. – every 30 minutes
3	Pierce Transit	Lakewood – Tacoma	Downtown Tacoma to Lakewood Mall	Weekdays – every 30 minutes Sat/Sun. – every 30 minutes
48	Pierce Transit	Sheridan – M St	Downtown Tacoma to Lakewood Mall	Weekdays – every 30 minutes Sat/Sun. – every hour
51	Pierce Transit	Union Ave	Ruston to St Clare Hospital	Weekdays – every hour Sat/Sun. – every hour
202	Pierce Transit	72nd St	Lakewood Mall to Tacoma City Park	Weekdays – every 30 minutes Sat/Sun. – every 30 minutes
204	Pierce Transit	Lakewood - Parkland	Pacific Lutheran University to Lakewood Mall	Weekdays – every 30 minutes Sat/Sun. – every 30 minutes
206	Pierce Transit	Pacific Highway – Tillicum	Lakewood Mall to Tillicum	Weekdays – every 45 minutes Sat/Sun. – every 45 minutes
212	Pierce Transit	Steilacoom	Lakewood Mall to Steilacoom Ferry	Weekdays – every 30 minutes Sat/Sun. – every hour
214	Pierce Transit	Washington	Lakewood Mall to Pierce College to American Lake Veterans Hospital	Weekdays – every 30 minutes Sat/Sun. – every hour
300	Pierce Transit	S Tacoma Way	Tacoma Mall to McChord Air Force Base	Weekdays – every 30 minutes Sat/Sun. – every hour
574	Sound Transit	Lakewood – Sea-Tac	Lakewood Mall to Sea-Tac Airport	Weekdays – every 30 minutes Sat/Sun. – every 30 minutes
592	Sound Transit	Olympia/DuPont – Seattle	Downtown Seattle to Downtown Olympia	Weekdays – every 20 minutes Sat/Sun. – every 30 minutes
594	Sound Transit	Lakewood – Seattle	Downtown Seattle to Downtown Tacoma to DuPont	Weekdays – every 15 minutes Sat/Sun. – every 30 minutes
Train	Sound Transit	Commuter rail line from Lakewood to Seattle	Downtown Seattle to St Clare Hospital	Weekdays – every 30 minutes Sat/Sun. – No Service
603	Intercity Transit	Olympia – Tumwater – Tacoma - Lakewood	Downtown Tacoma to Tumwater	Weekdays – every 30 minutes Sat/Sun. – No Service
605	Intercity Transit	Weekend Service	Downtown Tacoma to Tumwater	Weekdays – No Service Sat/Sun. – Every hour
609	Intercity Transit	S 19th St – Bridgeport	Downtown Tacoma to Lakewood Mall	Weekdays – every 30 minutes Sat/Sun. – every 30 minutes
612	Intercity Transit	Lakewood – Tacoma	Downtown Tacoma to Lakewood Mall	Weekdays – every 30 minutes Sat/Sun. – every 30 minutes
620	Intercity Transit	Sheridan – M St	Downtown Tacoma to Lakewood Mall	Weekdays – every 30 minutes Sat/Sun. – every hour

1. Route and service information provided on each transit agencies' website (Accessed 7/1/2015).

Pierce Transit also provides door-to-door paratransit service via the Shuttle for the mentally ill and physically impaired. This service is available through the Pierce Transit Dispatch Office. Rideshare and ridematch programs are also available for commuters who want to start or join a carpool or vanpool.

In support of these transit operations, several transit service facilities are also provided in Lakewood including:

- The Lakewood Transit Center located in the Town Center area,
- The SR 512 Park & Ride near the SR 512 / I-5 interchange, and
- Lakewood Station on Pacific Highway SW near the Bridgeport Way SW interchange with I-5

City Transportation Programs

The City of Lakewood maintains a Six-Year Comprehensive Transportation Improvement Program (Six-Year TIP) that provides a six-year list of proposed transportation-related capital expenditures and associated operating costs for the City. This plan sets funding strategies not only for the current year, but also to project future needs for major construction, land acquisition, and equipment to improve the cultural environment, capital infrastructure, and recreational opportunities for the citizens of Lakewood.

The City maintains a pavement resurfacing program to maintain the City's road system to the highest condition rating with the funds available using asphalt overlays and surface chip seals. The City uses a Pavement Management System software program to help identify individual resurfacing projects. The City targets alternating annual funding of $30,000 and $5,000 for the pavement management software program while funding for pavement resurfacing varies each year depending on roadway locations and resurfacing needs. The City's 2016-2021 Six-Year Transportation Improvement Program identifies a minimum annual expenditure of $1,410,000 for pavement resurfacing during the next six years.

Travel Forecasts and Needs Evaluation

In addition to addressing existing transportation system issues, the City must develop its transportation system to accommodate forecast growth. The Growth Management Act (GMA) requires that the transportation planning horizon be at least ten years in the future. The City has adopted 2030 as the forecast year for the Transportation Element consistent with the Land Use Element.

The City's travel demand model was updated to support the City's transportation planning efforts. The travel demand model provides a tool for forecasting long-range traffic volumes based on the projected growth in housing and employment identified in the Land Use Element. However, it must be noted that the specific land use forecasts included in the model are intended for planning purposes only and in no way are intended to restrict or require specific land use actions. The land use forecasts are consistent and supportive with the adopted countywide growth targets for the City and region.

The following sections summarize the travel demand forecast, planned improvements, and level of service standards used to evaluate the adequacy of the City's planned transportation system. A future baseline scenario (2030 Baseline) was evaluated that reflects all currently planned land uses and transportation improvements. Where deficiencies were identified by this analysis when compared to the City's adopted standards, improvements were identified to be added to the City's Comprehensive Plan (2030 Plan).

Travel Demand Forecasts

A citywide travel demand model was developed using the Visum computer software package. An important function of a travel demand model is its ability to analyze future land use and its corresponding travel forecasts. The model calculates trip generation based on land use characteristics, allowing the impact of different land use types and development intensities to be evaluated.

The City's travel demand model developed in 2009 was updated as part of the I-5 JBLM Corridor Plan. The I-5/JBLM/Lakewood Model (or 2014 Lakewood Model) was the basis for the 2015 Transportation Element update because in enhances the 2009 model with more detail around I-5 and JBLM facilities and travel demands. The 2009 Lakewood Model was a refined version of Pierce County's older regional EMME model, but was converted to the Visum software platform. TAZs had also been subdivided to better reflect travel patterns in the Cities of Lakewood and DuPont, and for JBLM areas.

The 2014 Lakewood Model was built to be generally consistent with PSRC model inputs and outputs, such as regional land use forecasts, mode share estimates, and trip distribution in the model area, along with future forecasts at some external zones. The model also included the roadway network in eastern Thurston County. The 2014 Lakewood Model is generally consistent with TRPC future volume forecasts for Thurston County external zones.

Land use inputs drive the travel demand developed for the study area. In other words, the number of person trips generated in the model is directly tied to the land use inputs. These land use inputs can be in units of people, homes, or employment, or for more unique land types, specific traffic counts. The land use growth assumed in the City's travel demand model is consistent with the Land Use Element.

Within the City of Lakewood, the number of residential dwelling units was forecast to grow at an annual growth rate of 1.3 percent until 2030, based on Pierce County growth targets for the City of Lakewood. The number of employees is expected to growth at an annual growth

rate of 1.6 percent until 2030, consistent with the growth agreed upon by Pierce County and local cities and the Land Use Element of the City of Lakewood Comprehensive Plan.

Planned Transportation Improvements

The City has identified a comprehensive list of multimodal transportation system improvement projects and programs. The multimodal improvement projects address transportation needs within the existing City limits. Improvements under other jurisdictions include previously identified projects as well as potential improvements identified by the City of Lakewood. The City will continue to coordinate with the other agencies in their transportation planning efforts to facilitate development of a comprehensive transportation system for the City and surrounding communities.

The following sections describe roadway network and transit service/capital project planned to improve the transportation system within the City. Additional improvement not currently included but identified to be added to the City's Comprehensive Plan are also identified (2030 Plan). Non-motorized improvements have been separately identified in the City's Non-Motorized Transportation Plan (NMTP, June 2009).

Roadway Network Improvements

Adapted from the existing street network, the future street network includes various planned transportation improvements. For travel demand forecasting purposes, only funded projects associated with vehicle operations and roadway capacity have been analyzed in the City's travel demand model. The following are planned transportation improvements outside the City assumed when evaluating future 2030 Baseline model:

- High-Occupancy Vehicle lanes on I-5 and SR 16 in the Tacoma area, north of S 38th Street
- SR 510 Yelm Loop
- I-5 Congestion Management TIGER III (Southbound auxiliary lane and ramp metering)
- Point Defiance Bypass rail project
- JBLM Joint-Base Connector Phase 1 (Rainer Gate Closed)
- JBLM Integrity Gate Open
- JBLM Mounts Road Gate Open (full access)
- JBLM I-Street and Pendleton Gates Closed

For areas within the City, the future 2030 Baseline scenario includes only the projects that have been recently completed or will be completed in the near future as identified in the City's current (2016-2021) Six-Year Transportation Program project list. This scenario provides a baseline for identifying future deficiencies, which are used to establish a framework for developing the Transportation Systems Plan. The 2030 Baseline scenario includes the following planned improvements:

- **Madigan Access Improvement Project** - Activate the traffic signal at the Union Avenue SW / Berkeley Avenue SW and add dual left-turn lanes from Union Avenue SW to Berkeley Avenue SW.
- **Steilacoom Boulevard / S Tacoma Way Intersection** – Add eastbound right-turn lane on Steilacoom Boulevard, replace/upgrade traffic signal controllers, and implement access control in the vicinity of the intersection.

- **Gravelly to Thorne Connector** – Construct a new two-way connector road between Tillicum and Gravelly Lake Drive, and install a traffic signal at the Union Avenue SW/Thorne Lane SW.

The future 2030 Plan scenario includes improvement projects expected to be completed as part of the City's Transportation Element. The 2030 Plan scenario includes the following long-term improvement projects which were identified based on the evaluation of 2030 Baseline conditions described in the later 2030 Baseline & Plan Evaluation section:

- All 2030 Baseline improvements
- **96th Street Two-Way Left-Turn Lane** – Construct a center two-way left-turn lane from 500 feet east of S Tacoma Way to the I-5 underpass.
- **Murray Road & 150th Street Corridor Widening** – Widen southbound Murray Road north of S 146th Street to two travel lanes. Previous phases of this project have been constructed and are reflected in existing conditions.
- **Gravelly Lake Drive: Bridgeport to Steilacoom Road Diet** – Reduce four travel lanes to two travel lanes with a center two-way left-turn lane.
- **Rechannelize Southbound S Tacoma Way at 96th Street** – Reconfigure the southbound channelization on southbound S Tacoma Way at 96th Street SW to provide two left-turn lanes, one through lane, and one shared through/right-turn lane, and modify associated traffic signal heads.

Note that the WSDOT is currently preparing an Interchange Justification Report (IJR) to identify improvements to the interchanges between SR 512 and Nisqually. Within the City of Lakewood, this study is considering potential improvements to the Thorne Lane SW and Berkeley Avenue SW interchanges. This study is currently still in progress and as such, no specific improvements to either of these interchanges or I-5 within the City are included in the future conditions analysis.

Transit Planned Service and Capital Improvements

Pierce Transit's planned service and capital improvements are summarized in the *Transit Development Plan: 2014-2019* and show no anticipated bus expansions. Bus routes are regularly reviewed for potential modification and/or consolidation although no specific expansion of bus route service is planned from 2015 and beyond, although vanpool service is anticipated to expand by approximately 10 vans per year through the 2019 planning horizon.

Sound Transit's current long-range plans are summarized in the *Final Supplemental Environmental Impact Statement on the Regional Transit Long-Range Plan* (2005). This plan identified two potential Sound Transit service expansions beyond existing conditions that would be located within the Lakewood:

1) The potential extension of Sounder Commuter Rail service from its current southern terminus at the Lakewood Sounder Station to a new station located in DuPont, although funding/construction of this extension was not included within the Sound Transit 2 funding package, and
2) A potential Bus Rapid Transit (BRT) route from DuPont to Lakewood and extending north to Tacoma and Federal Way.

Potential additional changes to Sound Transit service have been adopted by Sound Transit's Board of Directors in the Sound Transit *Regional Transit Long-Range Plan Update Final Supplemental Environmental Impact Statement* (November 2014). This document is the basis behind the potential "Sound Transit 3" funding package that is anticipated to be put a public vote in November 2016. Within Lakewood, this plan would maintain the previously planned extension of Sounder Commuter Rail service to DuPont and adds a potential regional

express/BRT service from Lakewood to Spanaway, Frederickson, South Hill, and Puyallup. However, it is important to consider that none of these potential Sound Transit service expansions are currently funded.

Based on a review of **Intercity Transit's** 2015-2019 *Strategic Plan*, no specific Intercity Transit service changes or capital projects are anticipated to occur that impact Lakewood.

Level of Service Standards & Concurrency

Level of service (LOS) standards establish the basis for the concurrency requirements in the GMA, while also being used to evaluate impacts as part of the State Environmental Protection Act (SEPA). Agencies are required to "adopt and enforce ordinances which prohibit development approval if the development causes the level of service on a transportation facility to decline below the standards adopted in the transportation element of the comprehensive plan, unless transportation improvements or strategies to accommodate the impacts of development are made concurrent with development" (RCW 36.70A.070(6)(b)). Therefore, setting the LOS standard is an essential component of regulating development and identifying planned improvements for inclusion in the Transportation Element.

Level of Service Definitions

Level of service is both a qualitative and quantitative measure of roadway and intersection operations. Level of service uses an "A" to "F" scale to define the operation of roadways and intersections as follows:

LOS A: Primarily free flow traffic operations at average travel speeds. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Control delays at signalized intersections are minimal.

LOS B: Reasonably unimpeded traffic flow operations at average travel speeds. The ability to maneuver within the traffic stream is only slightly restricted and control delays at signalized intersections are not significant.

LOS C: Stable traffic flow operations. However, the ability to maneuver and change lanes may be more restricted than in LOS B, and longer queues, adverse signal coordination, or both may contribute to lower than average travel speeds.

LOS D: Small increases in traffic flow may cause substantial increases in approach delays and, hence, decreases in speed. This may be due to adverse signal progression, poor signal timing, high volumes, or some combination of these factors.

LOS E: Significant delays in traffic flow operations and lower operating speeds. Conditions are caused by some combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and poor signal timing.

LOS F: Traffic flow operations at extremely low speeds. Intersection congestion is likely at critical signalized intersections, with high delays, high volumes, and extensive vehicle queuing.

A more technical method of measuring LOS is described in the Transportation Research Boards *Highway Capacity Manual* (HCM), which involves the calculation of the volume-to-capacity ratio (V/C) of a roadway or intersection. The V/C ratio ranges shown in Table 4have been developed for determining corridor LOS for urban roadways.

Table 4. Level of Service Criteria for Urban and Rural Roadways

LOS		Volume-to-Capacity (V/C) Ratio
A	less than or equal to	0.3
B	less than or equal to	0.5
C	less than or equal to	0.75
D	less than or equal to	0.90
E	less than or equal to	1.0
F	greater than	1.0

State Highway Level of Service Standards

The City of Lakewood is served by two state highways. Both of the highways, I-5 and SR 512, are classified as Highways of Statewide Significance (HSS). There are no state highways classified as Highways of Regional Significance (HRS) within Lakewood.

State law sets LOS D for HSS facilities in urban areas and LOS C for HSS facilities in rural areas. Both I-5 and SR 512 are classified as Urban within the Lakewood planning area so LOS D applies. The GMA concurrency requirements do not apply to HSS facilities.

WSDOT applies these standards to highway segments, intersections, and freeway interchange ramp intersections. When a proposed development affects a segment or intersection where the level of service is already below the region's adopted standard, then the pre-development level of service is used as the standard. When a development has degraded the level of service on a state highway, WSDOT works with the local jurisdiction through the SEPA process to identify reasonable and proportional mitigation to offset the impacts. Mitigation could include access constraints, constructing improvements, right-of-way dedication, or contribution of funding to needed improvements.

City of Lakewood Level of Service Standards

The City has adopted LOS standards for transportation facilities under its jurisdiction as required under the GMA. The Comprehensive Plan adopts the following roadway capacity and LOS standard:

> *Maintain LOS D with a V/C ratio threshold of 0.90 during weekday PM peak hour conditions on all arterial streets and intersection in the city, including state highways of statewide significance.*

Although, this standard is typically considered reasonable and is used in most urban areas in the Puget Sound region, some transportation facilities are considered fully built-out and are not able to be further improved due to either physical limitations or very high financial cost. Setting different LOS standards for specific areas is a common practice that accounts for the function and use of the roadways into acceptable operating conditions. At locations where physical limitations prevent widening or where a very high financial cost to construct additional improvements would likely occur, LOS standards are based on the 2030 Plan scenario described in the later 2030 Baseline & Plan Evaluation section.

- Maintain LOS F with a V/C ratio threshold of 1.10 in the Steilacoom Boulevard corridor between 88th Street SW and 83rd Avenue SW.
- Maintain LOS F with a V/C ratio threshold of 1.30 on Gravelly Lake Drive between I-5 and Washington Boulevard SW and Washington Boulevard SW, west of Gravelly Lake Drive.

Signalized and stop-sign controlled intersection LOS shall be calculated based on the most recent version of the *Highway Capacity Manual* (HCM, Transportation Research Board). Signalized and all-way stop-controlled intersection level of service shall be calculated for the overall intersection while side-street (two-way) stop-controlled intersections shall be calculated for the worst operating travel lane group at the intersection. Intersection level of service at roundabout intersections shall be evaluated using the Sidra software program roundabout methodology for the overall intersection and signalized LOS delay thresholds from the current HCM. When HCM or Sidra intersection methodologies are unable to be applied due to limitations of the methods, alternative calculation methods may be used.

The City also recognizes how intersection control (e.g., traffic signals, roundabouts, and stop signs) defines level of service. For two-way and one-way stop-controlled intersections, the LOS is defined by the amount of time vehicles are waiting at the stop sign. Although a substantial volume of traffic can proceed through the intersection without any delays, a small volume at the stop sign can incur delays that would exceed LOS D. To avoid mitigation that would only serve a small volume of traffic, the City may allow two-way and one-way stop-controlled intersections to operate worse than the LOS standards. However, the City requires that these instances be thoroughly analyzed from an operational and safety perspective.

As appropriate, mitigation will be identified and required to address potential impacts to safety or operations. Potential installation of traffic signals or other traffic control devices at these locations shall be based on the Manual on Uniform Traffic Control Devices (MUTCD), the Transportation Element, and sound engineering practices. This allowance within the LOS standards is needed because the installation of a traffic signal or other traffic control device may not be warranted per the MUTCD or desirable based on the proximity of other current or planned traffic controls as identified in the Transportation Element.

Transit Level of Service Standards

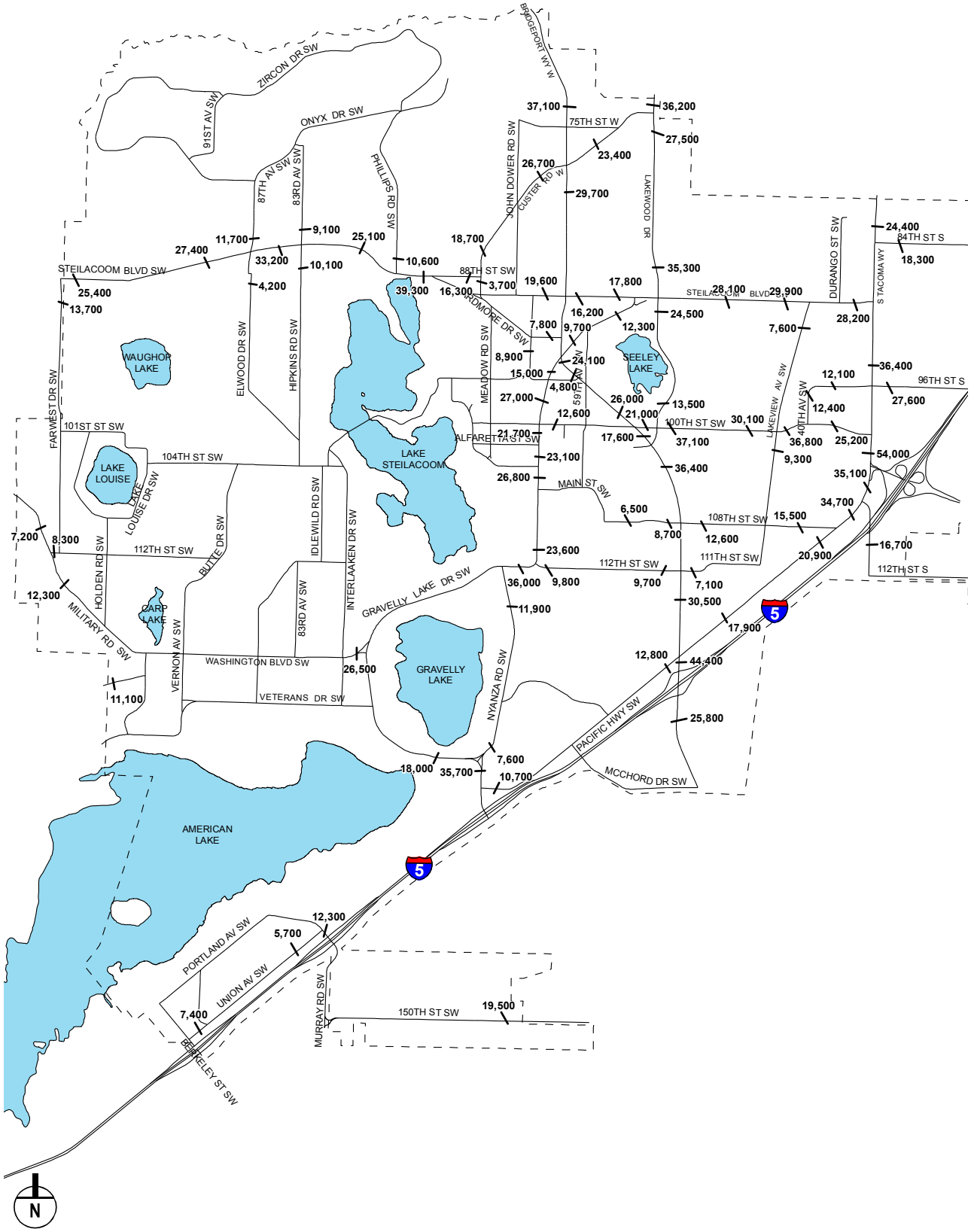
The City will work with each transit agency as they develop their respective level of service (LOS) or quality of service (QOS) goals, and identify and support enhancements to address any LOS/QOS deficiencies.

2030 Baseline & Plan Evaluation

The 2030 travel demand model assumed currently committed and planned transportation improvement projects would be constructed by 2030 as discussed above. This scenario provides a baseline for identifying potential alternative transportation improvement needs. The results of the alternatives evaluation were used to establish a framework for the Transportation Systems Plan.

The updated Lakewood travel demand model was used to convert forecasted 2030 land use data into vehicle travel demand growth on City roadways. This travel demand growth was then used to forecast 2030 traffic volumes and travel patterns. Figure 8 and Figure 9 summarize the forecast daily and weekday PM peak hour traffic volumes throughout Lakewood.

Traffic operations for forecast 2030 conditions were evaluated and have been summarized in Table 5 for intersection operations and Table 6 for roadway operations. Locations falling below City or WSDOT level of service (LOS) standards are highlighted in both tables. Both the future planned intersection and roadway segment LOS results are compared with the baseline conditions results to understand potential deficiencies in the transportation system, and whether the identified long-term transportation improvements address the baseline deficiencies.



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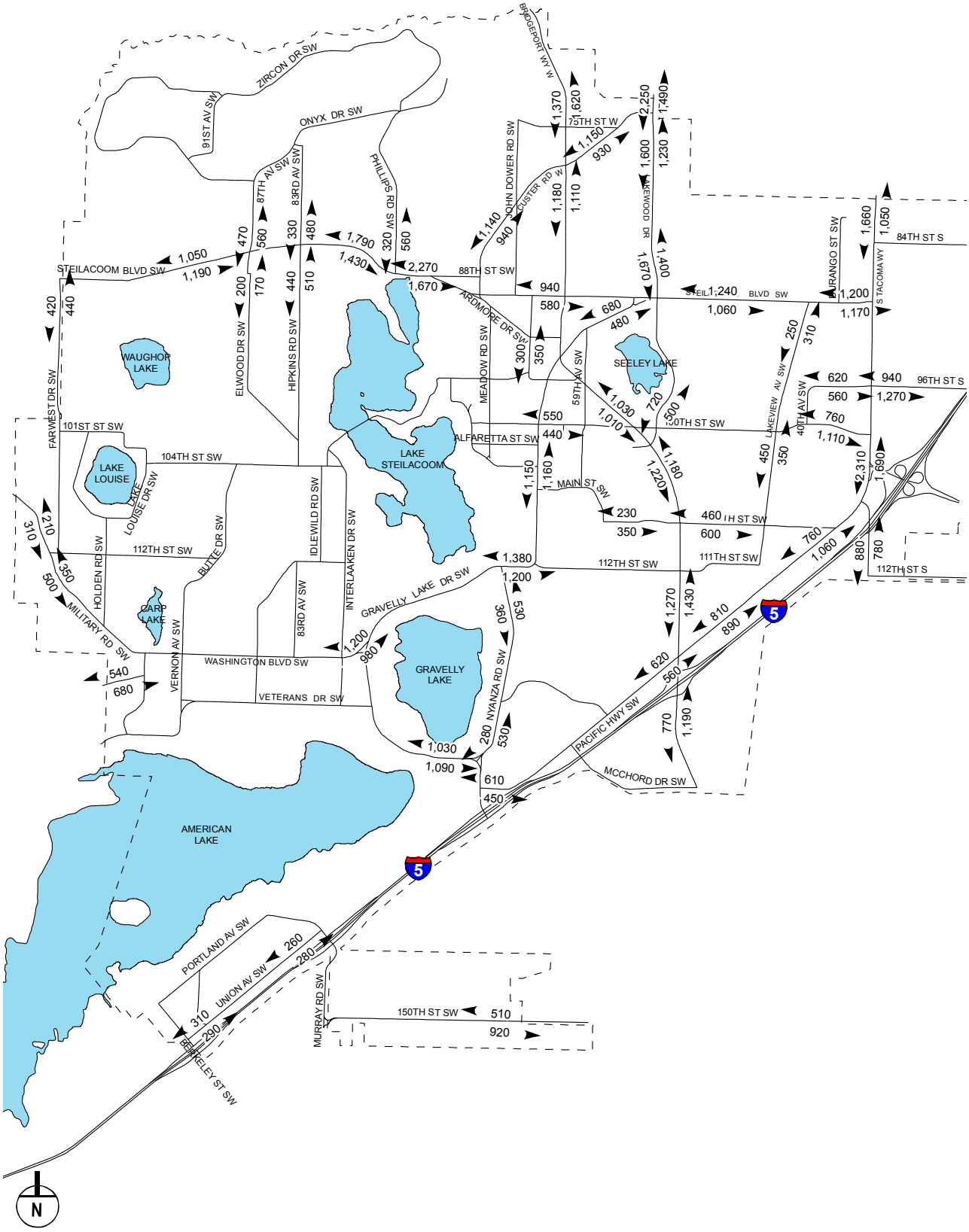
Source: Transpo Group

May 2015

Figure 8
Future (2030) Weekday Daily Traffic Volumes



0 2,000 4,000 Feet

Figure 9
Future (2030) Weekday PM Peak Hour Traffic Volumes

Source: Transpo Group

May 2015

Table 5. Future (2030) Weekday PM Peak Hour Intersection Traffic Operations Summary

	2030 Baseline		2030 Plan[1]	
Intersection	**LOS[2,3]**	**Delay[4]**	**LOS**	**Delay**
Berkeley Ave/NB I-5 Ramps[2]	D	46	-	-
Berkeley Ave/SB I-5 Ramps[2]	F	85		
Berkeley Ave/Union Ave	B	13		
Bridgeport Way/San Francisco Ave	A	9		
Bridgeport Way/NB I-5 Ramps[2]	B	20		
Bridgeport Way/SB I-5 Ramps[2]	B	14	-	-
Bridgeport Way/Pacific Hwy	D	53	-	-
Bridgeport Way/112th St	C	20	-	-
Bridgeport Way/108th St	C	28	-	-
Bridgeport Way/Lakewood Dr[2]	D	35	-	-
Bridgeport Way/100th St	D	51	-	-
Bridgeport Way/59th Ave	B	12	-	-
Bridgeport Way/Mt. Tacoma Dr	A	10	-	-
Bridgeport Way/Gravelly Lake Dr[2]	D	38	-	-
Bridgeport Way/93rd St	B	14	-	-
Bridgeport Way/Steilacoom Blvd	D	36	-	-
Bridgeport Way/Custer Rd	D	39	-	-
Bridgeport Way/75th St	C	21	-	-
Bridgeport Way/Meadow Park Rd	D	49	-	-
Gravelly Lake Dr/NB I-5 Ramps[2]	C	27	-	-
Gravelly Lake Dr/SB I-5 Ramps[2]	C	31	-	-
Gravelly Lake Dr/Pacific Hwy[2]	D	51	-	-
Gravelly Lake Dr/Nyanza Rd S[2]	A	10	-	-
Gravelly Lake Dr/Veterans Dr	B	15	-	-
Gravelly Lake Dr/Washington Blvd	C	21	-	-
Gravelly Lake Dr/Nyanza Rd N[2]	A	10	-	-
Gravelly Lake Dr/112th St	D	45	-	-
Gravelly Lake Dr/Main St[2]	C	26	-	-
Gravelly Lake Dr/Avondale Rd	A	6	-	-
Gravelly Lake Dr/Alfaretta St	B	12	-	-
Gravelly Lake Dr/100th St	C	23	-	-
Gravelly Lake Dr/Mt. Tacoma Dr	B	15	-	-
Gravelly Lake Dr/Steilacoom Blvd	C	20	-	-
Pacific Hwy/108th St[2]	C	25	-	-
Pacific Hwy/S Tacoma Way[2]	D	42	-	-
Steilacoom Blvd/Sentinel Dr	B	14	-	-
Steilacoom Blvd/Western State Hospital[2]	B	10	-	-
Steilacoom Blvd/87th Ave	C	25	-	-
Steilacoom Blvd/83rd Ave	C	34	-	-
Steilacoom Blvd/Custer ES	C	34	-	-
Steilacoom Blvd/Briggs Ln	C	28	-	-
Steilacoom Blvd/Phillips Rd[2]	B	13	-	-
Steilacoom Blvd/88th St[2]	C	25	-	-
Steilacoom Blvd/Custer Rd[2]	B	17	-	-
Steilacoom Blvd/Lakewood Dr	**E**	**66**	D	51

Intersection	2030 Baseline LOS[2,3]	2030 Baseline Delay[4]	2030 Plan[1] LOS	2030 Plan[1] Delay
Steilacoom Blvd/Hageness Dr	A	3	-	-
Steilacoom Blvd/Lakeview Dr	A	10	-	-
Steilacoom Blvd/Durango St	A	4	-	-
Steilacoom Blvd/S Tacoma Way	C	32	-	-
S Tacoma Way/Pacific Hwy[2]	D	42	-	-
S Tacoma Way/SR 512-Perkins Ln[2]	D	40	-	-
S Tacoma Way/100th St[2]	B	17	-	-
S Tacoma Way/96th St	**E**	**71**	D	48
S Tacoma Way/92nd St	A	7	-	-
S Tacoma Way/84th St[2]	B	17	-	-
SR 512/I-5 SB Off-Ramp	E	56	-	-
Thorne Ln/NB I-5 Ramps[2]	D	40	-	-
Thorne Ln/SB I-5 Ramps[2]	D	37	-	-
Thorne Ln/Union Ave	B	15	-	-
100th St/Lakewood Dr	D	42	-	-
Motor Ave/Whitman Ln	A	8	-	-
Ardmore Dr/Whitman Ln	B	12	-	-
Custer Rd/Lakewood Dr	D	55	-	-
Interlaaken Dr/Washington Blvd	A	5	-	-
75th St/Custer Rd	B	14	-	-
75th St/Lakewood Dr	C	26	-	-
108th St/Lakeview Dr	B	11	-	-
John Dower Rd/Custer Rd	B	12	-	-
88th St/Custer Rd[2]	A	6	-	-
112th St/Old Military Rd	A	7	-	-
112th St/Holden Rd	A	7	-	-
100th St/Lakeview Dr	C	31	-	-
100th St/59th Ave	B	16	-	-
108th St/Main St	B	12	-	-
100th St/David Ln	A	5	-	-
Murray Rd/150th St[5]	A	4	-	-

1. Traffic operations at locations where the 2030 Plan scenarios differs from the 2030 Baseline scenario are shown in both tables; where results are not shown for the 2030 Plan scenario, traffic operations remain the same as 2030 Baseline operations.
2. Level of service based on *Highway Capacity Manual (HCM) 2010* methodology unless otherwise noted.
3. Level of service based on *HCM 2000* methodology due to limitation of the *HCM 2010* methodology,
4. Average delay in seconds per vehicle.
5. Level of service based on Sidra roundabout methodology.

As shown in Table 5, the Steilacoom Boulevard SW / Lakewood Drive SW and S Tacoma Way / 96th Street S intersection would operate below the City's LOS D intersection standard without the planned improvements at both intersections.

Table 6. Future (2030) Weekday PM Peak Hour Roadway Traffic Operations Summary

	2030 Baseline					2030 Plan[1]		
Street Name/Section	NB/EB[2] Volume	SB/WB[2] Volume	Capacity[3]	NB/EB v/c	SB/WB v/c	Capacity	NB/EB v/c	SB/WB v/c
Ardmore Dr SW								
southeast of Steilacoom Blvd SW	550	610	720	0.76	0.85	-	-	-
northwest of Whitman Ave SW	420	530	720	0.58	0.74	-	-	-
Bridgeport Way W								
north of 75th St W	1,620	1,370	2,050	0.79	0.67	-	-	-
north of Custer Rd W	1,190	1,220	2,050	0.58	0.60	-	-	-
south of Custer Rd W	1,110	1,180	2,050	0.54	0.58	-	-	-
north of Gravelly Lake Dr SW	1,340	1,160	2,050	0.65	0.57	-	-	-
south of Gravelly Lake Dr SW	930	850	2,050	0.45	0.41	-	-	-
north of 100th St SW	1,030	1,010	2,050	0.50	0.49	-	-	-
south of 100th St SW	660	700	2,050	0.32	0.34	-	-	-
south of Lakewood Dr SW	1,180	1,220	2,050	0.58	0.60	-	-	-
north of 112th St SW	1,060	1,060	2,050	0.52	0.52	-	-	-
north of Pacific Highway SW	1,430	1,270	2,050	0.70	0.62	-	-	-
south of Pacific Highway SW	1,650	1,350	2,050	0.80	0.66	-	-	-
at Clover Creek bridge south of I-5	1,190	770	2,050	0.58	0.38	-	-	-
Custer Rd SW/ W								
northeast of Bridgeport Way SW	930	1,150	1,825	0.51	0.63	-	-	-
southwest of Bridgeport Way SW	980	1,150	1,825	0.54	0.63	-	-	-
north of 88th St SW	940	1,140	1,825	0.52	0.62	-	-	-
south of 88th St SW	260	190	2,050	0.13	0.09	-	-	-
Far West Dr SW								
south of Steilacoom Blvd SW	440	420	2,050	0.21	0.20	-	-	-
Gravelly Lake Dr SW								
southwest of Steilacoom Blvd SW	480	680	2,050	0.23	0.33	975	0.49	0.70
northeast of Bridgeport Way SW	350	610	1,825	0.19	0.33	975	0.36	0.63
southwest of Bridgeport Way SW	740	840	2,050	0.36	0.41	-	-	-
south of Mount Tacoma Dr SW	1,100	980	2,050	0.54	0.48	-	-	-
south of 100th St SW	1,080	1,070	2,050	0.53	0.52	-	-	-
south of Alfaretta St SW	1,050	950	2,050	0.51	0.46	-	-	-
north of Wildaire Rd SW	1,160	1,150	2,050	0.57	0.56	-	-	-
north of 112th St SW	1,100	1,170	2,050	0.54	0.57	-	-	-
west of 112th St SW	1,200	1,380	2,050	0.59	0.67	-	-	-
west of end Nyanza Rd SW (S)	1,090	1,030	975	1.12	1.06	-	-	-
north of Pacific Highway SW	1,670	1,320	2,050	0.81	0.64	-	-	-
south of Pacific Highway SW	1,530	1,350	2,050	0.75	0.66	-	-	-
Hipkins Rd SW								
south of Steilacoom Blvd SW	510	440	720	0.71	0.61	-	-	-
Lakeview Ave SW								
south of 100th St SW	350	450	1,825	0.19	0.25	-	-	-
south of Steilacoom Blvd SW	310	250	1,825	0.17	0.14	-	-	-
Lakewood Dr SW								

	2030 Baseline					2030 Plan[1]		
Street Name/Section	**NB/EB[2] Volume**	**SB/WB[2] Volume**	**Capacity[3]**	**NB/EB v/c**	**SB/WB v/c**	**Capacity**	**NB/EB v/c**	**SB/WB v/c**
north of 74th St W	1,490	2,250	2,050	0.73	1.10	2,050	0.73	1.10
south of 74th St W	1,230	1,600	1,825	0.67	0.88	-	-	-
north of Steilacoom Blvd SW	1,400	1,670	1,825	0.77	0.92	1,825	0.77	0.92
south of Steilacoom Blvd SW	1,020	1,080	2,050	0.50	0.53	-	-	-
north of 100th St SW	500	720	2,050	0.24	0.35	-	-	-
Military Rd SW								
south of 112th St SW	500	350	975	0.51	0.36	-	-	-
northwest of 112th St SW	310	210	975	0.32	0.22	-	-	-
Mount Tacoma Dr SW								
west of Bridgeport Way	240	210	975	0.25	0.22	-	-	-
west of Gravelly Lake Dr	440	500	975	0.45	0.51	-	-	-
Murray Rd SW								
north of 146th St SW	1,360	740	1,825 NB / 975 SB	0.75	0.76	1,825	0.75	0.41
N Gate Rd SW								
northeast of Nottingham Rd SW	680	540	720	0.94	0.75	-	-	-
N Thorne Ln SW								
southeast of Union Ave SW	440	650	720	0.61	0.90	-	-	-
Nyanza Rd SW (N)								
north of Gravelly Lake Dr SW	530	280	975	0.54	0.29	-	-	-
south of Gravelly Lake Dr SW	530	360	975	0.54	0.37	-	-	-
Pacific Highway SW								
north of 108th St SW	1,550	1,200	2,050	0.76	0.59	-	-	-
southwest of 108th St SW	1,060	760	2,050	0.52	0.37	-	-	-
northeast of Bridgeport Way SW	890	810	2,050	0.43	0.40	-	-	-
southwest of Bridgeport Way SW	560	620	975	0.57	0.64	-	-	-
east of Gravelly Lake Dr SW	450	610	720	0.63	0.85	-	-	-
Phillips Rd SW								
north of Steilacoom Blvd SW	560	320	720	0.78	0.44	-	-	-
South Tacoma Way								
north of 84th St SW	1,050	1,660	2,050	0.51	0.81	-	-	-
north of Steilacoom Blvd	1,350	1,960	2,050	0.66	0.96	-	-	-
south of Steilacoom Blvd SW	1,290	1,880	2,050	0.63	0.92	-	-	-
north of 96th St S	1,180	1,830	2,050	0.58	0.89	-	-	-
north of 100th St SW	1,110	1,350	2,050	0.54	0.66	-	-	-
south of SR 512	1,410	1,570	2,050	0.69	0.77	-	-	-
southeast of Pacific Highway SW	780	880	2,050	0.38	0.43	-	-	-
Steilacoom Blvd SW								
east of Farwest Dr SW	1,050	1,060	1,825	0.58	0.58	-	-	-
west of 87th Ave SW	1,190	1,050	1,825	0.65	0.58	-	-	-
west of 83rd Ave SW/Hipkins Rd SW	1,180	1,380	2,050	0.58	0.67	-	-	-
west of Phillips Rd SW	1,430	1,790	1,825	0.78	0.98	-	-	-
east of Phillips Rd	1,670	2,270	2,050	0.81	1.11	2,050	0.81	1.11

	2030 Baseline					2030 Plan[1]		
Street Name/Section	NB/EB[2] Volume	SB/WB[2] Volume	Capacity[3]	NB/EB v/c	SB/WB v/c	Capacity	NB/EB v/c	SB/WB v/c
southeast of 88th St SW	1,010	1,370	1,825	0.55	0.75	-	-	-
west of Bridgeport Way SW	580	940	1,825	0.32	0.52	-	-	-
east of Bridgeport Way SW	580	800	1,825	0.32	0.44	-	-	-
west of Gravelly Lake Dr SW	630	830	1,825	0.35	0.45	-	-	-
east of Lakewood Dr SW	1,060	1,240	2,050	0.52	0.60	-	-	-
west of Lakeview Ave SW	1,150	1,270	2,050	0.56	0.62	-	-	-
west of South Tacoma Way	1,170	1,200	2,050	0.57	0.59	-	-	-
Union Ave SW								
northeast of Berkeley St SW	290	310	720	0.40	0.43	-	-	-
southwest of North Thorne Ln SW	280	260	720	0.39	0.36	-	-	-
Washington Blvd SW								
west of Gravelly Lake Dr SW	980	1,200	975	1.01	1.23	975	1.01	1.23
Whitman Ave SW								
south of Ardmore Dr SW	350	300	975	0.36	0.31	-	-	-
40th Ave SW								
north of 100th St SW	420	670	975	0.43	0.69	-	-	-
74th St								
west of Lakewood Dr	1,160	1,280	2,050	0.57	0.62	-	-	-
83rd Ave SW								
north of Steilacoom Blvd SW	480	330	975	0.49	0.34	-	-	-
84th St S								
east of South Tacoma Way	750	730	2,050	0.37	0.36	-	-	-
87th Ave SW								
south of Steilacoom Blvd SW	170	200	720	0.24	0.28	-	-	-
north of Steilacoom Blvd SW	560	470	975	0.57	0.48	-	-	-
88th St SW								
east of Steilacoom Blvd SW	810	1,010	1,825	0.44	0.55	-	-	-
93rd St SW								
east of Whitman Ave SW	250	320	975	0.26	0.33	-	-	-
96th St S								
west of South Tacoma Way	560	620	975	0.57	0.64	-	-	-
east of South Tacoma Way	1,270	940	1,825	0.70	0.52	2,050	0.62	0.46
100th St SW								
west of South Tacoma Way	1,110	760	1,825	0.61	0.42	-	-	-
east of Lakeview Ave SW	1,530	1,320	2,050	0.75	0.64	-	-	-
west of Lakeview Ave SW	1,280	1,050	2,050	0.62	0.51	-	-	-
east of Lakewood Dr SW	1,400	1,310	2,050	0.68	0.64	-	-	-
east of Bridgeport Way	900	960	2,050	0.44	0.47	-	-	-
east of Gravelly Lake Dr	440	550	1,825	0.24	0.30	-	-	-
108th St SW								
west of Pacific Highway SW	630	590	720	0.88	0.82	-	-	-
east of Bridgeport Way SW	600	460	975	0.62	0.47	-	-	-
west of Bridgeport Way SW	400	270	975	0.41	0.28	-	-	-

	2030 Baseline					2030 Plan[1]		
Street Name/Section	**NB/EB[2] Volume**	**SB/WB[2] Volume**	**Capacity[3]**	**NB/EB v/c**	**SB/WB v/c**	**Capacity**	**NB/EB v/c**	**SB/WB v/c**
east of Davisson Rd SW	350	230	975	0.36	0.24	-	-	-
112th St SW/S								
between Military Rd SW & Farwest Dr S	240	280	720	0.33	0.39	-	-	-
east of Gravelly Lake Drive	370	490	975	0.38	0.50	-	-	-
east of Bridgeport Way SW	240	310	975	0.25	0.32	-	-	-
west of Bridgeport Way SW	350	460	720	0.49	0.64	-	-	-
150th St SW								
east of Woodbrook Rd SW	920	510	1,825	0.50	0.28	-	-	-

1. Traffic operations at locations where the 2030 Plan scenarios differs from the 2030 Baseline scenario are shown in both tables; where results are not shown for the 2030 Plan scenario, traffic operations remain the same as 2030 Baseline operations.
2. Volumes shown are for northbound and southbound (NB and SB) when the roadway is oriented NB-SB or eastbound and westbound (EB and WB) when oriented EB-WB.
3. When roadway capacity differs between a roadway's two directions of travel, each direction's capacity is shown (e.g. NB / SB or EB / WB).

Figure 10 highlights the arterial segments within the City of Lakewood that operate at LOS D (v/c > 0.90) or worse under future (2030) conditions and includes the following roadway sections:

- Southbound Lakewood Drive SW north of 74th Street W
- Southbound Lakewood Drive SW north of Steilacoom Boulevard SW
- Southbound Murray Road SW north of 146th Street SW
- Westbound Steilacoom Boulevard SW east of Phillips Road
- Westbound Washington Boulevard SW west of Gravelly Lake Drive SW

Mainline I-5 traffic operations were recently evaluated as part of the *WSDOT I-5 - JBLM Vicinity - Congestion Relief Study*. The traffic forecasting and infrastructure assumptions used in this I-5 study are consistent with those used in this evaluation. This WSDOT study identified several improvements along the I-5 corridor to improve mainline I-5 operations that are funded through the $495 million Connecting Washington transportation-revenue package passed by the Washington State Legislature in July 2015.

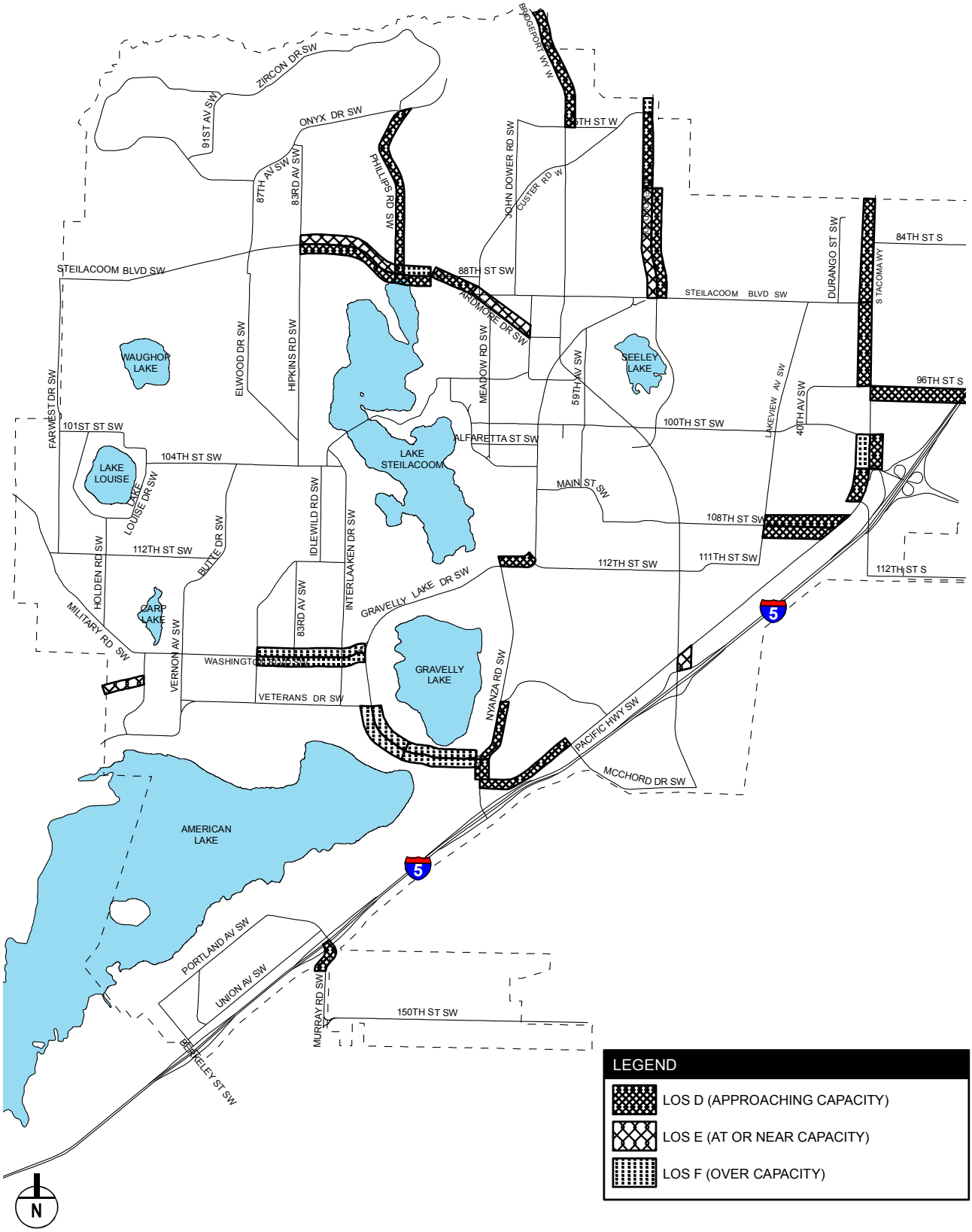


Figure 10
Future (2030) Baseline Weekday PM Peak Hour Roadway LOS where LOS D or Worse

Source: Transpo Group

May 2015

Transportation Systems Plan

The transportation system improvement recommendations provide a long-range strategy for the City of Lakewood to address current and forecast transportation issues and needs. Transportation system improvements are required to safely and more efficiently accommodate the projected growth in population and employment within the City. The recommended improvements are based upon analyses of the existing transportation system, forecasts of future travel demands, anticipated availability of funding resources, and the desire of the community to create an efficient transportation system that puts a priority on community livability.

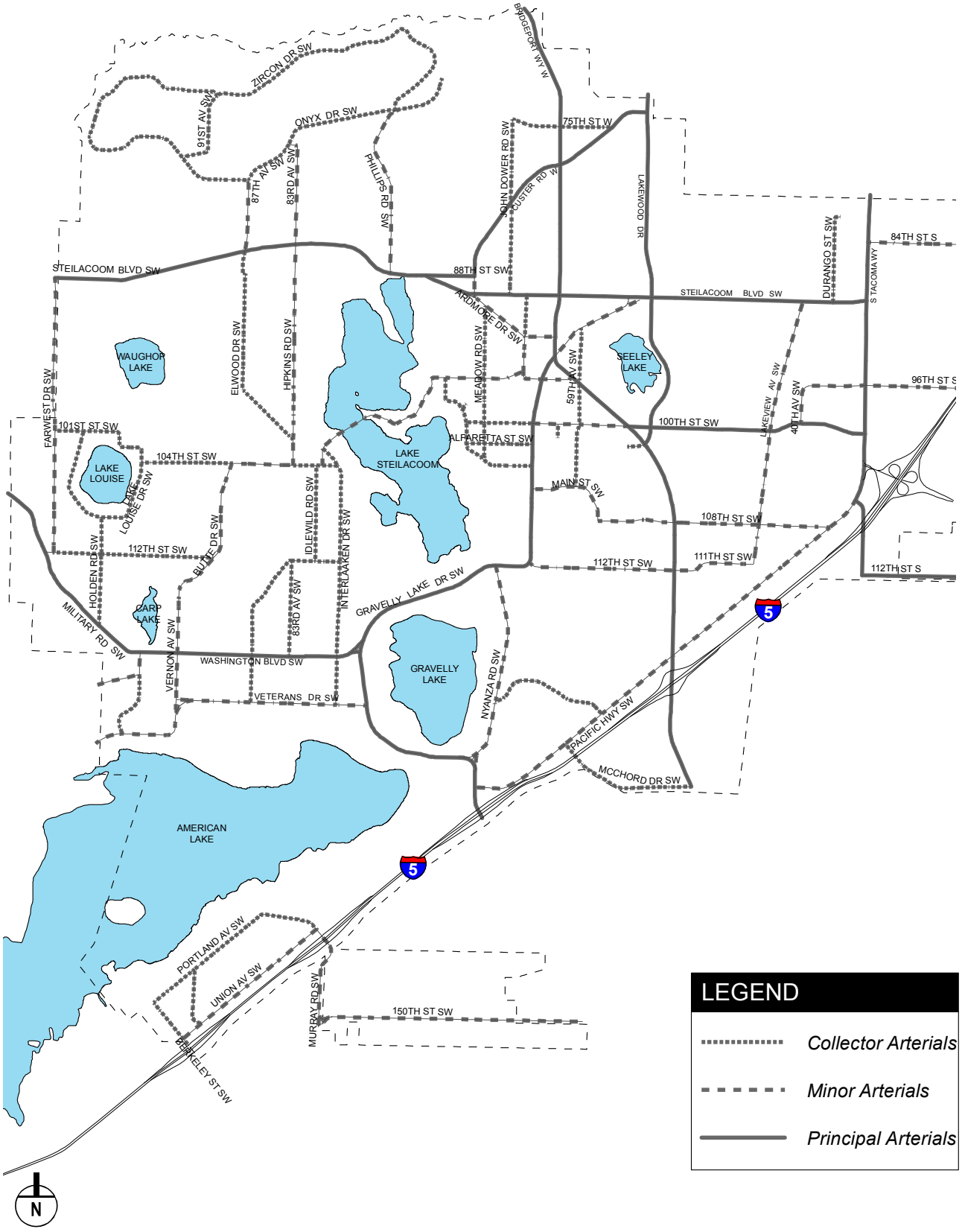
Street and Highway System

Streets and state highways are the core of the transportation system serving the City of Lakewood and surrounding communities. These facilities provide for the overall movement of people and goods through a wide range of travel modes. Streets and highways serve automobile trips, trucks, transit, vanpools, carpools, and bicycle/pedestrian travel. Therefore, the streets and highways establish the framework for the overall transportation system of the City.

Roadway Functional Classification

A roadway functional classification system allows the City to group highways, roads, and streets that comprise the transportation system into a hierarchy. The functional classification of a roadway is typically based on the types of trips that occur on it, the basic purpose for which it was designed, and the amount of traffic it carries. Higher classifications (e.g., freeways, principal arterials) provide a high degree of mobility with higher traffic volumes, generally at higher speeds, and should have limited access to adjacent land uses. Lower classifications (e.g., local access streets) provide greater access to adjacent land and are not intended to serve through traffic, carrying lower volumes at lower speeds. Collectors balance the function between mobility and access.

Based on state law, cities are required to adopt a roadway functional classification system that is consistent with state and federal guidelines. In Washington, these requirements are codified in RCW 35.78.010 and RCW 47.26.090. Each local jurisdiction is responsible for defining its transportation system into at a minimum, three functional classifications: principal arterial, minor arterial, and collector. All other roadways are assumed to be local streets. Lakewood's roadway functional classification system has four categories, as presented in Table 7. Figure 11 shows the functional classification for streets within the City.



0 2,000 4,000 Feet

Figure 11
Arterial Street Classification

Source: Transpo Group

May 2015

Table 7. Roadway Functional Classification Descriptions

Classification	Description
Principal Arterial	Principal arterials are roadways that provide access to principal centers of activity. These roadways serve as corridors between principal suburban centers, larger communities, and between major trip generators inside and outside the plan area. Service to abutting land is subordinate to travel service to major traffic movements. The principal transportation corridors within the City of Lakewood are principal arterials. These roadways typically have daily volumes of 15,000 vehicles or more.
Minor Arterial	Minor arterials are intra-community roadways connecting community centers with principal arterials. They provide service to medium-size trip generators, such as commercial developments, high schools and some junior high/grade schools, warehousing areas, active parks and ballfields, and other land uses with similar trip generation potential. These roadways place more emphasis on land access than do principal arterials and offer lower traffic mobility. In general, minor arterials serve trips of moderate length, and have volumes of 5,000 to 20,000 vehicles per day.
Collectors	Collector arterials connect residential neighborhoods with smaller community centers and facilities as well as provide access to the minor and principal arterial system. These roadways provide both land access and traffic circulation within these neighborhoods and facilities. Collector arterials typically have volumes of 2,000 to 8,000 vehicles per day.
Local Streets	Local access roads include all non-arterial public city roads and private roads used for providing direct access to individual residential or commercial properties. Service to through traffic movement usually is deliberately discouraged.

Planning for the transportation system needs primarily focuses on the arterial and collector street system within the City since local access streets typically do not have capacity deficiencies.

Roadway Standards

The City has sought to encourage standardization of road design elements for consistency and to assure that motoring, bicycling, and pedestrian public safety needs are met. Considerations include safety, convenience, aesthetics, proper drainage, and economical maintenance. The standards include items such as right-of-way needs, pavement width, type and width of pedestrian and bicycle facilities, and roadway and intersection radii.

The standards are intended to support the City's goals in providing adequate facilities to meet the mobility and safety needs of the community, as well as complying with storm water management, sensitive areas, and other regulations. The standards are intended to assist design professionals and developers for all new and reconstructed roadways and right-of-way facilities, both public and private, within the City. See City of Lakewood *Engineering Standards Manual* and *Non-Motorized Transportation Plan* for more details.

Transportation Improvement Projects

Based on an evaluation of existing and forecast traffic volumes, traffic operations, safety, and circulation needs, a recommended list of transportation improvement projects and programs were defined. The project list is organized into the following categories:

- New Construction Arterial Street Projects
- Roadway Improvements
- Traffic Signals
- Transportation Planning
- Bikeways
- Street Lighting
- Bridges
- Beautification Projects
- Roadway Restoration Projects
- Neighborhood Traffic Management
- Various Other Transportation Projects

Table 8 also provides a brief description of each project including the project limits. A project identification number consistent with the City's Six-Year TIP project list is provided for each project that is referenced. Planning-level cost estimates are also included for each project based on costs identified in the 2016-2021 Six-Year TIP. This project list includes one improvement in addition to the 2016-2021 Six-Year TIP: rechannelizing Southbound S Tacoma Way at 96th Street (Project #3.20). The cost estimates for Project #3.20 were prepared based on typical per unit costs, functional classification, and level of improvement. Adjustments to construction costs were included, as needed, to reflect any specific implementation issues, such as environmental impacts or impacts on adjacent properties.

Table 8. Transportation Projects and Programs

Number	Project	Description	Estimated Cost[1]
New Construction Arterial Street Projects			
1.2	Gravelly Lake Drive at I-5 Right Turn Lane	Widen GLD from Nyanza to I-5 SB on-ramp to provide dedicated right-turn lane. Traffic signal upgrades; bridge widening; r/w acquisition.	$1,600,000
1.4	Union Avenue – Berkeley to N. Thorne Lane	Widen to add turn lane, shared bike/travel lane, sidewalks, street lighting. Intersection improvements.	$5,000,000
1.18	96th Street – 2-way left turn lane	Widen 96th St. from 500' east of So. Tac. Way to I-5 underpass to provide 2- way left turn lane. Does not include sidewalks or HMA overlay.	$500,000
1.20	123rd St SW – Realignment	Realign 123rd St SW as it enters Bridgeport	$400,000
1.21	Murray Road and 150th Street Corridor Capacity	Provide capacity for Woodbrook Industrial development: widening of Murray Road and 150th; bike/pedestrian facilities; structural pavement section improvements	$4,500,000
1.22	Gravelly to Thorne Connector	Two-way connector road between Tillicum and Gravelly Lake Drive. Signalization.	$25,000,000
1.23	Interstate 5 through Lakewood	Planning and design coordination only.	$1,000 annual
1.24	Madigan Access Project	Provide improved access to Madigan including: Freedom bridge, ramp, & roadway widening; signalization improvements; Union Ave/Berkeley St improvements	$4,200,000
1.25	North Gate Access Improvements	Improve access to Lewis North including: intersection improvements (Edgewood / North Gate Road); non- motorized improvements (Edgewood Dr. and North Gate Rd)	$1,700,000
1.26	Steilacoom Boulevard / So Tacoma Way Intersection	SB right turn lane extension on Steilacoom Blvd. Access control improvements on both roads. Replace/upgrade traffic signals. Curb, gutter, sidewalk, lighting.	$1,380,000
1.27	Bridgeport Way – I-5 Ramp to Pacific Hwy	Turn lane extension to improve capacity and queuing capability. Road / shoulder widening; sidewalks; walls for widening.	$810,000
Roadway Improvements			
2.26	Safety Improvements in the Vicinity of Schools	May include sidewalks, crossing improvements, signage, etc. in vicinity of schools.	$50,000 bi-annual
2.29	Steilacoom Blvd. Custer to 88th Street	Curbs, gutters, sidewalks, street lighting, on both sides. Signal modifications. Signal replacement Custer/Ardmore. Overlay.	$1,975,000
2.41	Steilacoom Blvd – Bridgeport Way to Fairlawn	Curbs, gutters, sidewalks, on both sides. Overlay.	$1,400,000
2.50	Gravelly Lake Drive – 100th to Bridgeport Way	Curb, gutters, sidewalks, street lighting, drainage. Signal modifications. Signal replacement Mt. Tacoma.	$1,774,000

Number	Project	Description	Estimated Cost[1]
2.54	Minor Pedestrian Safety Improvements	Non-hardscape improvements. Shoulder widening on high-volume roads where less than 2' walkway exists.	$50,000 – annual
2.55	High Accident Location Safety Improvements	May include sight distance corrective measures, signal modifications, etc. at one of top 25 accident locations.	$50,000 – annual
2.60	South Tacoma Way – SR512 to 96th Street	Curb, gutter, sidewalks, street lighting, drainage, overlay.	$3,460,000
2.61	ADA Standards – Sidewalk Upgrades	On-going program to gradually upgrade existing facilities to current ADA standards	$50,000 – annual
2.65	Steilacoom Blvd – 87th to 83rd	Curb, gutter, sidewalks, street lighting, drainage, overlay.	$2,080,000
2.66	Steilacoom Blvd –83rd to Weller Road	Curb, gutters, sidewalks, street lighting, drainage, overlay.	$2,650,000
2.67	Bridgeport Way – I-5 to JBLM Gate	Curb, gutters, sidewalks, street lighting, drainage, overlay.	$3,650,000
2.68	Hipkins Rd. 104th to Steilacoom Blvd.	Curb, gutters, sidewalks, street lighting, drainage, overlay.	$3,050,000
2.69	Gravelly Lake Drive – Bridgeport to Steilacoom Road Diet	Reduce 4 travel lanes to 3. Curb, gutters, sidewalks, bike lanes, street lighting, drainage, overlay.	$1,850,000
2.70	Lakewood Station – Non-Motorized Access Improvements	Curb, gutters, sidewalks, and street lighting improvements per Lakewood NMTP and Sound Transit Access Improvement Study.	$1,500,000
2.71	Steilacoom Blvd – Weller Road to Phillips Road	Curb, gutter, sidewalks, street lighting, drainage, overlay.	$2,530,000
2.72	100th Street & Lakewood Drive	Curb, gutter, sidewalks, sharrows, replace 100th/Lakewood signal, street lighting, drainage, overlay.	$1,780,000
2.73	112th / 111th – Bridgeport to Kendrick	Curb, gutter, sidewalks, sharrows, street lighting, drainage, overlay.	$2,040,000
2.74	Steilacoom Blvd Corridor Design – Farwest to Phillips	Curb, gutter, sidewalks, sharrows, turn lanes, street lighting, drainage, overlay.	$942,000
2.75	South Tacoma Way – 88th to North City Limits	Curb, gutter, sidewalks, bike lanes, street lighting, signal at 84th, drainage, overlay.	$3,100,000
2.76	Phillips Road – Steilacoom to Onyx	Curb, gutter, sidewalks, bike lanes, street lighting, drainage, overlay.	$2,800,000
2.77	Washington Blvd – Edgewood Ave to Gravelly Lake Drive	Curb, gutter, sidewalks, bike lanes, street lighting, drainage, overlay.	$5,900,000
2.78	Oakbrook Sidewalks & Street Lighting	Curb, gutter, sidewalks, sharrows, turn lanes, street lighting, drainage, overlay.	$3,400,000
2.79	Lake City Business District Sidewalks (American Lake Park to Veterans Dr / Alameda)	Curb, gutter, sidewalks, sharrows, street lighting, drainage, overlay.	$2,100,000
2.80	Interlaaken Drive SW / Mt. Tacoma Drive Non-Motorized Improvements – Short Lane to Whitman Avenue SW	Provide curb and gutter, sidewalk and a shared travel/bike lane on one side of Interlaaken / Mt. Tacoma Dr.	$4,000,000
2.81	Roadway Safety Improvements at 40th Ave. SW and 96th St. SW	Curb, gutter, sidewalks, sharrows, guard rail, street lighting, pavement reconstruction.	$843,000
2.82	59th Ave SW Sidewalk – 100th to Bridgeport Way SW	Sidewalk east side of roadway	$125,000
2.83	Gravelly Lake Dr. – Pacific Hwy to Nyanza (south)	Curb, gutter, sidewalks, bike way, street lighting, pavement rehab.	$1,450,000
Traffic Signals			

Number	Project	Description	Estimated Cost[1]
3.1	Steilacoom / Durango Traffic Signal	Intersection meets warrants for traffic signal. Signal needed with new development in area. Special concern with adjacent train crossing becoming active.	$350,000
3.7	Washington Blvd. / Interlaaken Drive Signal and Intersection improvement	Install new signal at intersection.	$375,000
3.8	Traffic Signal Timing Upgrades	Upgrade traffic signal timing and coordination.	$10,000 – annual
3.11	City-Wide Traffic Signal Management System	City-hall based Traffic Management Center. Fiber optic interconnect. PTZ major corridors. Active traffic management including web based info.	$1,270,000
3.12	Traffic Signal Replacement Program	Replace aging traffic signals. Priorities based on maintenance history. (one signal every 3rd year)	$250,000 – bi-annual
3.13	Gravelly Lake Drive / Avondale Traffic Signal	Intersection meets warrants for traffic signal. Increased volumes in and around Towne Center.	$250,000
3.14	S Tacoma Way / 92nd Street	New warranted signal	$650,000
3.16	Steilacoom Blvd / Western State Hospital Signal Replacement	Replace existing signal	$210,000
3.17	Steilacoom Blvd / Lakeview Ave Signal Replacement	Replace existing signal	$340,000
3.19	Traffic Signal Asset Management System	Purchase software; develop asset management system	$115,000
3.20	Rechannelize Southbound S Tacoma Way at 96th Street	Reconfigure the southbound channelization on southbound S Tacoma Way at 96th Street SW to provide two left-turn lanes, one through lane, and one shared through/right-turn lane, and modify associated traffic signal heads.	$805,000
Transportation Planning			
4.1	Pavement Management System	Semi-Annual evaluation of pavement condition	$5,000 / $30,000 – bi-annual
4.2	Transportation Model	On-going updates of travel demand model.	$5,000 – annual
4.8	Lakewood City Center Sub-Area Plan	Review access and circulation for vehicles, transit, and non- motorized transportation.	$20,000
4.9	Non-Motorized Transportation Plan Update	Update NMTP to include relevant policy updates and capital improvement projects. (original plan adopted June 2009)	$15,000
4.10	ADA Transition Plan Update	Update ADA transition plan to address ADA deficiencies of existing curb ramps; signal access / operations; etc.	$15,000
Bikeways			
5.1	Miscellaneous Bikeway Markings / Signage	Ongoing installation of bicycle pavement markings and signage throughout the City.	$20,000 – annual
5.4	Miscellaneous Bike Lane Construction	Ongoing construction of bicycle lanes on existing roadways.	$50,000 – bi-annual
5.5	North Thorne Lane to Gravelly Lake Drive Non-Motorized Trail	Provide non-motorized path between Tillicum and Gravelly Lake Drive "Gravelly to Thorne Connector" construction.	$5,000,000
5.6	Gravelly Lake Non-Motorized Trail	Provide non-motorized path around Gravelly Lake along Gravelly Lake Drive and Nyanza Drive. Existing roadway cross section shifted to outside and overlaid. Lighting.	$200,000
Street Lighting			
6.2	Arterial Street Lighting	Install street lighting in requested areas based on ranking criteria	$30,000 – annual
6.4	Low income area street lighting	Install street lighting in various low income areas	$30,000 – annual

Number	Project	Description	Estimated Cost[1]
6.6	LED Street Lighting Upgrades	Update existing street lighting to LED. Coordinate with purveyors on rebates.	$2,260,000 (*typically $160,000 annual)
Bridges			
7.1	Bridge Inspection	On-going biennial bridge inspection.	$9,000 – bi-annual
Beautification Project			
8.10	Gateway Improvements		$20,000 – annual
Roadway Restoration Projects			
9.7	Resurfacing Program – Various Locations	Projects in various locations may include pavement preservation contribution to planned utility projects to facilitate full roadway overlays.	$18,070,000
9.10A	Steilacoom Boulevard – 87th to Weller Road	Restore roadway section to current City standards.	$1,120,000
9.10B	Steilacoom Boulevard – Weller Road to Custer Road	Restore roadway section to current City standards.	$1,120,000
9.14	Lakewood Drive – 100th to Steilacoom Blvd	Restore roadway section to current City standards.	$900,000
9.15	Lakewood Drive – Flett Creek to N. City Limits	Restore roadway section to current City standards.	$1,100,000
9.16	59th Ave – Main Street to 100 Street	Restore roadway section to current City standards.	$450,000
9.17	108th – Bridgeport Way to Pacific Hwy	Restore roadway section to current City standards.	$600,000
9.18	Custer – Steilacoom to John Dower	Restore roadway section to current City standards.	$450,000
9.19	88th – Steilacoom to Custer	Restore roadway section to current City standards.	$250,000
9.20	Pacific Hwy – 108th to SR512	Restore roadway section to current City standards.	$540,000
9.21	100th – Lakeview to South Tacoma Way	Restore roadway section to current City standards.	$480,000
9.22	100th – 59th to Lakeview	Restore roadway section to current City standards.	$1,100,000
10.1	Neighborhood Traffic Management	May include speed humps, traffic circles, signage, etc.	$20,000 – annual
Other			
11.1	On-call technical assistance	Various professional services including surveying, structural, geotechnical, environmental to support various projects	$50,000 – annual
11.2	Public Works Operations & Maintenance Facility	Property acquisition; design and construction of jointly-owned Streets / Surface Water Management O&M Shop.	$585,000

1. All costs in 2015 dollars with no accounting for inflation and are consistent with the 2016-2021 Six-Year TIP project list with the exception of Project #3.20 - Rechannelize Southbound S Tacoma Way at 96th Street.
2. Costs estimated for project #3.20 - Rechannelize Southbound S Tacoma Way at 96th Street prepared by Transpo Group and are based on typical per unit costs, functional classification, and level of improvement

Transportation Programs

The City of Lakewood has several ongoing programs to evaluate and improve the transportation system. These regular programs help to ensure the condition and reliability of the City's transportation system and to upgrade different elements to current City, State, Federal, or typical industry standards. Improvement programs include:

- Safety improvements within the vicinity of schools (bi-annual)
- A review of high accident location safety improvements (annual)

- On-going upgrades to pedestrian facilities to comply with current Americans with Disabilities Act (ADA) standards (annual)
- On-going operation and maintenance [pavement repair (patching and sealing); pavement striping and marking; signage; shoulder grading; vegetation control; street lighting; signalization; snow and ice control; structures (guard rails; bridges; etc.)]
- Maintenance updates for traffic signal timing settings (annual)
- A traffic signal replacement program to update/upgrade aging traffic signals (tri-annual)
- A pavement management system (bi-annual)
- On-going updates to the City's travel demand model
- Bikeway markings and signage (annual) and bike lane construction (bi-annual)
- Street lighting installation based on ranking criteria, specific low-income areas, and regular upgrading to LEDs (annual)
- Bridge inspections (bi-annual)
- Pavement resurfacing (annual)
- Neighborhood traffic management (annual)

Freight & Mobility System

Trucks deliver goods to retail establishments and construction materials to construction sites, as well as transport goods from industrial uses located throughout the City. By increasing the time cost and other costs of moving freight, traffic congestion increases the price of goods. The City must ensure that trucks have the ability to move to and through Lakewood.

To support freight movement, the City classifies all principal arterials as truck routes. Access to industrial areas such as the Lakewood Industrial Park, the areas northeast and southeast of the SR 512/I-5 interchange, the Woodbrook neighborhood, and other designated industrial areas throughout the City is supported by the maintenance and design of the City's principal arterials.

Non-Motorized System

Bicycle, pedestrian, and equestrian facilities play a vital role in the City's transportation environment. The non-motorized transportation system is comprised of facilities that promote mobility without the aid of motorized vehicles. A well-established system encourages healthy recreational activities, reduces vehicle demand on City roadways, and enhances safety within the community.

The City desires to enhance the Lakewood urban area pedestrian and bicycle system. The City has an annual program to enhance non-motorized facilities. Improvements summarized in the Non-Motorized Transportation Plan (NMTP, June 2009) are identified to address gaps in the non-motorized transportation system. Figures 6 and 7 show the priority pedestrian and bicycle improvements as identified in the NMTP. Greater details on existing and planned pedestrian and bicycle facilities are provided in the NMTP and previously in Table 8. As a separate publication, the NMTP was developed to directly address non-motorized elements as part of the Comprehensive Plan and the vision of citizens. Public Transit System
As the region continues to grow in population, vehicular traffic congestion, and ages, more citizens will become reliant on alternatives to the passenger vehicle for mobility purposes. Pierce

Transit, Sound Transit, and Intercity Transit will be key players in Lakewood's ability to maintain necessary mobility. The City will work with each transit agency as they develop their respective level of service (LOS) or quality of service (QOS) goals, and identify and support enhancements to address any LOS/QOS deficiencies.

The City will continue to support the use of transit services by supporting the following:

- Bus, commuter rail, and passenger rail stops at popular destinations;
- Transit oriented development near existing or new transit facilities;
- Transit agency LOS/QOS goals;
- Transit stops that are comfortable and convenient for waiting for transit service;
- High frequency and reliability of service (Bus Rapid Transit, transit signal priority, etc.);
- Low number of transfers required to reach a destination;
- Service during non-peak hours and weekends;
- Vehicular and non-motorized accessibility of transit facilities such as additional bus stops, park-and-rides, non-motorized facilities to aid access to transit facilities, etc.;
- Safety and security at the transit facilities

Several key transit facilities located in the City support of these features including the Lakewood Transit Center, SR 512 Park & Ride, and Lakewood Station. In addition, the City could implement transit oriented development policies in the vicinity of these facilities to further support transit usage and continue to improve non-motorized facilities serving transit operations. Non-motorized facility improvements supporting transit service and accessibility are identified in the adopted Non-Motorized Transportation Plan (NMTP) and Six-Year Transportation Improvement Program.

Transportation Demand Management

To minimize increases in the impacts of vehicles on the transportation system and the environment, alternatives to the single-occupancy vehicle will become more necessary. These alternatives include carpooling, walking, bicycling, transit, telecommuting, and flexible hours at work sites.

Transportation demand management (TDM) is the term used when communities, employers, schools, or households develop techniques to influence mode choice, the time of a trip, and the frequency of trips made. TDM is a major policy thrust in the Puget Sound Regional Council's MTP and is also required under the Growth Management Act (GMA). Examples of TDM include:

- Charging for parking at worksites to increase the cost of driving alone, relative to carpooling;
- Providing free or low cost bus passes to employees as part of an employee benefit package to encourage use of transit or vanpools;
- Providing incentives to employees who carpool, walk, or bicycle to work;
- Allowing flexible hours at work sites so employees can shift their commute trip to non-peak periods;
- Developing telecommuting programs so that employees do not need to commute into the office every work day;
- Providing guaranteed ride home programs to employees who bus, carpool, or vanpool; and

- Providing worksite amenities, such as cash machines, food services, daycare, breakrooms, showers, and clothes lockers to reduce the need for non-work trips.

Other techniques, such as convenient parking for carpool/vanpools, in-house ride matching services, and bus maps on site can encourage alternatives to the single-occupancy vehicle.

Washington's Commute Trip Reduction (CTR) Act sets goals for reducing the number of single-occupancy vehicle trips at worksites that employ over 100 regular, full-time employees. While there are currently no employers in the City that currently fall under these requirements, the City will continue to coordinate with employers and transportation service providers (such as Pierce Transit and Sound Transit) as appropriate, to coordinate policies and services to CTR affected sites.

Air, Rail, & Water Transportation Facilities

Regional, national, and international air travel for Lakewood is provided via Seattle-Tacoma International Airport, located approximately 30 miles north of the City. The airport can be accessed via I-5.

Sound Transit railroad tracks traverse Lakewood in approximate alignment with S Tacoma Way, Lakeview Avenue S, and I-5. Currently, this rail line serves Sounder Commuter Rail north from the Lakewood Station. Amtrak passenger train activity is anticipated to begin using these tracks through Lakewood beginning in 2017, although is not expected to stop at the Lakewood Station. The City of Lakewood would support potential improvements to rail facilities such as a study of a potential Amtrak stop at the Lakewood Station or potential grade separation from rail facilities at various crossing locations through the City.

There is no waterborne transportation serving Lakewood. The Transportation Element does not identify waterborne transportation as a component of the City's transportation system.

Implementation Program

The transportation improvement projects must be funded and implemented to meet existing and future travel demands in and around the City of Lakewood. Implementation of the projects identified in the Transportation Element involves a range of funding strategies and potential new funding sources. One strategy includes coordinating with other agencies to build support and construct the transportation improvement projects, including the expansion of transit service in the City. Another strategy includes the pursuit of grants, which will be especially critical in the implementation of safety and operational improvements and completion of the non-motorized projects. The City will also need to review and regularly maintain development review processes to assure that the impacts of growth are mitigated and transportation improvements are completed concurrent with new development. Additionally, the City should explore additional funding sources to implement high priority transportation projects to support new growth. Finally, if expected funding for improvements to meet future transportation needs is found to be inadequate and the City will not be able to meet adopted level of service (LOS) standards, then the City will need to pursue options as laid out under the Reassessment Strategy.

Local Funding

The City utilizes a number of fees and tax revenues to construct and maintain their transportation facilities. Primary City revenues directed toward transportation projects include the Real Estate Excise Tax (REET) and Surface Water fees. Drainage and retention of storm water is part of most roadway and intersection projects making Surface Water fee revenue an appropriate part of the transportation funding program. The City also uses state fuel tax revenue to maintain and operate the transportation system and can direct revenues from its General Fund to transportation projects and programs, as needed.

Transportation Benefit District

The City created a Transportation Benefit District (TBD) in 2012, and in 2014 authorized an annual $20 vehicle licensing fee to fund specific transportation projects and programs throughout the City. The TBD is governed by the members of the Lakewood City Council as the District's Board of Directors and the Mayor serves as the Chair of the Board. Revenues from a TBD can be used for the construction, maintenance, preservation, and operation of state, regional, or local agency roadways, high capacity transportation systems, public transit, and transportation management programs. However, Lakewood has specifically identified the projects and programs that the fee revenue will be applied towards. The City could consider enacting additional TBD taxes and fees to implement additional projects identified in the Transportation Element.

Multi-Year Financing Plan

The City of Lakewood recognizes the need to balance transportation system maintenance and preservation with needed transportation improvements to support growth and maintain adopted level of service standards. In addition as new improvements are added, the city needs to adjust resources in order to operate and maintain new infrastructure.

A "Lakewood Funding Strategy" project was completed in 2010 looking at a 10-year horizon through 2020 (see Appendix A). This document is scheduled to be updated in the next few of years and will be coordinated with the 6-Year Transportation CIP.

As a result of the “Lakewood Funding Strategy” project, the City moved forward and formed a Transportation Benefit District (TBD) and adopted the $20 per vehicle license tab fee. This funding was dedicated to close the gap on the needed funding for pavement preservation.

In addition, the City is in the process of completing asset management systems for the following infrastructure: street lighting, traffic signals, pavement markings, and signage. Information from these asset management systems will be utilized to determine annual maintenance costs.

Regional Coordination

The City will closely coordinate with WSDOT to implement improvements to I-5, SR 512, the Sound Transit railroad tracks in association with the Point Defiance Bypass project, and the Berkeley Street interchange. Even though I-5 and SR 512 are outside the corporate limits of the City, Lakewood residents and businesses take primary and direct access from these highways. Lakewood will work with WSDOT, PSRC, the transit providers, and neighboring jurisdictions to improve these corridors.

Lakewood's transportation system is also impacted by neighboring jurisdictions. Lakewood needs to address regional traffic impacts to jointly develop or advocate for transportation improvements along common border streets. The City must also work to improve connections to key Pierce Transit and Sound Transit facilities.

Grants

The City will continue to aggressively pursue federal and state grants to implement many of the identified transportation improvements. Key state and federal grant programs are managed by the state Transportation Improvement Board (TIB), PSRC, or through WSDOT Local Programs. Each grant program requires an agency match. The City will need to reserve adequate funding for use in matching against any grant funds that are received.

The City will work through TIB, PSRC, and WSDOT to pursue grants for specific projects. Projects to improve principal arterials such as South Tacoma Way, Steilacoom Boulevard, Bridgeport Way, and Gravelly Lake Drive are candidates for TIB and some federal grant programs managed through WSDOT. Grants to enhance pedestrian and bicycle facilities are largely through either TIB, WSDOT pedestrian/bicycle program, or the Safe Routes to Schools program.

Other Potential Funding Sources

The following outlines possible funding sources the City could consider for financing transportation maintenance, and capital projects and programs. The City should explore strategies to address funding shortfalls and consider policy changes that would provide for reliable future revenues to fully maintain, operate, and expand its transportation system. The potential funding options are described below and listed in Table 9.

Table 9. Local Transportation Funding Options

Local Funding Source	Comments
Transportation Impact Fee	With City Council approval, the City may charge a fee to help fund specific transportation projects shown to be reasonably related to new development.
Local or Business Improvement District (LID or BID)	Levy a special benefit assessment on properties within a specific area that would benefit from the improvement.
General Obligation (GO) Bonds	With voter approval, a GO bond requires 60 percent approval and creates a new source of funds when tied to an excess levy for repayment of the bond debt.
Planned Action Ordinance	A project specific action under the State Environmental Protection Act (SEPA) in which the mitigation measures that will be applied have already been identified through a environmental review process.
Other Developer Mitigation	Potential mitigation to address local development regulations and requirements such as GMA concurrency, the State Environmental Policy Act (SEPA), and street standards/frontage improvements.
Latecomers Agreements	Allow property owners who have paid for capital improvements to recover a portion of the costs from other property owners in the area who later develop property that will benefit from those improvements.

SOURCE: Transpo Group 2015

Transportation Impact Fees

Transportation impact fees (TIF) may be charged to help fund specific transportation projects shown to be reasonably related to new development. The impact fees “shall only be used to fund system improvements” that are reasonably related to and benefit the new development. Impact fees may not be used to correct existing deficiencies. The imposing jurisdiction must also contribute funds to the included projects, which by statute cannot be funded 100 percent through impact fees (RCW 82.02.050 [2]). The revenues collected from a TIF must then be used within six years of payment. The goal of implementing transportation impact fees is to create fees based on a new development’s expected benefit from the transportation system improvements that are needed to support future growth. Generally, this is done by basing the fees on the number of vehicle trips a development is expected to generate and the proportional cost of the transportation improvement projects (alternatively can be charged on a per unit basis) needed to serve growth.

Local Improvement District or Parking and Business Improvement Area

Any jurisdiction may form a local improvement district (LID) parking and business improvement area (PBIA) and levy a special assessment on properties within the district that would benefit from the improvements. An LID is a special purpose financing option that may be created by the City or other local governments to fund improvements, such as streets, water, or sewer facilities that benefit nearby property owners. Voter approval is not required to form an LID, but the LID formation may be challenged by the property owners. LIDs for cities are authorized under RCW 35.43 to 35.56. The City may levy a tax on the property within an area that will benefit from a specific capital project. They can be created by local governments or they can be initiated by property owners in the benefit area. Property owners that will benefit from the improvements would be assessed a special benefit assessment based on proportionate levels determined during the formation of the districts. This special benefit assessment would typically be paid annually by the property owner for a time period established during the formation of the district. The City would have discretion in its financial contribution to the overall project costs of the district.

A PBIA is somewhat similar to an LID, but has specific requirements per RCW 35.87A.010. A PBIA is permitted to aid general economic development and neighborhood revitalization. It is intended to facilitate the cooperation of merchants, businesses, and residential property

owners to support economic vitality, livability, and general trade. A PBIA requires a petition be submitted by at least 60 percent of the assessments of property within the area.

General Obligation Bonds Supported with an Excess Property Tax Levy

The City Council may go to the public for a voter-approved bond with a property tax increase. With voter approval, the City can increase funding through debt by raising the property tax rates to pay the general obligation bond.

Planned Action Ordinance

Planned Action Ordinances (PAO) are a project specific action under the State Environmental Protection Act (SEPA) in which an Environmental Impact Statement (EIS) designates, by ordinance, those types of projects to be considered Planned Actions – spelling out mitigation measures that will be applied. This type of action is appropriate for small areas, such as the downtown, expecting a specific type of development. Per RCW 43.21C.031, GMA counties and cities may designate a planned action. A planned action must be designated by an adopted ordinance or resolution of the City. The planned action must be based on an Environmental Impact Statement (EIS) that adequately addresses significant environmental impacts. The EIS needs to be prepared in conjunction with a comprehensive plan or subarea plan adopted under GMA.

The planned action can only include projects that are subsequent to or implement the comprehensive plan or subarea plan; however, the projects must be located within the defined urban growth area. The planned action would be limited to specific geographical areas that are less than the boundaries of the City or to specific types of development within the City. The ordinance and/or EIS must specify a time limit for the planned action. The City will need to fund the costs of preparing the subarea plan and EIS to establish the planned action, which is typically a significant upfront investment.

To ensure that the developments are not paying twice for the same impacts, it is recommended that projects included in a planned action are not also included in a TIF, or at least are specifically allocated to each funding source. This distinction would simplify the administration of both funding options.

Other Development Mitigation

All new development in the City must pass state and local development regulations and requirements. These include GMA concurrency requirements, the State Environmental Policy Act (SEPA), and road standards/frontage improvements. These elements are project specific and are reviewed as part of each development application.

Latecomers Agreements

Latecomers Agreements (RCW 35.72) are contracts that allow property owners who have elected to install capital improvements to recover a portion of the costs from other property owners in the area who later develop property that will benefit from those improvements. The City may also join in the financing of the improvement projects and be reimbursed in the same manner as a property owner. The period of collection may not exceed 15 years and is based on a pro-rata share of the construction and contract administration costs of the particular project. The City must define an area subject to the charges by determining which properties would require similar improvements. The preliminary assessment reimbursement area needs to be provided to all property owners within the area; owners of property in the area may request a hearing to discuss the Latecomers Agreement. The contract must define the cost allocation process based on benefits to properties in the reimbursement area. The final contract must be recorded with the County Auditor within 30 days to be valid. Although

not explicitly required, the City could adopt an ordinance noting the circumstances where the option for such a reimbursement contract would be acceptable.

Concurrency Management and Development Review

Concurrency refers to the ongoing process of coordinating infrastructure needs with community development. This concept was formalized in the GMA to ensure that adequate public facilities are provided in concert with population and employment growth. For transportation facilities, the GMA requirement is fulfilled if its LOS standards will continue to be met including the additional travel demand generated by each development.

Concurrency determinations for the roadway network are closely linked with development review decisions. In addition, the City reviews development applications pursuant to the State Environmental Policy Act (SEPA). Concurrency and SEPA are primarily focused on a shorter-term time frame. Projects that result in an adverse impact are required to fund or implement mitigation measures that reduce the impact below a level of significance and/or meet the LOS standard. The City provides credits where developers are required to construct improvements whose costs are included in the Six-Year TIP program.

The City will regularly monitor the operations and levels of service of its transportation system. The City will use the information in developing its Six-Year Transportation Improvement Program (TIP), pursuit of grants, and coordination with WSDOT and other agencies. The City will apply SEPA and the City's Road Standards to evaluate and identify appropriate improvements for mitigating impacts of developments in the City.

Reassessment Strategy

The implementation strategy to complete the capital projects identified in Table 8 is largely based on revenue from taxes and grants, and the Transportation Benefit District. The City may be able to shift revenues from other funding programs to address specific needs as yearly budgets are prepared. In addition, the City is committed to reassessing its transportation needs and funding sources each year as part of the annual six-year TIP. This allows the City to match the shorter-term improvement projects with available funding.

In order to maintain the vitality of the City's transportation system, the City should adhere to the following principles as it implements the Transportation Element:

- Coordinate timing of new development in LOS deficient areas with fully-funded improvements identified in the required six-year TIP.
- Provide for routing traffic to other roads with underutilized capacity to relieve LOS standard deficiencies, but taking into consideration the impact of additional traffic on the safety and comfort of existing neighborhoods.
- Aggressively pursue the following TDM strategies, including parking management actions in the commercial centers:
    - Install parking meters on streets within and adjacent to commercial centers;
    - Develop public parking facilities and use cost pricing to discourage SOV commuting;
    - Institute a municipal parking tax;
    - Set maximum parking space development standards and reduce over time to further constrain parking supply;
    - Support charging for employee parking and providing monetary incentives for car and vanpooling;
    - Partner with Pierce Transit to identify public and/or private funding for expanded transit service during peak and off-peak times along LOS deficient corridors.

- Aggressively pursue federal and state grants for specific transportation improvements on LOS deficient roadway segments.
- Make development density bonuses available to developers who provide additional transit, bicycle, and pedestrian-friendly amenities beyond the minimum requirements.
- Reassess commercial and residential development targets and make adjustments to channel development away from LOS deficient locations.
- If the actions above are not sufficient, consider changes in the LOS standards and/or limit the rate of growth, revise the City's current land use element to reduce density or intensity of development, and/or phase or restrict development to allow more time for the necessary transportation improvements to be completed.

Appendix A: Lakewood Funding Strategy

transpoGROUP
WHAT TRANSPORTATION CAN BE.

MEMORANDUM

Date:	August 30, 2010	**TG:**	09222.00
To:	Jeff Gonzalez – City of Lakewood		
From:	Jon Pascal – Transpo Group		
Subject:	Summary of the Lakewood Funding Strategy project		

This memorandum summarizes the work completed as part of the Lakewood Funding Strategy project. Specifically this memo describes the materials that were developed through the course of the project and how the analyses was conducted in development of the deliverables.

Description of the Deliverables

Several deliverables were prepared as part of the project and have been attached to the memorandum. They include:

Attachment A – Funding Outlook

A one-page handout was prepared that summarizes the main transportation funding categories, expected revenues and expenditures over the next 10 years for each category, and where the revenue comes from. Funding was separated into the three categories to better highlight the costs of each and how revenue is tied to specific types of projects. Each category is expected to have a significant shortfall over the next 10 years, with pavement management expected to have the largest shortfall. The only revenue source that specifically targets pavement management activities, such as chip sealing and asphalt overlay, is the state motor vehicle fuel tax.

Attachment B – Transportation Revenues and Expenditures

A spreadsheet and supporting graphs were prepared to breakdown the individual components of the revenue sources and types of expenditures by year. A series of assumptions were made to account for inflation, cost of materials, growth in revenue, and other potential revenue sources the City could consider. There are two main revenue accounts, the 101 Fund for street maintenance and operations, and the 102 Fund for capital improvements. Each is made up of sources such as the fuel tax, utility taxes, grants, surface water management fund, real estate excise tax, and other sources. This information was reviewed with City staff and several revisions were made to the assumptions during the course of the project. The resulting revenue and expenditure projections provide the basis for the funding outlook handout sheet shown as Attachment A.

Attachment C - Transportation Project List, Costs and Priorities

The list of the City's short and long-term capital improvement projects was prepared based on the existing six-year transportation improvement program (TIP), the adopted non-motorized plan, and an evaluation of future level of service deficiencies. The capital projects and programs were organized into the following eight categories:

- Arterial Street Improvements
- Intersection / Signal Improvements
- Pedestrian / Bicycle Improvements
- Roadway Improvements
- Safety Improvements
- Planning & Services
- Bridges

- Street Lighting

A summary of each project is included in the table that describes the project limits and provides a planning level description of the scope of work. The table also identifies if a project is currently in the City's TIP. This is useful for identifying projects that may already be in planning, design, or construction phases.

Planning level cost estimates are also included for each project. The cost estimates were prepared based on typical per unit costs and provided by the City. Each project was also assigned a relative priority tier. If the project was already identified on the TIP, then it was assigned a Tier 1 status. Tier 2 and 3 were assigned to the remaining projects based on discussions with the City. The costs of the Tier 1 projects were included in the funding outlook summary provided as Attachment A. Projects that would likely be funded by new development were highlighted in green.

Attachment D – PM Peak Hour Traffic Volumes and Corridor Levels of Service

Attachment D provides a series of maps and a supporting table summarizing PM peak hour traffic volumes and levels of service (LOS) by corridor. The information was prepared from a comprehensive traffic count inventory and development of traffic forecasts using the City's travel demand model.

Traffic Count Inventory

Existing weekday PM (4:00 PM to 6:00 PM) peak hour turning movement counts were collected at the study area intersections in winter and spring of 2010 by the City. The turning movements were then summarized by direction and corridor to arrive at the volumes shown on the maps and table. This time period typically represents the highest traffic volumes on a weekday within the City. The study intersections are shown as part of Attachment E.

Development of the Travel Forecasts

Travel forecasts were developed based on the Lakewood travel demand model. The Lakewood model was developed based on existing 2009 land use and growth anticipated by the City's Comprehensive Plan by 2030. The model includes key local and regional transportation projects assumed to be completed by 2030 and which would influence traffic volumes and travel patterns within Lakewood.

Evaluation of Corridor Levels of Service

The corridor levels of service are measured by calculating the volume to capacity (v/c) ratio for each direction of travel and segment of roadway. The City's LOS standard is LOS D. The v/c ratios are calculated by dividing the volume by the capacity of the roadway. The capacities were established in the City's adopted Comprehensive Plan. Any roadway segment with a v/c ratio greater than 0.90 is considered deficient. No roadway segments are estimated to be greater than 0.90 in the future. Only the Murray Road segment was shown to be deficient in 2010, but is assumed to be replaced with the Cross-Base Highway by 2030.

Attachment E – PM Peak Hour Intersection LOS Summary

Attachment E provides a summary of the existing and future intersection LOS. The intersection turning movements were used to evaluate traffic operations at the study intersections using the Synchro software program 7.0. The existing Synchro model and signal timing was provided by the City and used to construct the future model network. Specific intersection channelization assumptions for the transportation improvement projects were incorporated into the model. For the I-5 interchange intersections and intersections within Woodbrook, the resulting LOS is based on

information presented as part of two recent studies (I-5 Transportation Alternatives Analysis Study and the Woodbrook Traffic Analysis).

The intersection traffic operations analysis used the *Highway Capacity Manual* (HCM, 2000) methodology. The LOS definitions for signalized and unsignalized intersections are shown below.

Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (sec/veh)	General Description (Signalized Intersections)
A	≤10	Free Flow
B	>10 - 20	Stable Flow (slight delays)
C	>20 - 35	Stable flow (acceptable delays)
D	>35 - 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 - 80	Unstable flow (intolerable delay)
F	>80	Forced flow (jammed)

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report 209, 2000.

Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report 209, 2000.

The results of the intersection LOS results are summarized on several maps and a table. The table provides a summary of the LOS, intersection delay, and volume-to-capacity (V/C) ratio for each intersection for both 2010 and 2030. It includes a 2030 baseline assessment, along with the resulting LOS assuming the identified improvements in the capital project list are completed. Locations highlighted in yellow or red are expected to operate below the City's LOS D standard. All the future deficiencies are planned to be addressed if the long-term improvement project list is implemented, along with improvements to I-5.

Attachment F – PM Peak Hour Intersection LOS Worksheets

Detailed intersection LOS worksheets have been included as Attachment F for City maintained intersections.

Attachment A

FUNDING OUTLOOK

What is the City's Transportation Funding Outlook?

City of Lakewood Transportation Funding Strategy

What are the Major Transportation Funding Categories?

A Operations & Maintenance (O&M)

Example Activities

- Pothole Patching
- Emergency Repairs & Snow/Ice Removal
- Vegetation Control & Landscaping
- Signal Maintenance, Striping & Signing
- Vehicle Maintenance/ Replacement
- Street Lighting

B 6-Year Transportation Improvement Projects (TIP)

Types of Projects

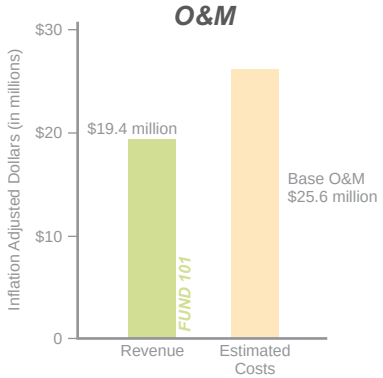
- Roadway Widening & Reconstruction
- Intersection Improvements & Signal Replacement
- New Trails & Sidewalks
- Safety Enhancements
- Bridge Replacement &
- Rehabilitation

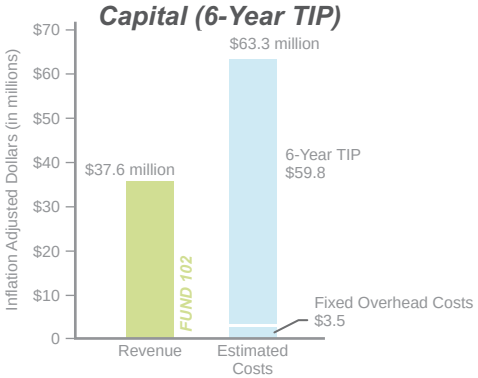
C Pavement Management

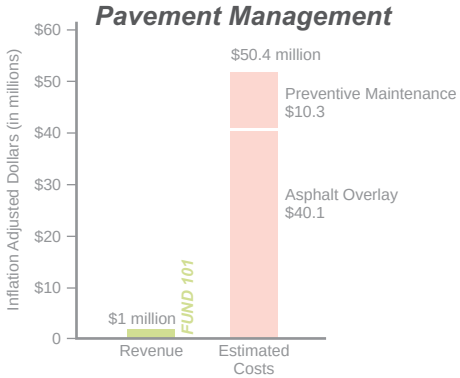
Types of Projects

- Preventive Maintenance (Chip Sealing, Major Patching)
- Asphalt Overlay

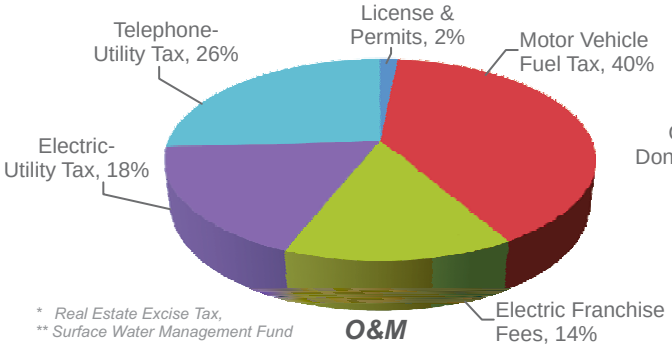
What are the Estimated Revenues and Expenditures over the Next 10 Years (2011 to 2020)?



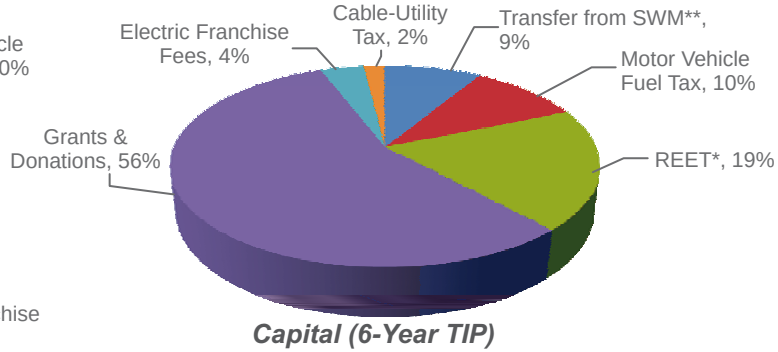


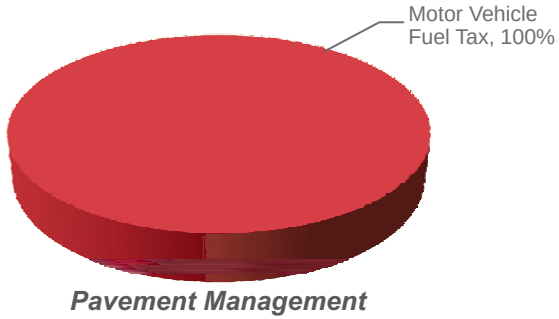


Where Do the Revenues Come From?



* Real Estate Excise Tax,
** Surface Water Management Fund

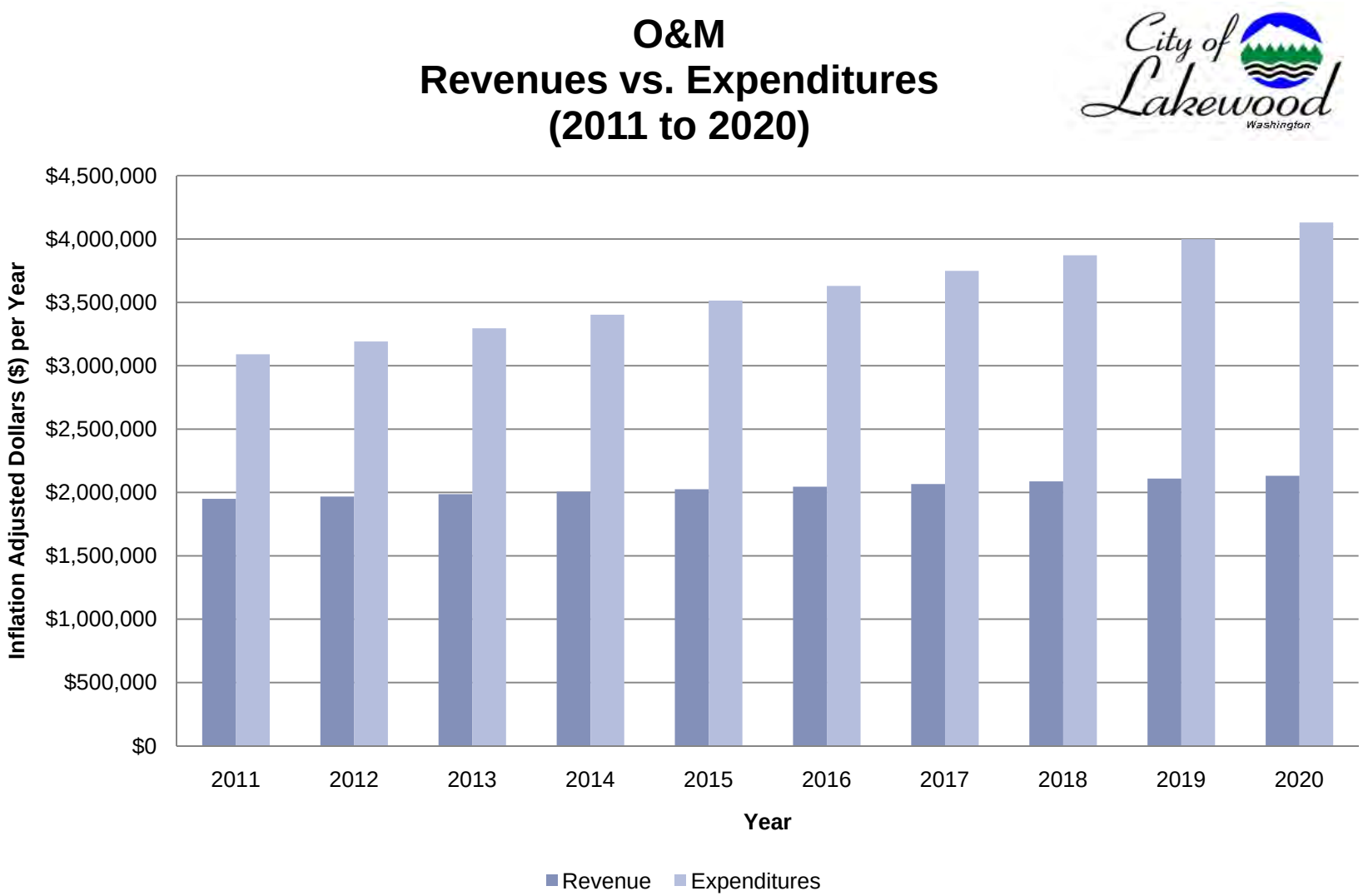




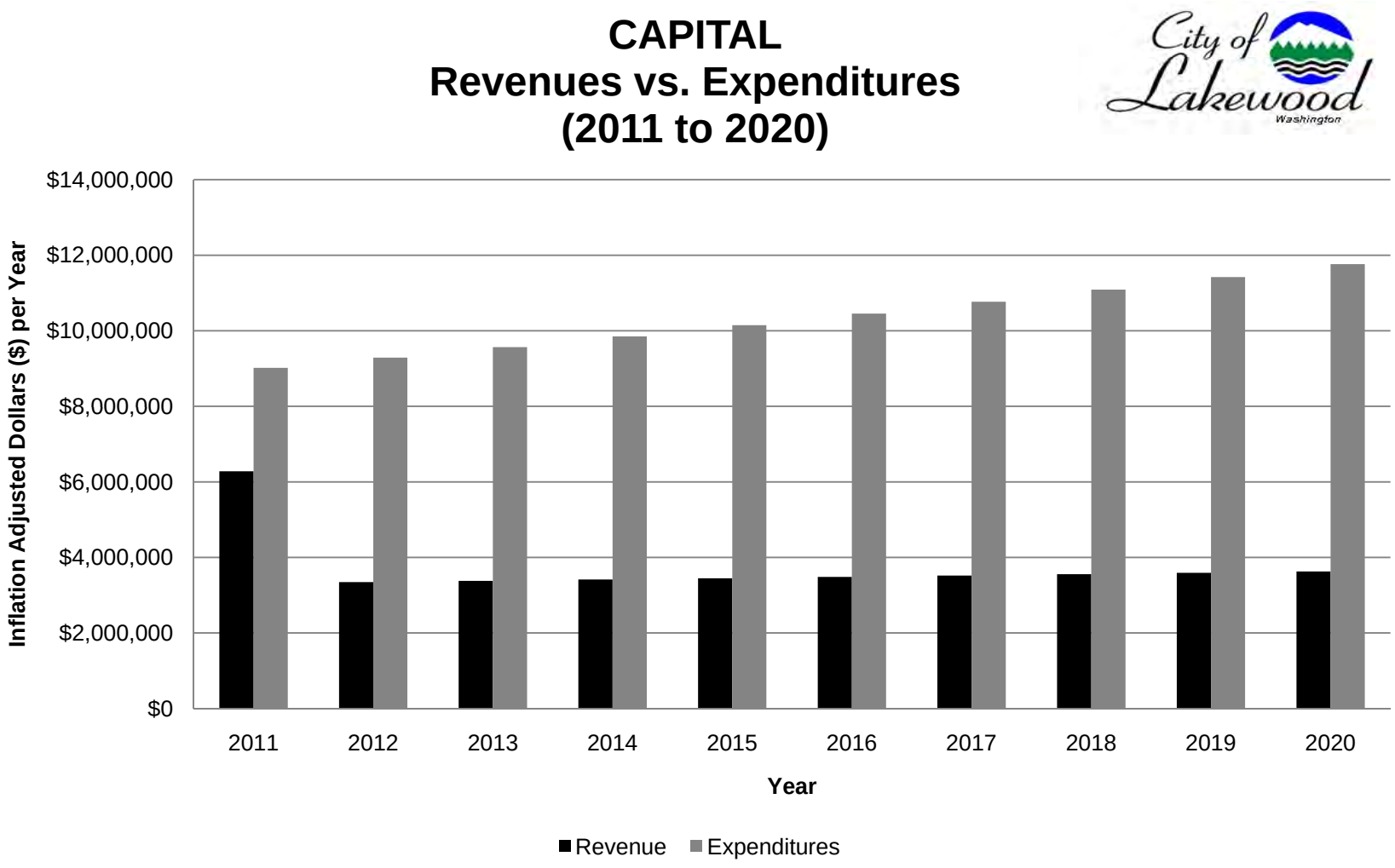
Attachment B

TRANSPORTATION REVENUES & EXPENDITURES

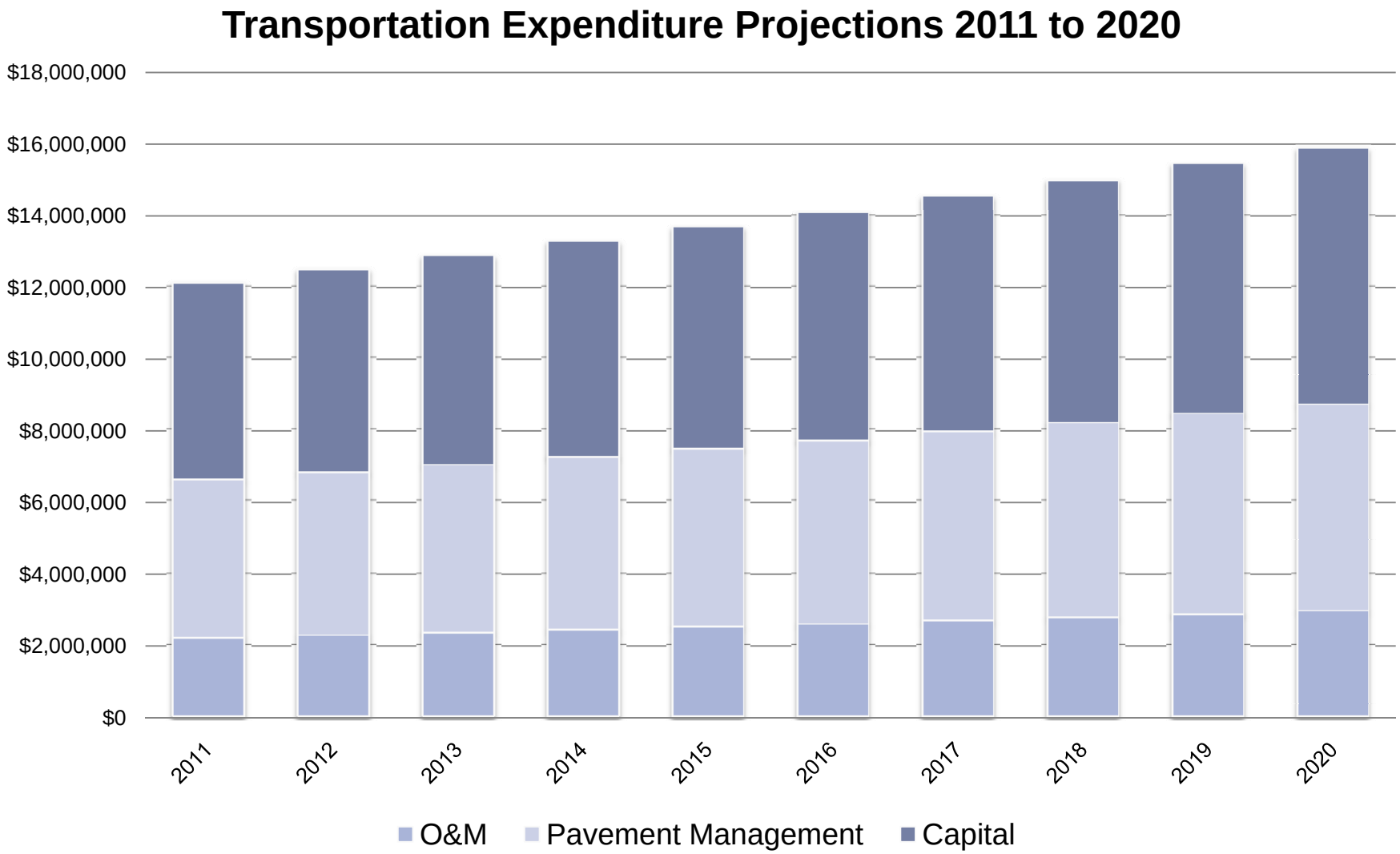
Transportation Revenue vs. Expenditures



Transportation Revenue vs. Expenditures



Transportation Revenue vs. Expenditures



City of Lakewood

FUNDING STRATEGIES - TRANSPORTATION O&M and CAPITAL

Updated June 21, 2010

SCENARIO #1: 6-YEAR TIP CAPITAL PROJECTS

2010 to 2019 Funding Category	Total Estimated Revenues [1]	Total Estimated Costs[1]	Difference
O&M	$20,380,000	$25,560,000	($5,180,000)
Capital[2]	$37,651,000	$63,251,000	($25,600,000)
Pavement Management	$0	$50,441,200	($50,441,200)
Total Transportation	**$58,031,000**	**$139,252,200**	**($81,221,200)**

1. All costs and revenues in inflation adjusted $$. (xxx) means negative value
2. Includes all 6-Year TIP capital improvements

SCENARIO #2: 6-YEAR TIP CAPITAL PROJECTS + TBD

2010 to 2019 Funding Category	Total Estimated Revenues [1]	Total Estimated Costs[1]	Difference
O&M	$20,380,000	$25,560,000	($5,180,000)
Capital[2]	$37,651,000	$63,251,000	($25,600,000)
Pavement Management	$8,604,000	$50,441,200	($41,837,200)
Total Transportation	**$66,635,000**	**$139,252,200**	**($72,617,200)**

1. All costs and revenues in inflation adjusted $$. (xxx) means negative value
2. Includes all 6-Year TIP capital improvements

SCENARIO #3: 6-YEAR TIP CAPITAL PROJECTS + TBD + OTHER POTENTIAL REVENUES

2010 to 2019 Funding Category	Total Estimated Revenues [1]	Total Estimated Costs[1]	Difference
O&M	$20,380,000	$25,560,000	($5,180,000)
Capital[2]	$37,651,000	$63,251,000	($25,600,000)
Pavement Management	$14,760,000	$50,441,200	($35,681,200)
Total Transportation	**$72,791,000**	**$139,252,200**	**($66,461,200)**

1. All costs and revenues in inflation adjusted $$. (xxx) means negative value
2. Includes all 6-Year TIP capital improvements

City of Lakewood

REVENUE PROJECTIONS - TRANSPORTATION O&M and CAPITAL

Updated June 21, 2010

	Revenue Description	2007	2008	2009	2010	2011	Average Annual Growth	2012	2013	2014	2015	2016	2017	2018	2019	2020	FUTURE 2011 to 2020 10-Year TOTAL	PAST 2001 to 2010 10-Year TOTAL
					Projections													
101 Fund ST. OP. AND MAINT. (City Street Fund)	County Road Tax	$0	$0	$0	$0	$0		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$0**
	License & Permits	$116,000	$20,000	$20,000	$30,000	$30,000	0.50%	$30,100	$30,300	$30,500	$30,600	$30,800	$30,900	$31,100	$31,200	$31,400	**$307,000**	**$366,000**
	Motor Vehicle Fuel Tax	$850,000	$875,000	$875,000	$875,000	$875,000	0.00%	$875,000	$875,000	$875,000	$875,000	$875,000	$875,000	$875,000	$875,000	$875,000	**$8,750,000**	**$8,604,000**
	City Hardship Asst.	$0	$0	$0	$0	$0		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$24,000**
	Electric Franchise Fees	$232,000	$235,000	$250,000	$250,000	$250,000	2.50%	$256,200	$262,700	$269,200	$276,000	$282,900	$289,900	$297,200	$304,600	$312,200	**$2,801,000**	**$2,315,000**
	Electric - Utility Tax	$278,000	$280,000	$304,000	$305,000	$305,000	3.00%	$314,200	$323,600	$333,300	$343,300	$353,600	$364,200	$375,100	$386,400	$398,000	**$3,497,000**	**$2,220,000**
	Gas - Utility Tax	$0	$0	$0	$0	$0		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$316,000**
	Cable - Utility Tax	$0	$0	$0	$0	$0		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$0**
	Telephone - Utility Tax	$480,000	$480,000	$488,000	$488,000	$490,000	0.55%	$492,700	$495,400	$498,200	$500,900	$503,700	$506,500	$509,300	$512,100	$514,900	**$5,024,000**	**$3,906,000**
	Photo enforce; Insurance Recovery R	$0	$0	$0	$0	$0		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$228,000**
	Total	**$1,956,000**	**$1,890,000**	**$1,937,000**	**$1,948,000**	**$1,950,000**		**$1,968,200**	**$1,987,000**	**$2,006,200**	**$2,025,800**	**$2,046,000**	**$2,066,500**	**$2,087,700**	**$2,109,300**	**$2,131,500**	**$20,380,000**	**$17,980,000**

	Revenue Description	2007	2008	2009	2010	2011	Average Annual Growth	2012	2013	2014	2015	2016	2017	2018	2019	2020	FUTURE 2011 to 2020 10-Year TOTAL	PAST 2001 to 2010 10-Year TOTAL
					Projections													
102 Fund ST CAPTIAL FUND (Arterial Street Fund)	Xfer from General Fund	$0	$0	$222,000	$0	$0		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$883,000**
	Xfer from SWM	$361,000	$400,000	$405,000	$3,770,000	$750,000	0.50%	$270,000	$272,700	$275,430	$278,190	$280,965	$283,770	$286,605	$289,470	$292,365	**$3,279,000**	**$7,203,000**
	Motor Vehicle Fuel Tax	$450,000	$375,000	$370,000	$375,000	$375,000	0.00%	$375,000	$375,000	$375,000	$375,000	$375,000	$375,000	$375,000	$375,000	$375,000	**$3,750,000**	**$4,028,000**
	City Harship Asst	$0	$0	$0	$0	$0		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$178,000**
	Motor Vehicle License Fee	$0	$0	$0	$0	$0		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$916,000**
	REET	$1,732,988	$900,000	$937,000	$500,000	$700,000	1.00%	$707,000	$714,100	$721,200	$728,400	$735,700	$743,100	$750,500	$758,000	$765,600	**$7,324,000**	**$13,409,000**
	Grants & Donations	$2,082,200	$2,000,000	$1,600,000	$6,734,000	$4,235,000	1.00%	$1,800,000	$1,818,000	$1,836,200	$1,854,600	$1,873,100	$1,891,800	$1,910,700	$1,929,800	$1,949,100	**$21,098,000**	**$24,754,000**
	Traffic Mitigation	$0	$0	$45,000	$95,000	$20,000		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$20,000**	**$140,000**
	Electric Franchise Fees	$127,000	$130,000	$136,000	$137,000	$137,000	3.00%	$131,000	$134,900	$138,900	$143,100	$147,400	$151,800	$156,400	$161,100	$165,900	**$1,468,000**	**$778,000**
	Electric - Utility Tax	$0	$0	$0	$0	$0		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$919,000**
	Gas - Utility Tax	$0	$0	$0	$0	$0		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$932,000**
	Cable - Utility Tax	$40,000	$50,000	$62,000	$63,000	$63,000	3.00%	$63,900	$65,800	$67,700	$69,800	$71,900	$74,000	$76,300	$78,500	$80,900	**$712,000**	**$1,261,000**
	Telephone - Utility Tax	$0	$0	$0	$0	$0		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$1,499,000**
	LIDs	$600,000	$0	$0	$0	$0		$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$4,375,000**
	Total	**$5,393,188**	**$3,855,000**	**$3,777,000**	**$11,674,000**	**$6,280,000**		**$3,346,900**	**$3,380,500**	**$3,414,430**	**$3,449,090**	**$3,484,065**	**$3,519,470**	**$3,555,505**	**$3,591,870**	**$3,628,865**	**$37,651,000**	**$61,275,000**

SUMMARY (101 + 102 Funds)	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	FUTURE 10-Year TOTAL	PAST 10-Year TOTAL
				Projections												
County Road Tax	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$0**
Utility Taxes / Fees & Permits	$1,273,000	$1,195,000	$1,305,000	$1,368,000	$1,295,000	$1,288,100	$1,312,700	$1,337,800	$1,363,700	$1,390,300	$1,417,300	$1,445,400	$1,473,900	$1,503,300	**$13,828,000**	**$15,082,000**
Motor Vehicle Fuel Tax	$1,300,000	$1,250,000	$1,245,000	$1,250,000	$1,250,000	$1,250,000	$1,250,000	$1,250,000	$1,250,000	$1,250,000	$1,250,000	$1,250,000	$1,250,000	$1,250,000	**$12,500,000**	**$12,632,000**
Motor Vehicle License Fee	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$916,000**
REET	$1,732,988	$900,000	$937,000	$500,000	$700,000	$707,000	$714,100	$721,200	$728,400	$735,700	$743,100	$750,500	$758,000	$765,600	**$7,324,000**	**$13,409,000**
Grants & Donations	$2,082,200	$2,000,000	$1,600,000	$6,734,000	$4,235,000	$1,800,000	$1,818,000	$1,836,200	$1,854,600	$1,873,100	$1,891,800	$1,910,700	$1,929,800	$1,949,100	**$21,098,000**	**$24,754,000**
LIDs	$600,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$4,375,000**
Surface Water Management Xfer	$361,000	$400,000	$405,000	$3,770,000	$750,000	$270,000	$272,700	$275,430	$278,190	$280,965	$283,770	$286,605	$289,470	$292,365	**$3,279,000**	**$7,203,000**
General Fund Xfer In	$0	$0	$222,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	**$0**	**$883,000**
Total	**$7,349,188**	**$5,745,000**	**$5,714,000**	**$13,622,000**	**$8,230,000**	**$5,315,100**	**$5,367,500**	**$5,420,630**	**$5,474,890**	**$5,530,065**	**$5,585,970**	**$5,643,205**	**$5,701,170**	**$5,760,365**	**$58,030,000**	**$79,250,000**

City of Lakewood

EXPENDITURE PROJECTIONS - TRANSPORTATION O&M and CAPITAL

	Updated June 21, 2010		*Projections*										FUTURE 2011 to 2020
	Expenditure Description	**Average Annual Growth**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**10-Year TOTAL**
O&M	Salaries and Benefits	4.00%	$830,000	$863,200	$897,700	$933,600	$971,000	$1,009,800	$1,050,200	$1,092,200	$1,135,900	$1,181,300	**$9,965,000**
	Equipment, Materials & Supplies	3.00%	$540,000	$556,200	$572,900	$590,100	$607,800	$626,000	$644,800	$664,100	$684,100	$704,600	**$6,191,000**
	Contracts	3.00%	$820,000	$844,600	$869,900	$896,000	$922,900	$950,600	$979,100	$1,008,500	$1,038,800	$1,069,900	**$9,400,000**
	Total		**$2,190,000**	**$2,264,000**	**$2,340,500**	**$2,419,700**	**$2,501,700**	**$2,586,400**	**$2,674,100**	**$2,764,800**	**$2,858,800**	**$2,955,800**	**$25,560,000**

			Projections										FUTURE 2011 to 2020
	Expenditure Description	**Average Annual Growth**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**10-Year TOTAL**
CAPITAL	Arterial Streets	3.00%	$1,752,000	$1,804,600	$1,858,700	$1,914,500	$1,971,900	$2,031,000	$2,092,000	$2,154,700	$2,219,400	$2,286,000	**$20,085,000**
	Intersections / Signals	3.00%	$358,500	$369,300	$380,300	$391,700	$403,500	$415,600	$428,100	$440,900	$454,100	$467,800	**$4,110,000**
	Pedestrian & Bicycle	3.00%	$1,225,000	$1,261,800	$1,299,600	$1,338,600	$1,378,700	$1,420,100	$1,462,700	$1,506,600	$1,551,800	$1,598,300	**$14,043,000**
	Roadway Improvements	3.00%	$1,555,500	$1,602,200	$1,650,200	$1,699,700	$1,750,700	$1,803,300	$1,857,300	$1,913,100	$1,970,500	$2,029,600	**$17,832,000**
	Safety	3.00%	$240,000	$247,200	$254,600	$262,300	$270,100	$278,200	$286,600	$295,200	$304,000	$313,100	**$2,751,000**
	Planning & Services	3.00%	$27,500	$28,300	$29,200	$30,000	$31,000	$31,900	$32,800	$33,800	$34,800	$35,900	**$315,000**
	Street Lighting	3.00%	$54,000	$55,600	$57,300	$59,000	$60,800	$62,600	$64,500	$66,400	$68,400	$70,500	**$619,000**
	Bridges	3.00%	$5,000	$5,200	$5,300	$5,500	$5,600	$5,800	$6,000	$6,100	$6,300	$6,500	**$57,000**
	Fixed Overhead Costs	3.00%	$300,000	$309,000	$318,300	$327,800	$337,700	$347,800	$358,200	$369,000	$380,000	$391,400	**$3,439,000**
	Total		**$5,517,500**	**$5,683,200**	**$5,853,500**	**$6,029,100**	**$6,210,000**	**$6,396,300**	**$6,588,200**	**$6,785,800**	**$6,989,300**	**$7,199,100**	**$63,251,000**

			Projections										FUTURE 2011 to 2020
	Expenditure Description	**Average Annual Growth**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**10-Year TOTAL**
PAVEMENT MANAGEMENT	Preventive Maintenance *(Chip Seal, Crack Seal, Patching)*	3.00%	$900,000	$927,000	$954,800	$983,500	$1,013,000	$1,043,300	$1,074,600	$1,106,900	$1,140,100	$1,174,300	**$10,317,500**
	Preservation *(Asphalt Overlay)*	3.00%	$3,500,000	$3,605,000	$3,713,200	$3,824,500	$3,939,300	$4,057,500	$4,179,200	$4,304,600	$4,433,700	$4,566,700	**$40,123,700**
	Total		**$4,400,000**	**$4,532,000**	**$4,668,000**	**$4,808,000**	**$4,952,300**	**$5,100,800**	**$5,253,800**	**$5,411,500**	**$5,573,800**	**$5,741,000**	**$50,441,200**

			Projections										FUTURE 2010 to 2019
	SUMMARY	**Average Annual Growth**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**10-Year TOTAL**
	O&M	3.30%	$2,190,000	$2,264,000	$2,340,500	$2,419,700	$2,501,700	$2,586,400	$2,674,100	$2,764,800	$2,858,800	$2,955,800	$25,555,800
	Capital	3.00%	$5,517,500	$5,683,200	$5,853,500	$6,029,100	$6,210,000	$6,396,300	$6,588,200	$6,785,800	$6,989,300	$7,199,100	$63,252,000
	Pavement Management	3.00%	$4,400,000	$4,532,000	$4,668,000	$4,808,000	$4,952,300	$5,100,800	$5,253,800	$5,411,500	$5,573,800	$5,741,000	$50,441,200
	Total		**$12,107,500**	**$12,479,200**	**$12,862,000**	**$13,256,800**	**$13,664,000**	**$14,083,500**	**$14,516,100**	**$14,962,100**	**$15,421,900**	**$15,895,900**	**$139,249,000**

Attachment C

TRANSPORTATION PROJECT LIST, COSTS AND PRIORITIES

City of Lakewood

TRANSPORTATION CAPITAL IMPROVEMENT PROJECT LIST (2010 to 2029)

Category	ID #	Project Name	Source	Description	Total Costs	Priority Tier
Arterial Street	1.2	Gravelly Lake Dr @ 1-5 Right Turn Ln	Six Year TIP 2010-2015	Widen GLD from Nyanza to 1-5 SB on-ramp to provide dedicated right-turn lane. Traffic signal upgrades; bridge widening; r/w acquisition.	$1,600,000	I
	1.3	Cross Base Highway 1-5 to SR-7	Six Year TIP 2010-2015	Design coordination only	$20,000	I
	1.4	Union Avenue - Berkeley to N Thorne Ln	Six Year TIP 2010-2015	Widen to add 2-way left turn lane, bicycle lanes, sidewalks, street lighting	$5,000,000	I
	1.6	Interlaaken Drive - Washington to 104th	Comprehensive Plan	Widen to add left turn lanes at key intersections, bike lanes, curb, gutter, sidewalks, street lights	$5,000,000	II
	1.18	96th St - 2-way left turn lane	Six Year TIP 2010-2015	Widen 96th St from 500' east of So Tac Wy to 1-5 underpass to provide 2-way left turn lane	$500,000	I
	1.19	Custer Road & John Down intersection	Comprehensive Plan	Add left turn lanes - Custer to John Dower	$800,000	III
	1.20	123rd St SW - Realignment	Six Year TIP 2010-2015	Realign 123rd ST SW as it enters Bridgeport	$400,000	I
	1.21	Murray Rd and 150th St Corridor Capacity	Six Year TIP 2010-2015	Provide capacity for Woodbrook Industrial development including: widening of Murray Road and 150th; traffic signal, etc	$10,000,000	I
	2.16	93rd & Whitman Intersection	Comprehensive Plan	Signal replacement; pedestrian and sidewalk improvements	$800,000	III
		I-5 Interchange Improvements	I-5 Study	Matching funds toward improvements at I-5 interchanges (Berkeley, Thorne, Gravelly Lake Dr, Berkeley, or S Tac Wy/SR 512 interchanges)	$5,000,000	II
				Subtotal	**$29,120,000**	
Intersections / Signals	3.1	Steilacoom / Durango Traffic Signal	Six Year TIP 2010-2015	Intersection meets warrants for traffic signal. Special concern with adjacent train crossing becoming active.	$250,000	I
	3.7	Washington / Interlaaken Signal and intersection improvement	Six Year TIP 2010-2015	Install new signal at intersection	$375,000	I
	3.8	Traffic Signal Timing Upgrades	Six Year TIP 2010-2015	Upgrade traffic signal timing and coordination	$60,000	I
	3.10	South Tacoma Way & 88th Street	Six Year TIP 2010-2015	Developer would like to add 4th leg to existing signal Eliminate adjacent driveways Improve access	$150,000	I
	3.11	City-Wide Traffic Signal Management System	Six Year TIP 2010-2015	Upgrade interconnect on major corridors with fiber optic to provide video feed and data collection streaming capability for dynamic traffic management. Develop web based traffic info	$1,000,000	I
	3.12	Traffic Signal Replacement Program	Six Year TIP 2010-2015	Replace aging traffic signals. Priorities based on maintenance history ($150,000 / year)	$1,500,000	I
	3.13	Gravelly Lake Drive / Avondale Traffic Signal	Six Year TIP 2010-2015	Intersection meets warrants for traffic signal. Increased volumes in and around Town Center.	$250,000	I
				Subtotal	**$3,590,000**	
	2.59	Lakewood Station Connection Construction	Six Year TIP 2010-2015	Pedestrian Overpass from Kendrick Street to Lakewood Station. Kendrick Street - curb, gutter, sidewalk, bikeway, streetlights. Bus pull-out / turn around facilities	$4,000,000	I

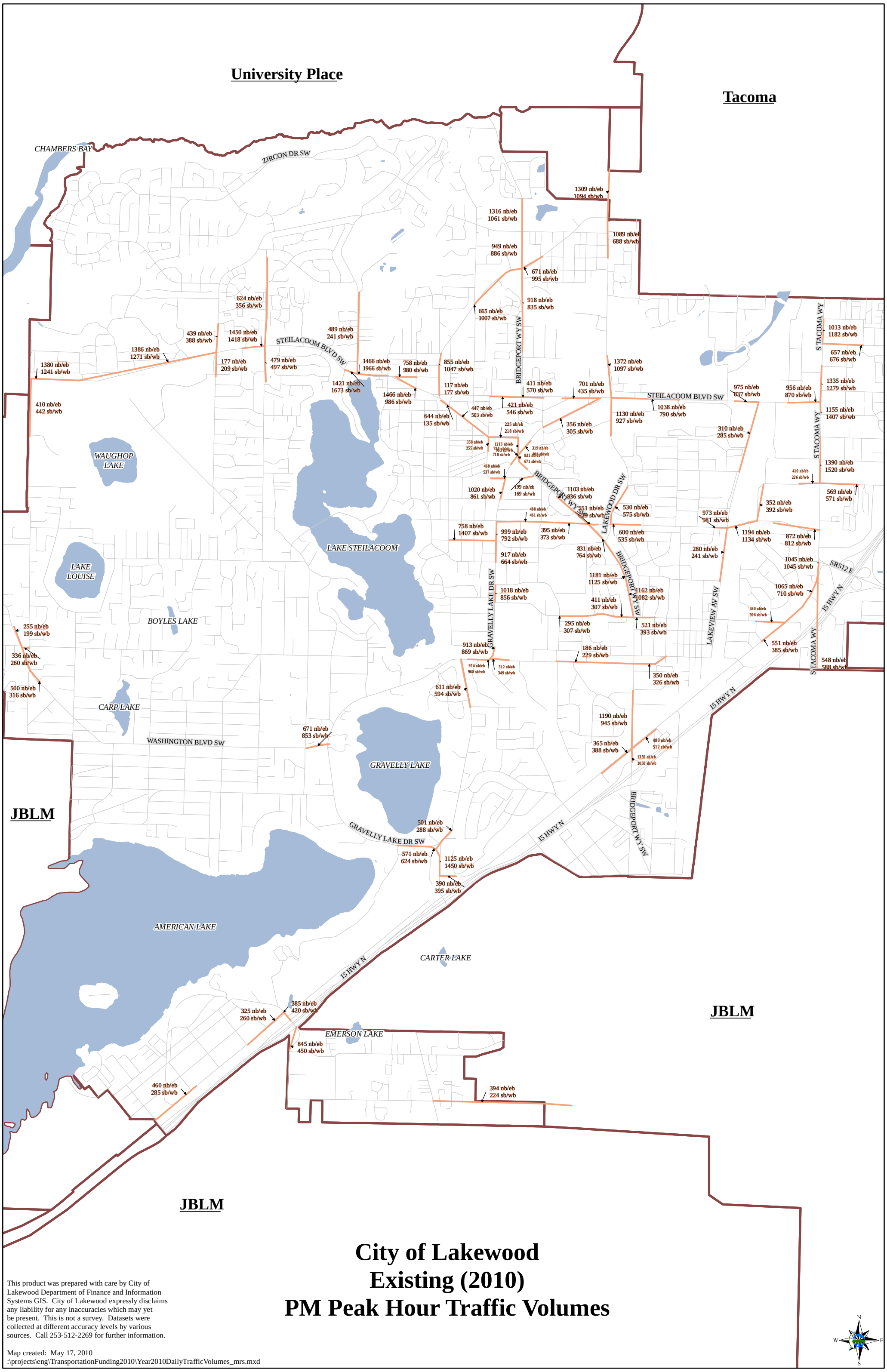
Category	ID #	Project Name	Source	Description	Total Costs	Priority Tier
Pedestrian & Bicycle	5.1	Miscellaneous Bikeway Markings and Signage	Six Year TIP 2010-2015		$250,000	I
	5.4	Miscellaneous Bike Lane Construction	Six Year TIP 2010-2015		$250,000	I
	5.5	North Thorne Lane to Gravelly Lake Drive Non-Motorized Trail	Six Year TIP 2010-2015	Provide non-motorized path prior to Cross Base Highway "Gravelly to Thorne Connector" construction Sound wall required as part of Cross Base	$5,000,000	I
	5.6	Gravelly Lake Non-Motorized Trail	Six Year TIP 2010-2015	Provide non-motorized path around Gravelly Lake along Gravelly Lake Drive and Nyanza Drive	$2,500,000	I
	USU-1	New Sidewalks-112th St	NMTP - Table 8-1		$2,958,000	III
	USU-2	New Sidewalks-112th St/111th St	NMTP - Table 8-1		$3,236,000	III
	USU-3	New Sidewalks-47th Avenue	NMTP - Table 8-1		$1,173,000	II
	USU-4	New Sidewalks-Bridgeport Way	NMTP - Table 8-1		$1,616,000	II
	USU-5	New Sidewalks-Butte Dr/Vernon Ave	NMTP - Table 8-1		$5,154,000	III
	USU-6	New Sidewalks-Custer Rd/Ardmore Dr/Meadow Rd	NMTP - Table 8-1		$4,370,000	III
	USU-7	New Sidewalks-Steilacoom Blvd	NMTP - Table 8-1		$5,873,000	II
	USU-8	New Sidewalks-Lakeview Ave	NMTP - Table 8-1		$3,603,000	III
	USU-9	New Sidewalks-McChord/New York	NMTP - Table 8-1		$2,250,000	III
	USU-10	New Sidewalks-Military Rd/Washington Blvd	NMTP - Table 8-1		$4,235,000	II
	USU-11	New Sidewalks-Murray / 150th Street	NMTP - Table 8-1		$2,471,000	II
	USU-12	New Sidewalks-Veterans Dr	NMTP - Table 8-1		$3,282,000	II
	NS-1	New Sidewalks-83rd Av	NMTP - Table 8-1		$1,800,000	III
	NS-2	New Sidewalks-100th St	NMTP - Table 8-1		$2,270,000	III
	NS-3	New Sidewalks-104th St	NMTP - Table 8-1		$3,066,000	III
	NS-4	New Sidewalks-87th Ave/Elwood Dr/Angle Lane	NMTP - Table 8-1		$3,225,000	III
	NS-5	New Sidewalks-Amber	NMTP - Table 8-1		$1,200,000	III
	NS-6	New Sidewalks-Farwest Dr	NMTP - Table 8-1		$942,000	III
	NS-7	New Sidewalks-Hipkins Rd	NMTP - Table 8-1		$2,082,000	III
	NS-8	New Sidewalks-Lakewood Dr	NMTP - Table 8-1		$2,168,000	III
	NS-9	New Sidewalks-Mt Tacoma Dr	NMTP - Table 8-1		$1,746,000	III
	NS-10	New Sidewalks-Onyx Dr/Phillips Rd	NMTP - Table 8-1		$2,784,000	III
	NS-11	New Sidewalks-Onyx Dr/Zircon Dr	NMTP - Table 8-1		$4,572,000	III
	SR-1	Sidewalk Repair/Rehab-100th St	NMTP - Table 8-1		$218,000	II
	SR-2	Sidewalk Repair/Rehab-112th St/111th St	NMTP - Table 8-1		$21,000	II
	SR-3	Sidewalk Repair/Rehab-87th Ave/Elwood Dr/Angle Lane	NMTP - Table 8-1		$19,000	II

Category	ID #	Project Name	Source	Description	Total Costs	Priority Tier
	SR-4	Sidewalk Repair/Rehab-Custer Rd/Ardmore Dr/Meadow Rd	NMTP - Table 8-1		$76,000	II
	SR-5	Sidewalk Repair/Rehab-Farwest Dr	NMTP - Table 8-1		$36,000	II
	SR-6	Sidewalk Repair/Rehab-Lakeview Ave	NMTP - Table 8-1		$17,000	II
	SR-7	Sidewalk Repair/Rehab-Lakewood Dr	NMTP - Table 8-1		$40,000	II
	SR-8	Sidewalk Repair/Rehab-Mt Tacoma Dr	NMTP - Table 8-1		$4,000	II
	SR-9	Sidewalk Repair/Rehab-Steilacoom Blvd	NMTP - Table 8-1		$542,000	II
		Pedestrian Signal Button Replacements	NMTP - Table 8-1		$264,000	II
	P-2	Shared-Use Path -Flett Creek	NMTP - Table 8-2		$485,000	II
	P-3	Shared-Use Path -Railroad path	NMTP - Table 8-2		$285,000	II
	2.61	ADA Standards - Sidewalk Upgrades	Six Year TIP 2010-2015	On-going program to gradually upgrade existing facilities to current ADA standards	$250,000	I
				Subtotal	**$80,330,000**	
Roadway	2.29	Steilacoom Blvd Custer to 88th St	Six Year TIP 2010-2015	Curbs, gutters, sidewalks, on north side Overlay	$950,000	I
	2.41	Steilacoom Blvd - Bridgeport Way to Fairlawn	Six Year TIP 2010-2015	Curbs, gutters, sidewalks, on one side Overlay	$950,000	I
	2.42	100th St SW - GLD to 59th Ave	Six Year TIP 2010-2015	Curbs, gutters, sidewalks on both sides Overlay	$2,300,000	I
	2.49	Bridgeport Way - 83rd to Custer Rd	Six Year TIP 2010-2015	Curb, gutters, sidewalks, street lighting, widening for 2-way left turn lane, drainage Overlay	$2,400,000	I
	2.50	Gravelly Lake Dr - 100th to Bridgeport Way	Six Year TIP 2010-2015	Curb, gutters, sidewalks, street lighting, drainage Overlay	$1,500,000	I
	2.52	Bridgeport Way - Custer to 75th	Six Year TIP 2010-2015	Curb, gutters, sidewalks, street lighting, widening for 2-way left turn lane, drainage Overlay	$1,800,000	I
	2.53	Bridgeport Wy - 75th to North City Limits	Six Year TIP 2010-2015	Curb, gutters, sidewalks, street lighting, widening for 2-way left turn lane, drainage Overlay	$2,200,000	I
	2.60	South Tacoma Way - SR512 to 96th St	Six Year TIP 2010-2015	Curb, gutter, sidewalks, street lighting, drainage, overlay	$3,300,000	I
	8.8	Bridgeport Way - South Gateway	Six Year TIP 2010-2015	Potentially conduct design with Pac Hwy Phase 4 grant dollars in 2010	$60,000	I
	8.9	Bridgeport Way - North Gateway	Six Year TIP 2010-2015		$95,000	I
				Subtotal	**$15,560,000**	
Safety	10.1	Neighborhood Traffic Management	Six Year TIP 2010-2015	May include speed humps, traffic circles, signage, etc	$200,000	I
	2.26	Safety Improvements in Vicinity of Schools	Six Year TIP 2010-2015	May include sidewalks, crossing improvements, signage, etc in vicinity of schools	$1,500,000	I
	2.54	Minor Pedestrian Safety Improvements	Six Year TIP 2010-2015	Non-hardscape improvements. Shoulder widening on high volume roads where less than 2' walkway exists	$200,000	I
	2.55	High Accident Location Safety Improvements	Six Year TIP 2010-2015	May include sight distance corrective measures, signal modifications, etc at one of top 25 accident locations	$500,000	I
				Subtotal	**$2,400,000**	

Category	ID #	Project Name	Source	Description	Total Costs	Priority Tier
Planning & Services	4.1	Pavement Management System	Six Year TIP 2010-2015	Semi-Annual evaluation of pavement condition ($25,000 every 2 years)	$125,000	I
	4.2	Transportation Model	Six Year TIP 2010-2015	On-going updates of travel demand model	$50,000	I
	11.1	On-call Technical Assistance	Six Year TIP 2010-2015		$100,000	I
				Subtotal	**$280,000**	
Bridges						
	7.1	Bridge Inspection	Six Year TIP 2010-2015	On going biannual bridge inspection	$50,000	I
				Subtotal	**$50,000**	
Street Lighting	6.2	Arterial Street Lighting	Six Year TIP 2010-2015	Install street lighting in requested areas based on ranking criteria	$270,000	I
	6.4	Low Income Area Street Lighting	Six Year TIP 2010-2015	Install street lighting in various low income areas	$270,000	I
				Subtotal	**$540,000**	
		Developer Funded				
				GRAND TOTAL	**$131,870,000**	

Attachment D

PM PEAK HOUR TRAFFIC VOLUMES & CORRIDOR LOS



City of Lakewood
Existing (2010)
PM Peak Hour Traffic Volumes

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Map created: May 17, 2010
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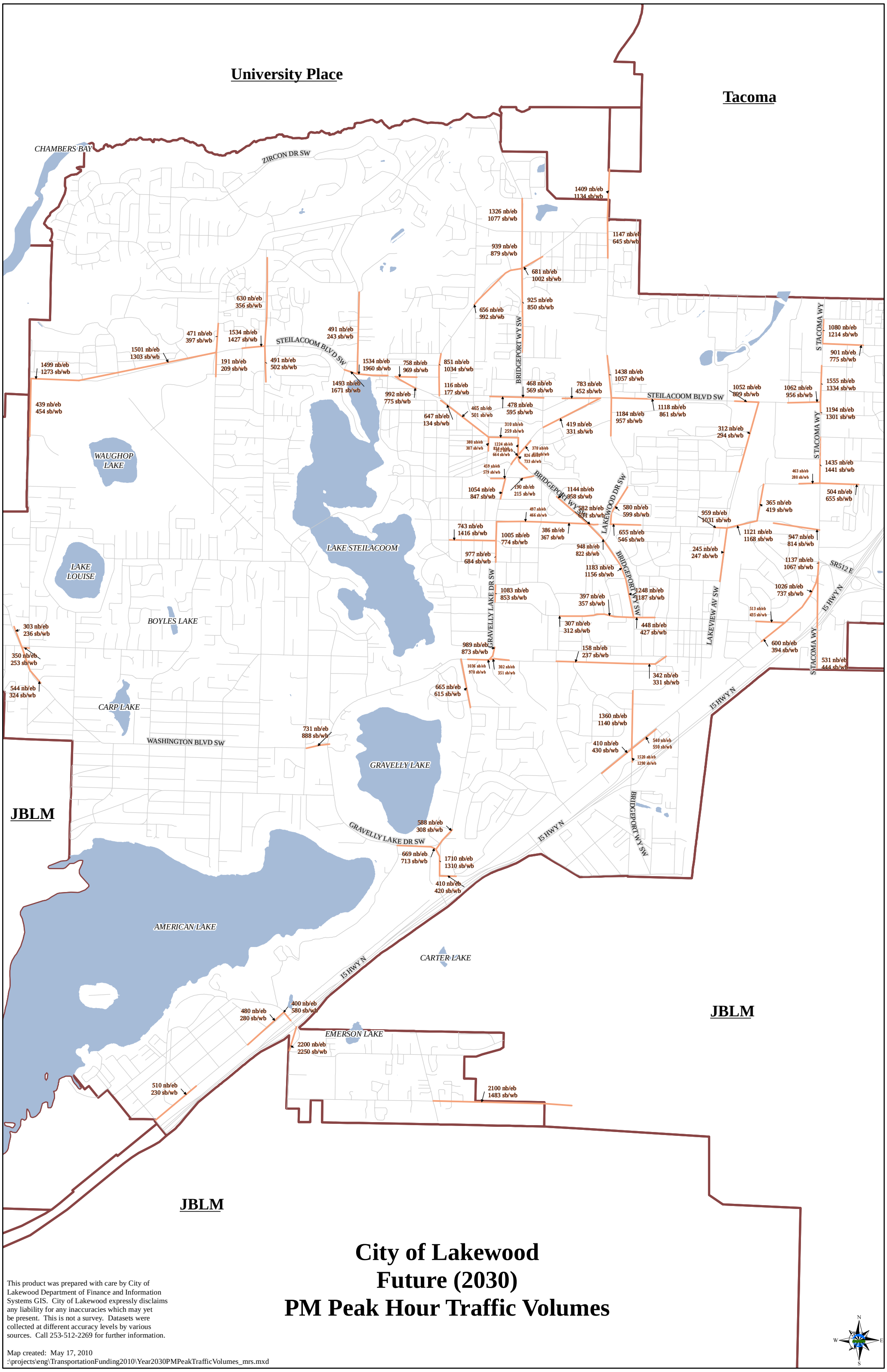

City of Lakewood
Future (2030)
PM Peak Hour Traffic Volumes

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Map created: May 17, 2010
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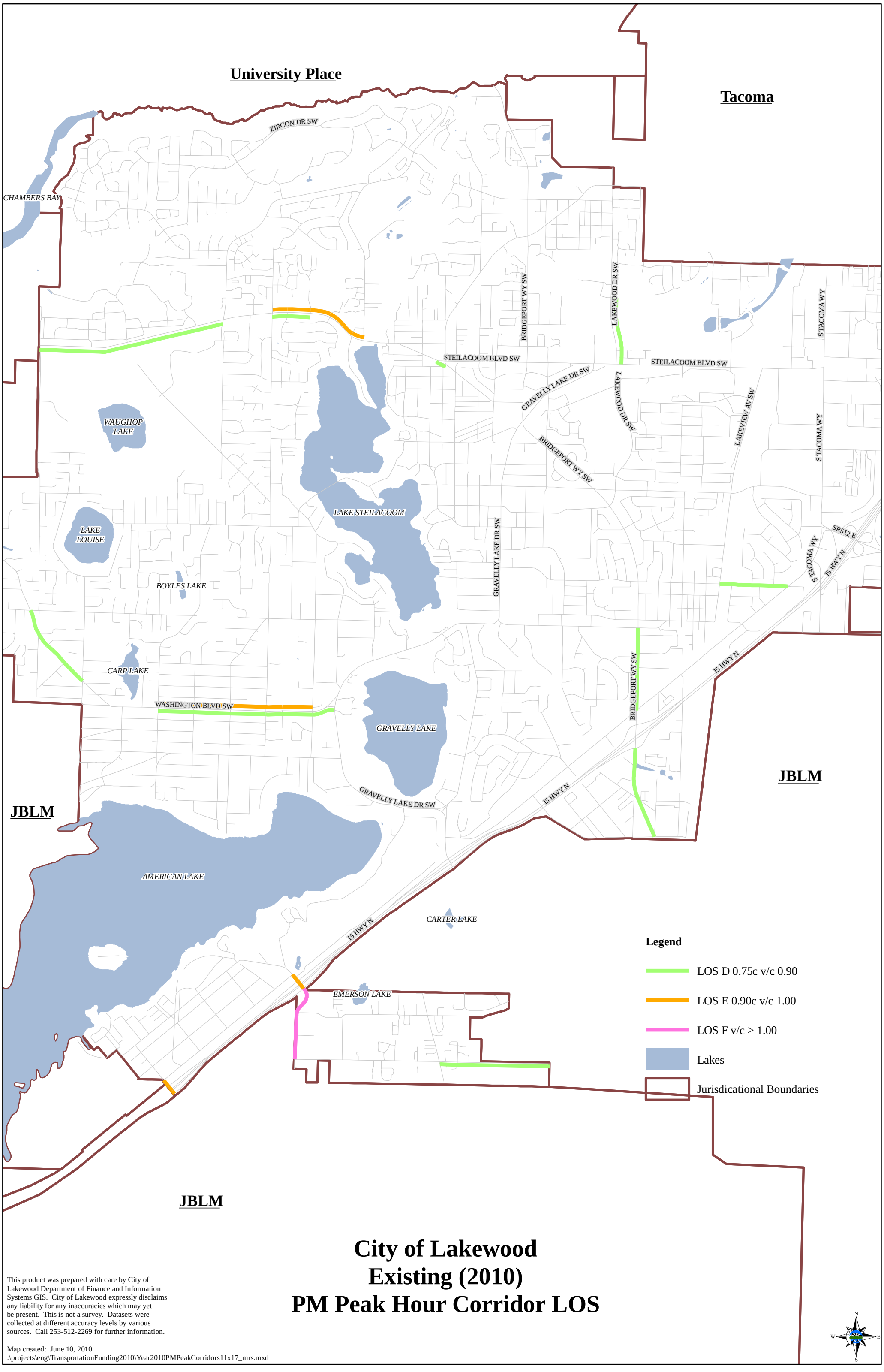

City of Lakewood
Existing (2010)
PM Peak Hour Corridor LOS

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Map created: June 10, 2010
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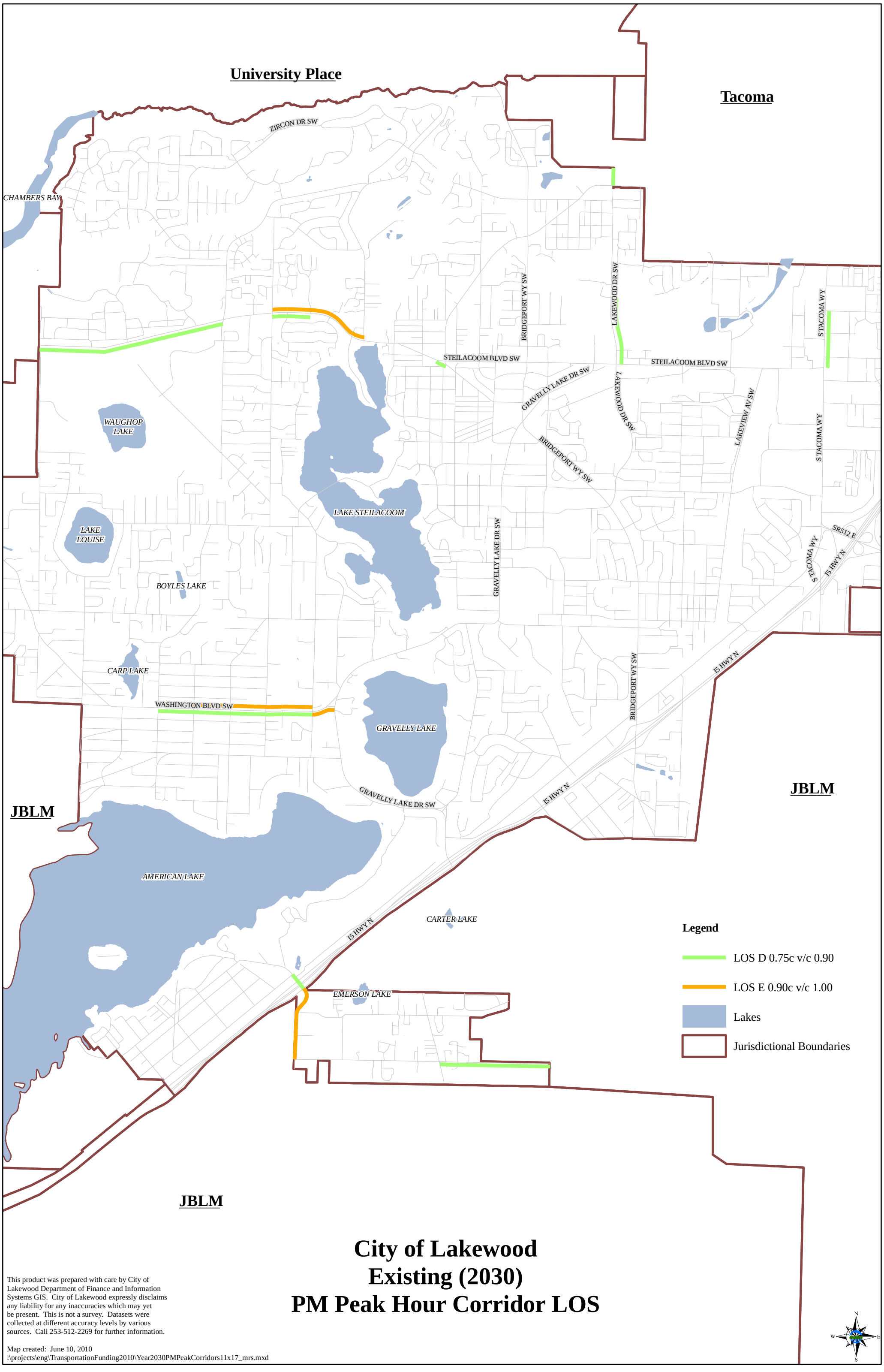

City of Lakewood
Existing (2030)
PM Peak Hour Corridor LOS

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Map created: June 10, 2010
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Street Name/Section	Model Link No.	Traffic Volumes 2010 Existing NB/EB	Traffic Volumes 2010 Existing SB/WB	Traffic Volumes 2030 Future NB/EB	Traffic Volumes 2030 Future SB/WB	Directional Capacity[1] Existing	Directional Capacity[1] Future	Volume-to-Capacity (v/c) Ratios 2010 Existing NB/EB	Volume-to-Capacity (v/c) Ratios 2010 Existing SB/WB	Volume-to-Capacity (v/c) Ratios 2030 Future NB/EB	Volume-to-Capacity (v/c) Ratios 2030 Future SB/WB
Ardmore Dr SW											
southeast of Steilacoom Blvd SW	6814	644	135	647	134	720	720	0.89	0.19	0.90	0.19
northwest of Whitman Ave SW	4617	447	503	465	501	720	720	0.62	0.70	0.65	0.70
Berkeley St SW											
I-5 overcrossing	5741	665	540	840	500	720	720	0.92	0.75	1.17	0.69
Bridgeport Way W											
north of 75th St W	4225	1,316	1,061	1,326	1,077	2,050	2,050	0.64	0.52	0.65	0.53
north of Custer Rd W	4286	949	886	939	879	2,050	2,050	0.46	0.43	0.46	0.43
south of Custer Rd W	4375	918	835	925	850	2,050	2,050	0.45	0.41	0.45	0.41
north of Gravelly Lake Dr SW	4664	1,213	903	1,224	912	2,050	2,050	0.59	0.44	0.60	0.44
south of Gravelly Lake Dr SW	6740	831	671	826	733	2,050	2,050	0.41	0.33	0.40	0.36
north of 100th St SW	4759	1,103	936	1,144	958	2,050	2,050	0.54	0.46	0.56	0.47
south of 100th St SW	4814	831	764	948	822	2,050	2,050	0.41	0.37	0.46	0.40
south of Lakewood Dr SW	4858	1,181	1,125	1,183	1,156	2,050	2,050	0.58	0.55	0.58	0.56
north of 112th St SW	4936	1,162	1,082	1,248	1,187	2,050	2,050	0.57	0.53	0.61	0.58
north of Pacific Highway SW	5184	1,190	945	1,360	1,140	2,050	2,050	0.58	0.46	0.66	0.56
south of Pacific Highway SW	5301	1,350	1,050	1,520	1,290	2,050	2,050	0.66	0.51	0.74	0.63
I-5 overcrossing	5324	1,265	910	1,450	960	2,050	2,050	0.62	0.44	0.71	0.47
at Clover Creek bridge south of I-5	5422	854	596	867	598	2,050	2,050	0.42	0.29	0.42	0.29
Custer Rd SW/ W											
northeast of Bridgeport Way SW	4339	671	995	681	1,002	1,825	1,825	0.37	0.55	0.37	0.55
southwest of Bridgeport Way SW	4374	665	1,007	656	992	1,825	1,825	0.36	0.55	0.36	0.54
north of 88th St SW	4493	855	1,047	851	1,034	1,825	1,825	0.47	0.57	0.47	0.57
south of 88th St SW	4559	117	177	116	177	2,050	2,050	0.06	0.09	0.06	0.09
Far West Dr SW											
south of Steilacoom Blvd SW	4564	410	442	439	454	2,050	2,050	0.20	0.22	0.21	0.22
Gravelly Lake Dr SW											
southwest of Steilacoom Blvd SW	4600	356	305	419	331	2,050	2,050	0.17	0.15	0.20	0.16
northeast of Bridgeport Way SW	6741	319	401	370	419	1,825	1,825	0.17	0.22	0.20	0.23
southwest of Bridgeport Way SW	6826	734	710	834	664	2,050	2,050	0.36	0.35	0.41	0.32
south of Mount Tacoma Dr SW	4717	1,020	861	1,054	847	2,050	2,050	0.50	0.42	0.51	0.41
south of 100th St SW	4804	999	792	1,005	774	2,050	2,050	0.49	0.39	0.49	0.38
south of Alfaretta St SW	4859	917	664	977	684	2,050	2,050	0.45	0.32	0.48	0.33
north of Wildaire Rd SW	6803	1,018	856	1,083	853	2,050	2,050	0.50	0.42	0.53	0.42
north of 112th St SW	5088	913	869	989	873	2,050	2,050	0.45	0.42	0.48	0.43
west of 112th St SW	6767	974	968	1,036	970	2,050	2,050	0.48	0.47	0.51	0.47
west of end Nyanza Rd SW (S)	5464	571	624	669	713	975	975	0.59	0.64	0.69	0.73
north of Pacific Highway SW	5467	1,125	1,450	1,710	1,310	2,050	2,050	0.55	0.71	0.83	0.64
south of Pacific Highway SW	5490	1,430	1,110	1,710	1,320	2,050	2,050	0.70	0.54	0.83	0.64
I-5 overcrossing	5536	1,000	535	1,320	570	2,050	2,050	0.49	0.26	0.64	0.28

Street Name/Section	Model Link No.	Traffic Volumes 2010 Existing NB/EB	Traffic Volumes 2010 Existing SB/WB	Traffic Volumes 2030 Future NB/EB	Traffic Volumes 2030 Future SB/WB	Directional Capacity[1] Existing	Directional Capacity[1] Future	Volume-to-Capacity (v/c) Ratios 2010 Existing NB/EB	Volume-to-Capacity (v/c) Ratios 2010 Existing SB/WB	Volume-to-Capacity (v/c) Ratios 2030 Future NB/EB	Volume-to-Capacity (v/c) Ratios 2030 Future SB/WB
Hipkins Rd SW											
south of Steilacoom Blvd SW	4475	479	497	491	502	720	720	0.67	0.69	0.68	0.70
Lakeview Ave SW											
south of 100th St SW	4826	280	241	245	247	1,825	1,825	0.15	0.13	0.13	0.14
south of Steilacoom Blvd SW	6733	310	285	312	294	1,825	1,825	0.17	0.16	0.17	0.16
Lakewood Dr SW											
north of 74th St W	4176	1,309	1,094	1,409	1,134	1,825	1,825	0.72	0.60	0.77	0.62
south of 74th St W	4251	1,089	688	1,147	645	1,825	1,825	0.60	0.38	0.63	0.35
north of Steilacoom Bvd SW	4507	1,372	1,097	1,438	1,057	1,825	1,825	0.75	0.60	0.79	0.58
south of Steilcoom Blvd SW	4602	1,130	927	1,184	957	2,050	2,050	0.55	0.45	0.58	0.47
north of 100th St SW	4745	530	575	580	599	2,050	2,050	0.26	0.28	0.28	0.29
Military Rd SW											
south of 112th St SW	5081	500	316	544	324	975	975	0.51	0.32	0.56	0.33
northwest of 112th St SW	6716	255	199	303	236	975	975	0.26	0.20	0.31	0.24
Mount Tacoma Dr SW											
west of Bridgeport Way	6807	199	169	190	215	975	975	0.20	0.17	0.19	0.22
west of Gravelly Lake Dr	4715	468	537	459	579	975	975	0.48	0.55	0.47	0.59
Murray Rd SW											
north of 146th St SW	5663	845	450	2,200	2,250	720	2,400*	1.17	0.63	0.92	0.94
N Thorne Ln SW											
southeast of Union Ave SW	5656	385	420	400	580	720	720	0.53	0.58	0.56	0.81
Nyanza Rd SW											
north of Gravelly Lake Dr SW	5434	501	288	588	308	975	975	0.51	0.30	0.60	0.32
south of Gravelly Lake Dr SW	5124	611	594	665	615	975	975	0.63	0.61	0.68	0.63
Pacific Highway SW											
north of 108th St SW	4933	1,065	710	1,026	737	2,050	2,050	0.52	0.35	0.50	0.36
southwest of 108th St SW	5030	551	385	600	394	2,050	2,050	0.27	0.19	0.29	0.19
northeast of bridgeport Way SW	5255	480	512	540	550	2,050	2,050	0.23	0.25	0.26	0.27
southwest of Bridgeport Way SW	5302	365	388	410	430	975	975	0.37	0.40	0.42	0.44
east of Gravelly Lake Dr SW	5489	390	395	410	420	720	720	0.54	0.55	0.57	0.58
Phillips Rd SW											
north of Steilacoom Blvd SW	4394	489	241	491	243	720	720	0.68	0.33	0.68	0.34
South Tacoma Way											
north of 84th St SW	4436	1,013	1,182	1,080	1,214	2,050	2,050	0.49	0.58	0.53	0.59
north of Steilacoom Blvd	4527	1,335	1,279	1,555	1,334	2,050	2,050	0.65	0.62	0.76	0.65
south of Steilacoom Blvd SW	6786	1,155	1,407	1,194	1,301	2,050	2,050	0.56	0.69	0.58	0.63
north of 96th St S	4666	1,390	1,520	1,435	1,441	2,050	2,050	0.68	0.74	0.70	0.70
north of 100th St SW	4856	758	1,407	743	1,416	2,050	2,050	0.37	0.69	0.36	0.69
south of SR-512	4898	1,045	1,045	1,137	1,067	2,050	2,050	0.51	0.51	0.55	0.52
southeast of Pacific Highway SW	4934	548	588	531	444	2,050	2,050	0.27	0.29	0.26	0.22

Street Name/Section	Model Link No.	Traffic Volumes 2010 Existing NB/EB	Traffic Volumes 2010 Existing SB/WB	Traffic Volumes 2030 Future NB/EB	Traffic Volumes 2030 Future SB/WB	Directional Capacity[1] Existing	Directional Capacity[1] Future	Volume-to-Capacity (v/c) Ratios 2010 Existing NB/EB	Volume-to-Capacity (v/c) Ratios 2010 Existing SB/WB	Volume-to-Capacity (v/c) Ratios 2030 Future NB/EB	Volume-to-Capacity (v/c) Ratios 2030 Future SB/WB
Steilacoom Blvd SW											
east of Farwest Dr SW	4562	1,380	1,241	1,499	1,273	1,825	1,825	0.76	0.68	0.82	0.70
west of 87th Ave SW	4490	1,386	1,271	1,501	1,303	1,825	1,825	0.76	0.70	0.82	0.71
west of 83rd Ave SW/Hipkins Rd SW	4474	1,450	1,418	1,534	1,427	2,050	2,050	0.71	0.69	0.75	0.70
west of Phillips Rd SW	6748	1,421	1,673	1,493	1,671	1,825	1,825	0.78	0.92	0.82	0.92
east of Phillips Rd	6865	1,466	1,966	1,534	1,960	2,050	2,050	0.72	0.96	0.75	0.96
southeast of 88th St SW	4557	986	708	992	775	1,825	1,825	0.54	0.39	0.54	0.42
west of Bridgeport Way SW	4592	421	546	478	595	1,825	1,825	0.23	0.30	0.26	0.33
east of Bridgeport Way SW	4586	411	570	468	569	1,825	1,825	0.23	0.31	0.26	0.31
west of Gravelly Lake Dr SW	6724	701	435	783	452	1,825	1,825	0.38	0.24	0.43	0.25
east of Lakewood Dr SW	4601	1,038	790	1,118	861	2,050	2,050	0.51	0.39	0.55	0.42
west of Lakeview Ave SW	6792	975	837	1,052	899	2,050	2,050	0.48	0.41	0.51	0.44
west of South Tacoma Way	4609	956	870	1,062	956	2,050	2,050	0.47	0.42	0.52	0.47
Thorne Ln SW											
I-5 overcrossing	5658	270	670	1,030	1,150	720	2,050	0.38	0.93	0.50	0.56
Union Ave SW											
northeast of Berkeley St SW	6772	460	285	510	230	720	720	0.64	0.40	0.71	0.32
southwest of North Thorne Ln SW	5657	325	260	480	280	720	720	0.45	0.36	0.67	0.39
Washington Blvd SW											
west of Gravelly Lake Dr SW	5268	671	853	731	888	975	975	0.69	0.87	0.75	0.91
west of Interlaken	5299	741	921	807	954	975	975	0.76	0.94	0.83	0.98
Whitman Ave SW											
south of Ardmore Dr SW	4665	358	255	380	307	975	975	0.37	0.26	0.39	0.31
Wildaire Rd SW											
west of Gravelly Lake Dr SW	none	125	97	125	97	720	720	0.17	0.13	0.17	0.13
40th Ave SW											
north of 100th St SW	4729	352	392	365	419	975	975	0.36	0.40	0.37	0.43
74th St											
west of Lakewood Dr	6726	1,051	1,267	822	970	2,050	2,050	0.51	0.62	0.40	0.47
83rd Ave SW											
north of Steilacoom Blvd SW	4371	624	356	630	356	975	975	0.64	0.37	0.65	0.37
84th St S											
east of South Tacoma Way	6795	657	676	901	775	2,050	2,050	0.32	0.33	0.44	0.38
87th Ave SW											
south of Steilacoom Blvd SW	6872	177	209	191	209	720	720	0.25	0.29	0.27	0.29
north of Steilacoom Blvd SW	4453	439	388	471	397	975	975	0.45	0.40	0.48	0.41
88th St SW											
east of Steilacoom Blvd SW	4556	758	980	758	969	1,825	1,825	0.42	0.54	0.42	0.53
93rd St SW											
east of Whitman Ave SW	4663	225	218	310	259	975	975	0.23	0.22	0.32	0.27

Street Name/Section	Model Link No.	Traffic Volumes 2010 Existing NB/EB	Traffic Volumes 2010 Existing SB/WB	Traffic Volumes 2030 Future NB/EB	Traffic Volumes 2030 Future SB/WB	Directional Capacity[1] Existing	Directional Capacity[1] Future	Volume-to-Capacity (v/c) Ratios 2010 Existing NB/EB	Volume-to-Capacity (v/c) Ratios 2010 Existing SB/WB	Volume-to-Capacity (v/c) Ratios 2030 Future NB/EB	Volume-to-Capacity (v/c) Ratios 2030 Future SB/WB
96th St S											
west of South Tacoma Way	6882	410	226	463	280	975	975	0.42	0.23	0.47	0.29
east of South Tacoma Way	4727	569	571	504	655	1,825	1,825	0.31	0.31	0.28	0.36
100th St SW											
west of South Tacoma Way	6885	872	812	947	814	1,825	1,825	0.48	0.44	0.52	0.45
east of Lakeview Dr SW	4807	1,194	1,134	1,121	1,168	2,050	2,050	0.58	0.55	0.55	0.57
west of Lakeview Dr SW	4824	973	981	959	1,031	2,050	2,050	0.47	0.48	0.47	0.50
east of Lakewood Dr SW	4815	600	535	655	546	2,050	2,050	0.29	0.26	0.32	0.27
east of Bridgeport Way	6736	551	629	582	631	2,050	2,050	0.27	0.31	0.28	0.31
west of Bridgeport Way	4809	395	373	386	367	2,050	2,050	0.19	0.18	0.19	0.18
east of Gravelly Lake Dr	4803	488	461	497	466	1,825	1,825	0.27	0.25	0.27	0.26
108th St SW											
west of Pacific Highway SW	5028	580	396	513	435	720	720	0.81	0.55	0.71	0.60
east of Bridgeport Way SW	5011	521	393	448	427	975	975	0.53	0.40	0.46	0.44
west of Bridgeport Way SW	5008	411	307	397	357	975	975	0.42	0.31	0.41	0.37
east of Davisson Rd SW	5006	295	307	307	312	975	975	0.30	0.31	0.31	0.32
west of Davisson Rd SW	none	41	49	41	49	720	720	0.06	0.07	0.06	0.07
112th St SW/S											
between Military Rd SW & Farwest Dr S	5080	336	260	350	253	720	720	0.47	0.36	0.49	0.35
east of Gravelly Lake Drive	6756	312	349	302	351	975	975	0.32	0.36	0.31	0.36
east of Bridgeport Way SW	5132	186	229	158	237	975	975	0.19	0.23	0.16	0.24
west of Bridgeport Way SW	5112	350	326	342	331	720	720	0.49	0.45	0.48	0.46
150th St SW											
east of Woodbrook Rd SW	5719	394	224	2,100	1,483	720	2,400*	0.55	0.31	0.88	0.62

Notes:

1) Capacity values come from Lakewood Comprehensive Plan . Capacities for roadways widened under future conditions were increased to match similarly sized existing facilities (i.e. widening as part of Cross-Base Highway project on Murray Rd & 150th St).

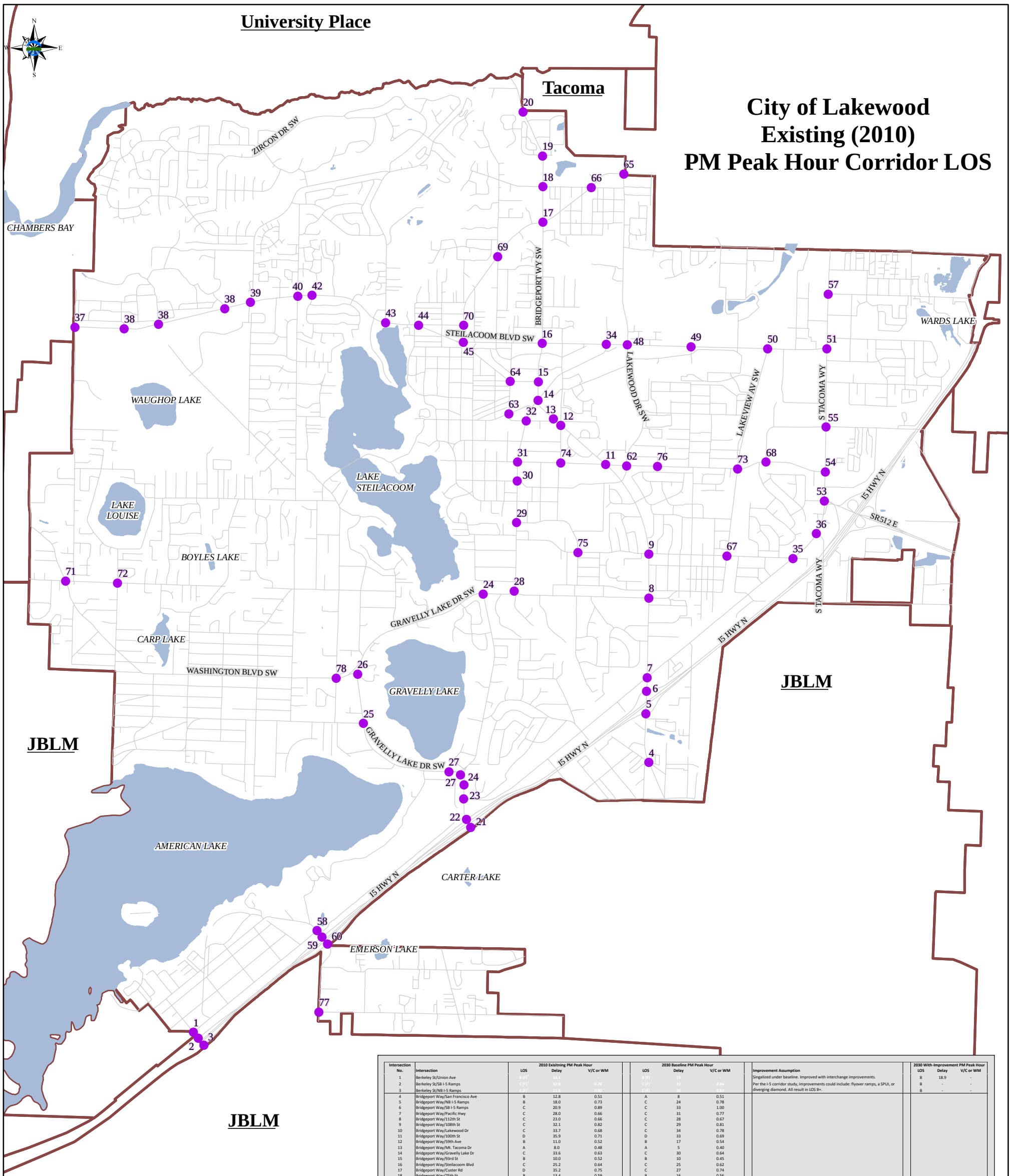
City roadway LOS standard = LOS D

V/C	LOS
0.00 to 0.75	LOS A to LOS C
0.75 to 0.90	LOS D
0.91 to 1.00	LOS E
1.00 and greater	LOS F

Attachment E

PM PEAK HOUR INTERSECTION LOS SUMMARY

City of Lakewood
Existing (2010)
PM Peak Hour Corridor LOS



Intersection No.	Intersection	2010 Exisitning PM Peak Hour LOS	Delay	V/C or WM	2030 Baseline PM Peak Hour LOS	Delay	V/C or WM	Improvement Assumption	2030 With-Improvement PM Peak Hour LOS	Delay	V/C or WM
1	Berkeley St/Union Ave	B (F)[1]	14.1	-	B (F)	19	-	Singalized under baseline. Improved with interchange improvements.	B	18.9	-
2	Berkeley St/SB I-5 Ramps	C (F)[1]	32.8	0.76	C (F)	32	0.84	Per the I-5 corridor study, improvements could include: flyover ramps, a SPUI, or	B	-	-
3	Berkeley St/NB I-5 Ramps	C (F)[1]	31.4	0.93	C (F)	26	1.13	diverging diamond. All result in LOS B+.	B	-	-
4	Bridgeport Way/San Francisco Ave	B	12.8	0.51	A	8	0.51				
5	Bridgeport Way/NB I-5 Ramps	B	18.0	0.73	C	24	0.78				
6	Bridgeport Way/SB I-5 Ramps	C	20.9	0.89	C	33	1.00				
7	Bridgeport Way/Pacific Hwy	C	28.0	0.66	C	31	0.77				
8	Bridgeport Way/112th St	C	23.0	0.66	C	28	0.67				
9	Bridgeport Way/108th St	C	32.1	0.82	C	29	0.81				
10	Bridgeport Way/Lakewood Dr	C	33.7	0.68	C	34	0.78				
11	Bridgeport Way/100th St	D	35.9	0.71	D	33	0.69				
12	Bridgeport Way/59th Ave	B	11.0	0.52	B	17	0.54				
13	Bridgeport Way/Mt. Tacoma Dr	A	8.0	0.48	A	5	0.40				
14	Bridgeport Way/Gravelly Lake Dr	C	33.6	0.63	C	30	0.64				
15	Bridgeport Way/93rd St	B	10.0	0.52	B	10	0.45				
16	Bridgeport Way/Steilacoom Blvd	C	25.2	0.64	C	25	0.62				
17	Bridgeport Way/Custer Rd	D	35.2	0.75	C	27	0.74				
18	Bridgeport Way/75th St	B	13.4	0.59	B	16	0.56				
19	Bridgeport Way/Meadow Park Rd	C	25.4	0.81	C	25	0.81				
20	Bridgeport Way/Wal-Mart North Access	B	16.2	0.69	B	11	0.69				
21	Gravelly Lake Dr/NB I-5 Ramps	**E**	**61.5**	**0.68**	-	-	-	Add EB-LT lane (results in 2 EB-LT & 1 shared EB LT/Th/RT)	D	42.0	0.65
22	Gravelly Lake Dr/SB I-5 Ramps	D	37.5	0.77	D	55	0.88				
23	Gravelly Lake Dr/Pacific Hwy	B	18.0	0.71	B	18	0.82				
24	Gravelly Lake Dr/Nyanza Rd S	B	11.2	0.61	B	12	0.68				
25	Gravelly Lake Dr/Veterans Dr	B	10.1	0.56	B	17	0.48				
26	Gravelly Lake Dr/Washington Blvd	D	46.1	0.91	D	41	0.73				
27	Gravelly Lake Dr/Nyanza Rd N	B	13.4	0.72	C	22	0.70				
28	Gravelly Lake Dr/112th St	B	19.0	0.63	B	18	0.63				
29	Gravelly Lake Dr/Main St	C	21.3	0.64	B	17	0.64				
30	Gravelly Lake Dr/Alfaretta St	B	13.7	0.59	B	12	0.57				
31	Gravelly Lake Dr/100th St	C	30.8	0.71	C	27	0.72				
32	Gravelly Lake Dr/Mt. Tacoma Dr	C	27.7	0.75	C	31	0.69				
33	Gravelly Lake Dr/Bridgeport Way		*See Int #14			*See Int #14					
34	Gravelly Lake Dr/Steilacoom Blvd	A	9.7	0.53	B	14	0.53				
35	Pacific Hwy/108th St	B	15.8	0.44	C	22	0.38				
36	Pacific Hwy/S Tacoma Way	C	31.8	0.77	C	23	0.68				
37	Steilacoom Blvd/Sentinel Dr	C	22.9	0.75	C	26	0.80				
38	Steilacoom Blvd/Western State Hospital	A	6.8	0.66	A	6	0.69				
39	Steilacoom Blvd/87th Ave	C	24.4	0.82	C	21	0.81				
40	Steilacoom Blvd/83rd Ave	D	44.9	0.82	C	34	0.85				
41	Steilacoom Blvd/Custer ES	A	7.1	0.65	B	16	0.59				
42	Steilacoom Blvd/Briggs Ln	A	6.4	0.65	A	6	0.61				
43	Steilacoom Blvd/Phillips Rd	B	17.3	0.82	B	16	0.79				
44	Steilacoom Blvd/88th St	B	15.8	0.71	D	36	0.67				
45	Steilacoom Blvd/Custer Rd	C	29.3	0.76	D	39	0.75				
46	Steilacoom Blvd/Bridgeport Way		*See Int #16			*See Int #16					
47	Steilacoom Blvd/Gravelly Lake Dr		*See Int #34			*See Int #34					
48	Steilacoom Blvd/Lakewood Dr	D	44.0	1.09	D	39	0.90				
49	Steilacoom Blvd/Hageness Dr	A	3.8	0.49	A	2	0.39				
50	Steilacoom Blvd/Lakeview Dr	B	12.6	0.60	B	13	0.55				
51	Steilacoom Blvd/S Tacoma Way	D	37.9	0.67	C	35	0.78				
52	S Tacoma Way/Pacific Hwy	C	31.8	0.77	C	24	0.73				
53	S Tacoma Way/SR 512-Perkins Ln	**E**	**58.5**	**0.84**	**E**	**57**	**0.99**	Separate shared EB-Th/LT lane to provide 2 LT & 1 Th	D	52.0	0.93
54	S Tacoma Way/100th St	B	13.5	0.77	B	17	0.74				
55	S Tacoma Way/96th St	C	30.3	0.71	C	28	0.74				
56	S Tacoma Way/Steilacoom Blvd		*See Int #51			*See Int #51					
57	S Tacoma Way/84th St	C	20.3	0.74	C	28	0.73				
58	Thorne Ln/Union Ave	B	11.6	EB	C	21	WB				
59	Thorne Ln/SB I-5 Ramps	D	43.0	0.60	-	-	-	Construct SPUI as part of Cross-Base Highway	D	39.5	0.96
60	Thorne Ln/NB I-5 Ramps	D	41.0	0.59	F	119	1.48	Construct SPUI as part of Cross-Base Highway			
61	84th St/Wapato St	A	7.8	0.34	A	8	0.39				
62	100th St/Lakewood Dr	C	25.6	0.57	D	36	0.55				
63	Motor Ave/Whitman Ln	A	8.7	0.36	B	11	0.26				
64	Ardmore Dr/Whitman Ln	B	14.3	0.49	C	22	0.43				
65	Custer Rd/Lakewood Dr	D	41.0	0.84	D	40	0.93				
66	75th St/Custer Rd	B	12.3	0.62	C	22	0.61				
67	108th St/Lakeview Dr	A	7.8	0.39	C	34	0.45				
68	100th St/40th Ave	B	11.2	0.67	B	14	0.70				
69	John Dower Rd/Custer Rd	A	6.9	0.70	A	9	0.64				
70	88th St/Custer Rd	A	5.4	0.61	A	7	0.65				
71	112th St/Old Military Rd	A	7.7	0.49	B	19	0.45				
72	112th St/Holden Rd	A	7.5	0.31	B	13	0.27				
73	100th St/Lakeview Dr	B	18.9	0.67	C	22	0.69				
74	100th St/59th Ave	B	16.1	0.41	B	20	0.35				
75	108th St/Main St	A	9.7	0.37	A	10	0.38				
76	100th St/David Ln	A	4.6	0.41	A	6	0.36				
77	Murray Rd/150th St	F	58.0	-	F	>180	-	Realign roadway & install signal as part of Cross-Base Highway	C	34.0	0.93
78	Washington Way/Interlaken Dr	F	129.0	-	A	5	0.75	Traffic signal installed under baseline			

Notes:
1) Existing conditions observed in the field indicate LOS F conditions. Without future improvement, these intersections would continue to operate similar to todays conditions with additional traffic volume increases. (i.e. LOS F)

A - D = Meets or exceeds City LOS D standard
E = LOS E (below City standard)
F = LOS F (below City standard)

Legend

- LOS Intersections
- Lakes
- Jurisdicational Boundaries

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Map created: June 10, 2010
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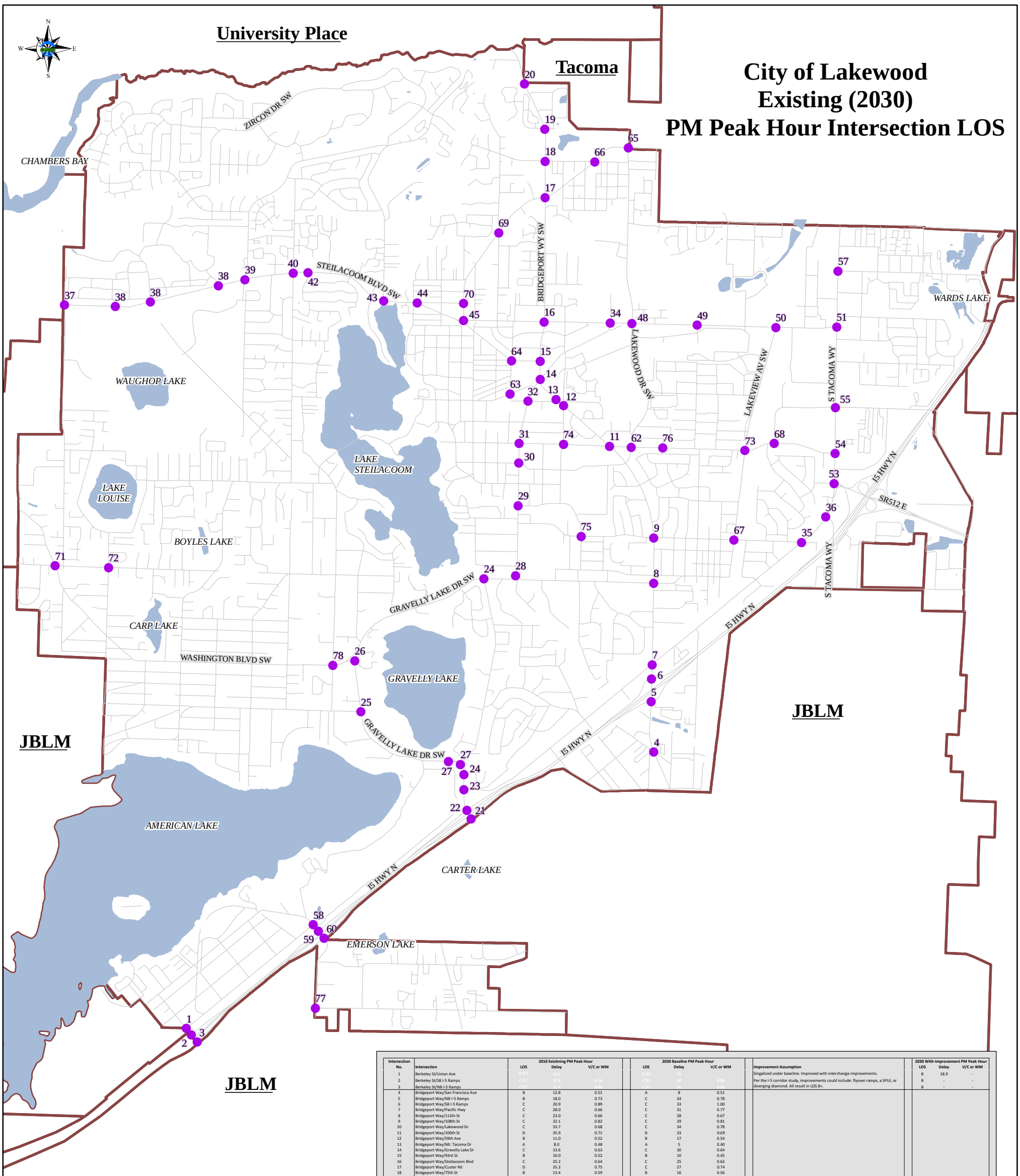
City of Lakewood
Existing (2030)
PM Peak Hour Intersection LOS



Intersection No.	Intersection	2010 Exisitning PM Peak Hour LOS	Delay	V/C or WM	2030 Baseline PM Peak Hour LOS	Delay	V/C or WM	Improvement Assumption	2030 With-Improvement PM Peak Hour LOS	Delay	V/C or WM
1	Berkeley St/Union Ave	B (F)[1]	14.1	-	B (F)	19	-	Singalized under baseline. Improved with interchange improvements.	B	18.9	-
2	Berkeley St/SB I-5 Ramps	C (F)[1]	32.8	0.76	C (F)	32	0.84	Per the I-5 corridor study, improvements could include: flyover ramps, a SPUI, or	B	-	-
3	Berkeley St/NB I-5 Ramps	C (F)[1]	21.6	0.80	C (F)	26	0.83	diverging diamond. All result in LOS B+.	B	-	-
4	Bridgeport Way/San Francisco Ave	B	12.8	0.51	A	8	0.51				
5	Bridgeport Way/NB I-5 Ramps	B	18.0	0.73	C	24	0.78				
6	Bridgeport Way/SB I-5 Ramps	C	20.9	0.89	C	33	1.00				
7	Bridgeport Way/Pacific Hwy	C	28.0	0.66	C	31	0.77				
8	Bridgeport Way/112th St	C	23.0	0.66	C	28	0.67				
9	Bridgeport Way/108th St	C	32.1	0.82	C	29	0.81				
10	Bridgeport Way/Lakewood Dr	C	33.7	0.68	C	34	0.78				
11	Bridgeport Way/100th St	D	35.9	0.71	D	33	0.69				
12	Bridgeport Way/59th Ave	B	11.0	0.52	B	17	0.54				
13	Bridgeport Way/Mt. Tacoma Dr	A	8.0	0.48	A	5	0.40				
14	Bridgeport Way/Gravelly Lake Dr	C	33.6	0.63	C	30	0.64				
15	Bridgeport Way/93rd St	B	10.0	0.52	B	10	0.45				
16	Bridgeport Way/Steilacoom Blvd	C	25.2	0.64	C	25	0.62				
17	Bridgeport Way/Custer Rd	D	35.2	0.75	C	27	0.74				
18	Bridgeport Way/75th St	B	13.4	0.59	B	16	0.56				
19	Bridgeport Way/Meadow Park Rd	C	25.4	0.81	C	25	0.81				
20	Bridgeport Way/Wal-Mart North Access	B	16.2	0.69	B	11	0.69				
21	Gravelly Lake Dr/NB I-5 Ramps	**E**	**61.5**	**0.68**	F	89	0.78	Add EB-LT lane (results in 2 EB-LT & 1 shared EB LT/Th/RT)	D	42.0	0.65
22	Gravelly Lake Dr/SB I-5 Ramps	D	37.5	0.77	D	55	0.88				
23	Gravelly Lake Dr/Pacific Hwy	B	18.0	0.71	B	18	0.82				
24	Gravelly Lake Dr/Nyanza Rd S	B	11.2	0.61	B	12	0.68				
25	Gravelly Lake Dr/Veterans Dr	B	10.1	0.56	B	17	0.48				
26	Gravelly Lake Dr/Washington Blvd	D	46.1	0.91	D	41	0.73				
27	Gravelly Lake Dr/Nyanza Rd N	B	13.4	0.72	C	22	0.70				
28	Gravelly Lake Dr/112th St	B	19.0	0.63	B	18	0.63				
29	Gravelly Lake Dr/Main St	C	21.3	0.64	B	17	0.64				
30	Gravelly Lake Dr/Alfaretta St	B	13.7	0.59	B	12	0.57				
31	Gravelly Lake Dr/100th St	C	30.8	0.71	C	27	0.72				
32	Gravelly Lake Dr/Mt. Tacoma Dr	C	27.7	0.75	C	31	0.69				
33	Gravelly Lake Dr/Bridgeport Way		*See Int #14			*See Int #14					
34	Gravelly Lake Dr/Steilacoom Blvd	A	9.7	0.53	B	14	0.53				
35	Pacific Hwy/108th St	B	15.8	0.44	C	22	0.38				
36	Pacific Hwy/S Tacoma Way	C	31.8	0.77	C	23	0.68				
37	Steilacoom Blvd/Sentinel Dr	C	22.9	0.75	C	26	0.80				
38	Steilacoom Blvd/Western State Hospital	A	6.8	0.66	A	6	0.69				
39	Steilacoom Blvd/87th Ave	C	24.4	0.82	C	21	0.81				
40	Steilacoom Blvd/83rd Ave	D	44.9	0.82	C	34	0.85				
41	Steilacoom Blvd/Custer ES	A	7.1	0.65	B	16	0.59				
42	Steilacoom Blvd/Briggs Ln	A	6.4	0.65	A	6	0.61				
43	Steilacoom Blvd/Phillips Rd	B	17.3	0.82	B	16	0.79				
44	Steilacoom Blvd/88th St	B	15.8	0.71	D	36	0.67				
45	Steilacoom Blvd/Custer Rd	C	29.3	0.76	D	39	0.75				
46	Steilacoom Blvd/Bridgeport Way		*See Int #16			*See Int #16					
47	Steilacoom Blvd/Gravelly Lake Dr		*See Int #34			*See Int #34					
48	Steilacoom Blvd/Lakewood Dr	D	44.0	1.09	D	39	0.90				
49	Steilacoom Blvd/Hageness Dr	A	3.8	0.49	A	2	0.39				
50	Steilacoom Blvd/Lakeview Dr	B	12.6	0.60	B	13	0.55				
51	Steilacoom Blvd/S Tacoma Way	D	37.9	0.67	C	35	0.78				
52	S Tacoma Way/Pacific Hwy	C	31.8	0.77	C	24	0.73				
53	S Tacoma Way/SR 512-Perkins Ln	**E**	**58.5**	**0.84**	**E**	**57**	**0.99**	Separate shared EB-Th/LT lane to provide 2 LT & 1 Th	D	52.0	0.93
54	S Tacoma Way/100th St	B	13.5	0.77	B	17	0.74				
55	S Tacoma Way/96th St	C	30.3	0.71	C	28	0.74				
56	S Tacoma Way/Steilacoom Blvd		*See Int #51			*See Int #51					
57	S Tacoma Way/84th St	C	20.3	0.74	C	28	0.73				
58	Thorne Ln/Union Ave	B	11.6	EB	C	21	WB				
59	Thorne Ln/SB I-5 Ramps	D	43.0	0.60	F	218	1.37	Construct SPUI as part of Cross-Base Highway	D	39.5	0.96
60	Thorne Ln/NB I-5 Ramps	D	41.0	0.59	F	115	1.45	Construct SPUI as part of Cross-Base Highway			
61	84th St/Wapato St	A	7.8	0.34	A	8	0.39				
62	100th St/Lakewood Dr	C	25.6	0.57	D	36	0.55				
63	Motor Ave/Whitman Ln	A	8.7	0.36	B	11	0.26				
64	Ardmore Dr/Whitman Ln	B	14.3	0.49	C	22	0.43				
65	Custer Rd/Lakewood Dr	D	41.0	0.84	D	40	0.93				
66	75th St/Custer Rd	B	12.3	0.62	C	22	0.61				
67	108th St/Lakeview Dr	A	7.8	0.39	C	34	0.45				
68	100th St/40th Ave	B	11.2	0.67	B	14	0.70				
69	John Dower Rd/Custer Rd	A	6.9	0.70	A	9	0.64				
70	88th St/Custer Rd	A	5.4	0.61	A	7	0.65				
71	112th St/Old Military Rd	A	7.7	0.49	B	19	0.45				
72	112th St/Holden Rd	A	7.5	0.31	B	13	0.27				
73	100th St/Lakeview Dr	B	18.9	0.67	C	22	0.69				
74	100th St/59th Ave	B	16.1	0.41	B	20	0.35				
75	108th St/Main St	A	9.7	0.37	A	10	0.38				
76	100th St/David Ln	A	4.6	0.41	A	6	0.36				
77	Murray Rd/150th St		-	-		0	-	Realign roadway & install signal as part of Cross-Base Highway	C	34.0	0.93
78	Washington Way/Interlaken Dr	F	122.0	-	A	5	0.75	Traffic signal installed under baseline			

Notes:
1) Existing conditions observed in the field indicate LOS F conditions. Without future improvement, these intersections would continue to operate similar to todays conditions with additional traffic volume increases. (i.e. LOS F)

A - D = Meets or exceeds City LOS D standard
E = LOS E (below City standard)
= LOS F (below City standard)

Legend

- LOS Intersection
- Lakes
- Jurisdictional Boundaries

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Map created: June 10, 2010
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Intersection			2010 Exisitning PM Peak Hour			2030 Baseline PM Peak Hour				2030 With-Improvement PM Peak Hour		
No.	Corridor	Intersection	LOS	Delay	V/C or WM	LOS	Delay	V/C or WM	Improvement?	LOS	Delay	V/C or WM
1	Berkeley St	Berkeley St/Union Ave	B (F)[1]	14.1	-	B (F)	18.9	-	Singalized under baseline. Improved with interchange improvements.	B	18.9	-
2	Berkeley St	Berkeley St/SB I-5 Ramps	C (F)[1]	32.8	0.76	C (F)	32.4	0.84	Per the I-5 corridor study, improvements could include: flyover ramps, a SPUI, or	B	-	-
3	Berkeley St	Jackson Ave/NB I-5 Ramps	C (F)[1]	21.6	0.80	C (F)	26.2	0.83	diverging diamond. All result in LOS B+.	B	-	-
4	Bridgeport Way	Bridgeport Way/San Francisco Ave	B	12.8	0.51	A	8.3	0.51				
5	Bridgeport Way	Bridgeport Way/NB I-5 Ramps	B	18.0	0.73	C	24.0	0.78				
6	Bridgeport Way	Bridgeport Way/SB I-5 Ramps	C	20.9	0.89	C	32.5	1.00				
7	Bridgeport Way	Bridgeport Way/Pacific Hwy	C	28.0	0.66	C	30.6	0.77				
8	Bridgeport Way	Bridgeport Way/112th St	C	23.0	0.66	C	27.9	0.67				
9	Bridgeport Way	Bridgeport Way/108th St	C	32.1	0.82	C	29.3	0.81				
10	Bridgeport Way	Bridgeport Way/Lakewood Dr	C	33.7	0.68	C	34.9	0.78				
11	Bridgeport Way	Bridgeport Way/100th St	D	35.9	0.71	D	32.2	0.69				
12	Bridgeport Way	Bridgeport Way/59th Ave	B	11.0	0.52	B	17.1	0.54				
13	Bridgeport Way	Bridgeport Way/Mt. Tacoma Dr	A	8.0	0.48	A	5.5	0.39				
14	Bridgeport Way	Bridgeport Way/Gravelly Lake Dr	C	33.6	0.63	C	29.6	0.64				
15	Bridgeport Way	Bridgeport Way/93rd St	B	10.0	0.52	B	10.3	0.45				
16	Bridgeport Way	Bridgeport Way/Steilacoom Blvd	C	25.2	0.64	C	25.0	0.62				
17	Bridgeport Way	Bridgeport Way/Custer Rd	D	35.2	0.75	C	26.5	0.74				
18	Bridgeport Way	Bridgeport Way/75th St	B	13.4	0.59	B	16.0	0.56				
19	Bridgeport Way	Bridgeport Way/Meadow Park Rd	C	25.4	0.81	C	24.3	0.81				
20	Bridgeport Way	Bridgeport Way/Wal-Mart North Access	B	16.2	0.69	B	11.2	0.69				
21	Gravelly Lake Dr	Woodbrook Rd SW/NB I-5 Ramps	E	61.5	0.68	F	88.6	0.78	Add EB-LT lane (results in 2 EB-LT & 1 shared EB LT/Th/RT)	D	42.0	0.65
22	Gravelly Lake Dr	Gravelly Lake Dr/SB I-5 Ramps	D	37.5	0.77	D	54.9	0.88				
23	Gravelly Lake Dr	Gravelly Lake Dr/Pacific Hwy	B	18.0	0.71	B	18.1	0.82				
24	Gravelly Lake Dr	Gravelly Lake Dr/Nyanza Rd S	B	11.2	0.61	B	12.4	0.68				
25	Gravelly Lake Dr	Gravelly Lake Dr/Veterans Dr	B	10.1	0.56	B	17.4	0.48				
26	Gravelly Lake Dr	Gravelly Lake Dr/Washington Blvd	D	46.1	0.91	D	40.4	0.73				
27	Gravelly Lake Dr	Gravelly Lake Dr/Nyanza Rd N	B	13.4	0.72	C	22.0	0.70				
28	Gravelly Lake Dr	Gravelly Lake Dr/112th St	B	19.0	0.63	B	17.5	0.63				
29	Gravelly Lake Dr	Gravelly Lake Dr/Main St	C	21.3	0.64	B	17.1	0.64				
30	Gravelly Lake Dr	Gravelly Lake Dr/Alfaretta St	B	13.7	0.59	B	11.6	0.57				
31	Gravelly Lake Dr	Gravelly Lake Dr/100th St	C	30.8	0.71	C	27.9	0.72				
32	Gravelly Lake Dr	Gravelly Lake Dr/Mt. Tacoma Dr	C	27.7	0.75	C	28.1	0.69				
33	Gravelly Lake Dr	Gravelly Lake Dr/Bridgeport Way		*See Int #14			*See Int #14					
34	Gravelly Lake Dr	Gravelly Lake Dr/Steilacoom Blvd	A	9.7	0.53	B	13.4	0.53				
35	Other	84th St/Wapato St	A	7.8	0.34	A	7.9	0.39				
36	Other	100th St/Lakewood Dr	C	25.6	0.57	D	35.4	0.55				
37	Other	Motor Ave/Whitman Ave	A	8.7	0.36	B	11.3	0.26				
38	Other	Ardmore Dr/Whitman Ave	B	14.3	0.49	C	21.5	0.43				
39	Other	Custer Rd/Lakewood Dr	D	41.0	0.84	D	40.3	0.93				
40	Other	75th St/Custer Rd	B	12.3	0.62	C	22.4	0.61				
41	Other	108th St/Lakeview Dr	A	7.8	0.39	C	33.8	0.45				
42	Other	100th St/40th Ave	B	11.2	0.67	B	13.4	0.69				
43	Other	John Dower Rd/Custer Rd	A	6.9	0.70	A	9.3	0.64				
44	Other	88th St/Custer Rd	A	5.4	0.61	A	7.0	0.65				
45	Other	112th St/Old Military Rd	A	7.7	0.49	B	18.5	0.45				
46	Other	112th St/Holden Rd	A	7.5	0.31	B	12.6	0.27				
47	Other	100th St/Lakeview Dr	B	18.9	0.67	C	21.4	0.68				
48	Other	100th St/59th Ave	B	16.1	0.41	B	19.5	0.35				
49	Other	108th St/Main St	A	9.7	0.37	A	9.5	0.38				
50	Other	100th St/David Ln	A	4.6	0.41	A	5.7	0.36				
51	Other	Murray Rd/150th St	F	58.0	-	F	>180	-				
52	Pacific Hwy	Pacific Hwy/108th St	B	15.8	0.44	C	22.3	0.38				
53	Pacific Hwy	Pacific Hwy/S Tacoma Way	C	31.8	0.77	C	22.6	0.68	Separate shared EB-Th/LT lane to provide 2 LT & 1 Th	D	52.0	0.93
54	S Tacoma Way	S Tacoma Way/Pacific Hwy	C	31.8	0.77	C	22.6	0.68				
55	S Tacoma Way	S Tacoma Way/SR 512-Perkins Ln	E	58.5	0.84	E	56.5	0.99				
56	S Tacoma Way	S Tacoma Way/100th St	B	13.5	0.77	B	16.9	0.74				
57	S Tacoma Way	S Tacoma Way/96th St	C	30.3	0.71	C	28.6	0.75				
58	S Tacoma Way	S Tacoma Way/Steilacoom Blvd		*See Int #51			*See Int #51					

Intersection No.	Corridor	Intersection	2010 Exisitning PM Peak Hour LOS	Delay	V/C or WM	2030 Baseline PM Peak Hour LOS	Delay	V/C or WM	Improvement?	2030 With-Improvement PM Peak Hour LOS	Delay	V/C or WM
59	S Tacoma Way	S Tacoma Way/84th St	C	20.3	0.74	C	27.8	0.73	Construct SPUI as part of Cross-Base Highway	D	39.5	0.96
60	Steilacoom Blvd	Steilacoom Blvd/Sentinel Dr	C	22.9	0.75	C	26.0	0.80	Construct SPUI as part of Cross-Base Highway			
61	Steilacoom Blvd	Steilacoom Blvd/Western State Hospital (Circle Dr)	A	6.8	0.66	A	5.9	0.69				
62	Steilacoom Blvd	Steilacoom Blvd/87th Ave	C	24.4	0.82	C	21.3	0.81				
63	Steilacoom Blvd	Steilacoom Blvd/83rd Ave	D	44.9	0.82	C	34.1	0.85				
64	Steilacoom Blvd	Steilacoom Blvd/Fairway Dr (Custer Elem. School)	A	7.1	0.65	B	16.0	0.59				
65	Steilacoom Blvd	Steilacoom Blvd/Briggs Ln	A	6.4	0.65	A	6.0	0.61				
66	Steilacoom Blvd	Steilacoom Blvd/Phillips Rd	B	17.3	0.82	B	16.3	0.79				
67	Steilacoom Blvd	Steilacoom Blvd/88th St	B	15.8	0.71	D	35.5	0.67				
68	Steilacoom Blvd	Steilacoom Blvd/Custer Rd	C	29.3	0.76	D	38.4	0.75				
69	Steilacoom Blvd	Steilacoom Blvd/Bridgeport Way		*See Int #16			*See Int #16					
70	Steilacoom Blvd	Steilacoom Blvd/Gravelly Lake Dr		*See Int #34			*See Int #34					
71	Steilacoom Blvd	Steilacoom Blvd/Lakewood Dr	D	44.0	1.09	D	39.0	0.90				
72	Steilacoom Blvd	Steilacoom Blvd/Hageness Dr	A	3.8	0.49	A	1.6	0.39				
73	Steilacoom Blvd	Steilacoom Blvd/Lakeview Dr	B	12.6	0.60	B	13.2	0.55				
74	Steilacoom Blvd	Steilacoom Blvd/S Tacoma Way	D	37.9	0.67	C	35.0	0.78				
75	Thorne Ln	Thorne Ln/Union Ave	B	11.6	EB	C	20.9	WB				
76	Thorne Ln	Thorne Ln/SB I-5 Ramps	D	43.0	0.60	F	214.3	1.37				
77	Thorne Ln	Murray Rd SW/NB I-5 Ramps	D	41.0	0.59	F	119.2	1.40	Realign roadway & install signal as part of Cross-Base Highway	C	34.0	0.93
78	Other	Washington Way/Interlaken Dr	F	122.0	-	A	5.2	0.75	Traffic signal installed under baseline			

Notes:
1) Existing conditions observed in the field indicate LOS F conditions. Without future improvement, these intersections would continue to operate similar to todays conditions with additional traffic volume increases. (i.e. LOS F)

A - D	= Meets or exceeds City LOS D standard
E	= LOS E (below City standard)
F	= LOS F (below City standard)

Attachment F

PM PEAK HOUR INTERSECTION LOS WORKSHEETS

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	71	250	74	64	250	315	283	626	27	96	717	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.92		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3401		1770	3204		1770	3514		1770	3524	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3401		1770	3204		1770	3514		1770	3524	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	272	80	70	272	342	308	680	29	104	779	20
RTOR Reduction (vph)	0	18	0	0	152	0	0	2	0	0	1	0
Lane Group Flow (vph)	77	334	0	70	462	0	308	707	0	104	798	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	7.9	24.0		7.5	23.6		24.2	47.1		11.4	34.3	
Effective Green, g (s)	7.9	24.0		7.5	23.6		24.2	47.1		11.4	34.3	
Actuated g/C Ratio	0.07	0.22		0.07	0.22		0.22	0.44		0.11	0.32	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	129	756		123	700		397	1532		187	1119	
v/s Ratio Prot	c0.04	0.10		0.04	c0.14		c0.17	0.20		0.06	c0.23	
v/s Ratio Perm												
v/c Ratio	0.60	0.44		0.57	0.66		0.78	0.46		0.56	0.71	
Uniform Delay, d1	48.5	36.2		48.7	38.5		39.4	21.5		45.9	32.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.9	0.6		3.6	2.5		8.4	0.3		2.0	2.3	
Delay (s)	53.4	36.8		52.3	41.0		47.8	21.8		47.9	34.8	
Level of Service	D	D		D	D		D	C		D	C	
Approach Delay (s)		39.8			42.2			29.7			36.3	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	35.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	108.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	596	14	55	514	21	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	5.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3525		1768	3539	1770	1553
Flt Permitted	1.00		0.30	1.00	0.95	1.00
Satd. Flow (perm)	3525		555	3539	1770	1553
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	648	15	60	559	23	65
RTOR Reduction (vph)	1	0	0	0	0	53
Lane Group Flow (vph)	662	0	60	559	23	12
Confl. Peds. (#/hr)		10	10		10	10
Turn Type			pm+pt			Perm
Protected Phases	2		1	6	4	
Permitted Phases			6			4
Actuated Green, G (s)	21.0		29.4	29.4	9.0	9.0
Effective Green, g (s)	21.0		29.4	29.4	9.0	9.0
Actuated g/C Ratio	0.43		0.61	0.61	0.19	0.19
Clearance Time (s)	5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.5		2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	1529		422	2150	329	289
v/s Ratio Prot	c0.19		0.01	c0.16	c0.01	
v/s Ratio Perm			0.08			0.01
v/c Ratio	0.43		0.14	0.26	0.07	0.04
Uniform Delay, d1	9.5		4.3	4.4	16.2	16.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		0.1	0.0	0.1	0.0
Delay (s)	9.7		4.5	4.5	16.3	16.2
Level of Service	A		A	A	B	B
Approach Delay (s)	9.7			4.5	16.2	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	48.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	752	22	147	934	41	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5	4.5	4.5
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3521		1769	3539	1770	1583
Flt Permitted	1.00		0.22	1.00	0.95	1.00
Satd. Flow (perm)	3521		418	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	817	24	160	1015	45	172
RTOR Reduction (vph)	2	0	0	0	0	34
Lane Group Flow (vph)	839	0	160	1015	45	138
Confl. Peds. (#/hr)		10	10		10	10
Turn Type			pm+pt			pt+ov
Protected Phases	6		5	2	4	4 5
Permitted Phases			2			
Actuated Green, G (s)	24.5		37.0	37.0	9.0	22.0
Effective Green, g (s)	24.5		37.0	37.0	9.0	22.0
Actuated g/C Ratio	0.45		0.67	0.67	0.16	0.40
Clearance Time (s)	4.5		4.0	4.5	4.5	
Vehicle Extension (s)	5.0		2.0	5.0	3.0	
Lane Grp Cap (vph)	1568		490	2381	290	633
v/s Ratio Prot	c0.24		0.05	c0.29	0.03	c0.09
v/s Ratio Perm			0.17			
v/c Ratio	0.53		0.33	0.43	0.16	0.22
Uniform Delay, d1	11.1		4.3	4.1	19.7	10.8
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6		0.1	0.3	0.3	0.2
Delay (s)	11.7		4.5	4.4	20.0	11.0
Level of Service	B		A	A	B	B
Approach Delay (s)	11.7			4.4	12.9	
Approach LOS	B			A	B	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	310	45	125	325	85	45	310	125	165	325	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3462		1770	3415		1770	3365		1770	3414	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3462		1770	3415		1770	3365		1770	3414	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	337	49	136	353	92	49	337	136	179	353	92
RTOR Reduction (vph)	0	10	0	0	20	0	0	35	0	0	17	0
Lane Group Flow (vph)	147	376	0	136	425	0	49	438	0	179	428	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	10.4	17.2		9.9	16.7		3.8	18.0		11.8	26.0	
Effective Green, g (s)	10.4	17.2		9.9	16.7		3.8	18.0		11.8	26.0	
Actuated g/C Ratio	0.14	0.23		0.13	0.23		0.05	0.24		0.16	0.35	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	4.0		1.0	4.0		1.0	3.0		1.0	3.0	
Lane Grp Cap (vph)	249	806		237	772		91	820		283	1201	
v/s Ratio Prot	c0.08	0.11		0.08	c0.12		0.03	c0.13		c0.10	0.13	
v/s Ratio Perm												
v/c Ratio	0.59	0.47		0.57	0.55		0.54	0.53		0.63	0.36	
Uniform Delay, d1	29.8	24.4		30.0	25.3		34.2	24.3		29.0	17.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	0.6		2.1	1.1		3.0	0.7		3.4	0.2	
Delay (s)	32.2	25.0		32.1	26.3		37.2	25.0		32.4	17.9	
Level of Service	C	C		C	C		D	C		C	B	
Approach Delay (s)		27.0			27.7			26.1			22.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	25.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	73.9	Sum of lost time (s)	17.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	100	701	30	42	564	297	487	247	44	63	313	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.91	0.91		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	0.98		0.95	1.00	
Satd. Flow (prot)	1770	3513		1770	3539	1542	1610	3268		1770	3492	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	0.98		0.95	1.00	
Satd. Flow (perm)	1770	3513		1770	3539	1542	1610	3268		1770	3492	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	762	33	46	613	323	529	268	48	68	340	27
RTOR Reduction (vph)	0	2	0	0	0	189	0	5	0	0	5	0
Lane Group Flow (vph)	109	793	0	46	613	134	280	560	0	68	362	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases						6						
Actuated Green, G (s)	10.9	34.3		6.0	29.4	29.4	27.0	27.0		15.8	15.8	
Effective Green, g (s)	10.9	34.3		6.0	29.4	29.4	27.0	27.0		15.8	15.8	
Actuated g/C Ratio	0.11	0.34		0.06	0.29	0.29	0.27	0.27		0.16	0.16	
Clearance Time (s)	4.0	4.5		4.0	4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	3.0	3.0		2.0	2.0	
Lane Grp Cap (vph)	192	1198		106	1034	451	432	877		278	548	
v/s Ratio Prot	c0.06	c0.23		0.03	0.17		c0.17	0.17		0.04	c0.10	
v/s Ratio Perm						0.09						
v/c Ratio	0.57	0.66		0.43	0.59	0.30	0.65	0.64		0.24	0.66	
Uniform Delay, d1	42.6	28.2		45.7	30.5	27.6	32.6	32.5		37.2	39.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	1.5		1.0	1.1	0.5	3.3	1.5		0.2	2.3	
Delay (s)	44.9	29.7		46.7	31.5	28.1	35.9	34.0		37.3	42.2	
Level of Service	D	C		D	C	C	D	C		D	D	
Approach Delay (s)		31.6			31.1			34.7			41.4	
Approach LOS		C			C			C			D	

Intersection Summary				
HCM Average Control Delay	33.6	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	100.6	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	64.6%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	119	315	34	131	54	366	615	39	21	512	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1629		1763	1863	1543	1770	3498		1770	3489	
Flt Permitted	0.64	1.00		0.17	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1182	1629		324	1863	1543	1770	3498		1770	3489	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	129	342	37	142	59	398	668	42	23	557	43
RTOR Reduction (vph)	0	69	0	0	0	41	0	4	0	0	5	0
Lane Group Flow (vph)	37	402	0	37	142	18	398	706	0	23	595	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		4						
Actuated Green, G (s)	28.6	28.6		28.6	28.6	28.6	28.4	49.6		2.2	23.4	
Effective Green, g (s)	28.6	28.6		28.6	28.6	28.6	28.4	49.6		2.2	23.4	
Actuated g/C Ratio	0.31	0.31		0.31	0.31	0.31	0.30	0.53		0.02	0.25	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0		1.0	2.0	
Lane Grp Cap (vph)	362	499		99	570	472	538	1858		42	874	
v/s Ratio Prot		c0.25			0.08		c0.22	0.20		0.01	c0.17	
v/s Ratio Perm	0.03			0.11		0.01						
v/c Ratio	0.10	0.81		0.37	0.25	0.04	0.74	0.38		0.55	0.68	
Uniform Delay, d1	23.2	29.8		25.4	24.3	22.7	29.2	12.9		45.1	31.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	8.7		0.9	0.1	0.0	4.6	0.0		7.6	1.8	
Delay (s)	23.3	38.6		26.2	24.4	22.8	33.8	12.9		52.7	33.4	
Level of Service	C	D		C	C	C	C	B		D	C	
Approach Delay (s)		37.5			24.3			20.4			34.1	
Approach LOS		D			C			C			C	

Intersection Summary				
HCM Average Control Delay	27.7	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	93.4	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	74.9%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	66	13	167	84	210	15	788	196	226	612	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1809		1770	1863	1539	1770	3413		1770	3513	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1809		1770	1863	1539	1770	3413		1770	3513	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	72	14	182	91	228	16	857	213	246	665	25
RTOR Reduction (vph)	0	4	0	0	0	175	0	13	0	0	1	0
Lane Group Flow (vph)	24	82	0	182	91	53	16	1057	0	246	689	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8						
Actuated Green, G (s)	3.2	12.8		15.9	25.5	25.5	1.9	43.6		20.0	61.7	
Effective Green, g (s)	3.2	12.8		15.9	25.5	25.5	1.9	43.6		20.0	61.7	
Actuated g/C Ratio	0.03	0.12		0.15	0.23	0.23	0.02	0.40		0.18	0.56	
Clearance Time (s)	4.0	4.5		4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0		1.0	2.0	
Lane Grp Cap (vph)	52	212		257	435	359	31	1361		324	1983	
v/s Ratio Prot	0.01	c0.05		c0.10	0.05		0.01	c0.31		c0.14	0.20	
v/s Ratio Perm						0.03						
v/c Ratio	0.46	0.38		0.71	0.21	0.15	0.52	0.78		0.76	0.35	
Uniform Delay, d1	52.2	44.6		44.5	33.8	33.3	53.2	28.6		42.4	12.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.4		7.1	0.1	0.1	5.9	2.6		8.8	0.0	
Delay (s)	54.6	45.0		51.6	33.9	33.3	59.2	31.2		51.1	12.9	
Level of Service	D	D		D	C	C	E	C		D	B	
Approach Delay (s)		47.1			40.1			31.6			23.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	30.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	109.3	Sum of lost time (s)	17.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	0	102	2	0	37	97	257	4	18	233	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.97			0.97		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.90			0.87		1.00	1.00		1.00	0.99	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1604			1568		1764	1858		1761	1832	
Flt Permitted		0.91			0.98		0.47	1.00		0.59	1.00	
Satd. Flow (perm)		1474			1540		870	1858		1086	1832	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	0	111	2	0	40	105	279	4	20	253	25
RTOR Reduction (vph)	0	92	0	0	33	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	52	0	0	9	0	105	283	0	20	275	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		7.0			7.0		25.5	20.8		16.9	16.2	
Effective Green, g (s)		7.0			7.0		25.5	20.8		16.9	16.2	
Actuated g/C Ratio		0.17			0.17		0.61	0.50		0.41	0.39	
Clearance Time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)		2.0			2.0		1.5	2.0		1.5	2.0	
Lane Grp Cap (vph)		249			260		649	931		454	715	
v/s Ratio Prot							c0.02	c0.15		0.00	c0.15	
v/s Ratio Perm		c0.04			0.01		0.08			0.02		
v/c Ratio		0.21			0.03		0.16	0.30		0.04	0.38	
Uniform Delay, d1		14.9			14.4		3.5	6.1		7.4	9.1	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.0		0.0	0.1		0.0	0.1	
Delay (s)		15.0			14.4		3.5	6.2		7.4	9.2	
Level of Service		B			B		A	A		A	A	
Approach Delay (s)		15.0			14.4			5.5			9.1	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	41.5	Sum of lost time (s)	17.5
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	195	246	7	196	15	305	29	24	6	21	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.0	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1863	1530	1752	1839		1752	1713		1750	1836	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.74	1.00		0.72	1.00	
Satd. Flow (perm)	1752	1863	1530	1752	1839		1367	1713		1325	1836	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	212	267	8	213	16	332	32	26	7	23	2
RTOR Reduction (vph)	0	0	200	0	3	0	0	13	0	0	1	0
Lane Group Flow (vph)	7	212	67	8	226	0	332	45	0	7	24	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8				2			6		
Actuated Green, G (s)	0.7	13.2	13.2	0.7	12.7		25.7	25.7		25.7	25.7	
Effective Green, g (s)	0.7	13.2	13.2	0.7	12.7		25.7	25.7		25.7	25.7	
Actuated g/C Ratio	0.01	0.25	0.25	0.01	0.24		0.49	0.49		0.49	0.49	
Clearance Time (s)	4.5	4.5	4.5	4.0	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	1.0	4.0	4.0	1.0	4.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	23	468	384	23	444		668	837		647	897	
v/s Ratio Prot	0.00	0.11		c0.00	c0.12			0.03			0.01	
v/s Ratio Perm			0.04				c0.24			0.01		
v/c Ratio	0.30	0.45	0.17	0.35	0.51		0.50	0.05		0.01	0.03	
Uniform Delay, d1	25.7	16.6	15.4	25.7	17.3		9.1	7.1		6.9	7.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	1.0	0.3	3.3	1.3		0.2	0.0		0.0	0.0	
Delay (s)	28.4	17.6	15.7	29.0	18.5		9.3	7.1		6.9	7.0	
Level of Service	C	B	B	C	B		A	A		A	A	
Approach Delay (s)		16.7			18.9			9.0			7.0	
Approach LOS		B			B			A			A	

Intersection Summary				
HCM Average Control Delay	14.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.49			
Actuated Cycle Length (s)	52.6	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	43.4%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	0	203	1	0	1	237	1013	0	0	696	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5		4.0	4.5			4.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.98		0.99		1.00	1.00			1.00	
Flpb, ped/bikes		0.99	1.00		1.00		1.00	1.00			1.00	
Frt		1.00	0.85		0.93		1.00	1.00			0.99	
Flt Protected		0.95	1.00		0.98		0.95	1.00			1.00	
Satd. Flow (prot)		1755	1551		1665		1768	3539			3501	
Flt Permitted		0.76	1.00		0.90		0.22	1.00			1.00	
Satd. Flow (perm)		1397	1551		1535		410	3539			3501	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	0	221	1	0	1	258	1101	0	0	757	47
RTOR Reduction (vph)	0	0	181	0	1	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	96	40	0	1	0	258	1101	0	0	799	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		10.7	10.7		10.7		38.9	38.9			23.8	
Effective Green, g (s)		10.7	10.7		10.7		38.9	38.9			23.8	
Actuated g/C Ratio		0.18	0.18		0.18		0.66	0.66			0.41	
Clearance Time (s)		4.5	4.5		4.5		4.0	4.5			4.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	4.0			4.0	
Lane Grp Cap (vph)		255	283		280		529	2349			1422	
v/s Ratio Prot							0.09	c0.31			c0.23	
v/s Ratio Perm		c0.07	0.03		0.00		0.23					
v/c Ratio		0.38	0.14		0.00		0.49	0.47			0.56	
Uniform Delay, d1		21.0	20.1		19.6		5.4	4.8			13.4	
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	
Incremental Delay, d2		0.9	0.2		0.0		0.3	0.2			0.6	
Delay (s)		22.0	20.3		19.6		5.6	5.0			14.0	
Level of Service		C	C		B		A	A			B	
Approach Delay (s)		20.8			19.6			5.1			14.0	
Approach LOS		C			B			A			B	

Intersection Summary				
HCM Average Control Delay	10.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.52			
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	13.5	
Intersection Capacity Utilization	55.8%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	315	61	51	417	102	101	913	25	71	602	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3441		1770	3419		1770	3523		1770	3513	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3441		1770	3419		1770	3523		1770	3513	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	342	66	55	453	111	110	992	27	77	654	30
RTOR Reduction (vph)	0	13	0	0	17	0	0	1	0	0	2	0
Lane Group Flow (vph)	53	395	0	55	547	0	110	1018	0	77	682	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	5.2	18.6		5.2	18.6		7.6	37.1		6.2	35.7	
Effective Green, g (s)	5.2	18.6		5.2	18.6		7.6	37.1		6.2	35.7	
Actuated g/C Ratio	0.06	0.22		0.06	0.22		0.09	0.44		0.07	0.42	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lane Grp Cap (vph)	109	761		109	756		160	1554		130	1491	
v/s Ratio Prot	0.03	0.11		c0.03	c0.16		c0.06	c0.29		0.04	0.19	
v/s Ratio Perm												
v/c Ratio	0.49	0.52		0.50	0.72		0.69	0.66		0.59	0.46	
Uniform Delay, d1	38.2	28.8		38.2	30.4		37.1	18.5		37.7	17.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.2		1.3	2.9		9.4	0.8		4.7	0.1	
Delay (s)	39.4	29.1		39.5	33.3		46.5	19.2		42.5	17.4	
Level of Service	D	C		D	C		D	B		D	B	
Approach Delay (s)		30.3			33.8			21.9			19.9	
Approach LOS		C			C			C			B	

Intersection Summary				
HCM Average Control Delay	25.2	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.64			
Actuated Cycle Length (s)	84.1	Sum of lost time (s)	12.5	
Intersection Capacity Utilization	63.4%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	181	462	20	190	786	19	22	749	147	62	625	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5	4.5	4.0	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3513		1770	3524		1770	3539	1542	1770	3539	1545
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3513		1770	3524		1770	3539	1542	1770	3539	1545
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	197	502	22	207	854	21	24	814	160	67	679	216
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	51	0	0	77
Lane Group Flow (vph)	197	522	0	207	874	0	24	814	109	67	679	139
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	17.3	32.0		17.9	32.6		3.2	32.5	32.5	6.5	35.8	35.8
Effective Green, g (s)	17.3	32.0		17.9	32.6		3.2	32.5	32.5	6.5	35.8	35.8
Actuated g/C Ratio	0.16	0.30		0.17	0.31		0.03	0.31	0.31	0.06	0.34	0.34
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	2.0	3.0		2.0	3.0		1.0	3.0	3.0	1.0	3.0	3.0
Lane Grp Cap (vph)	289	1062		299	1085		53	1086	473	109	1196	522
v/s Ratio Prot	0.11	0.15		c0.12	c0.25		0.01	c0.23		c0.04	c0.19	
v/s Ratio Perm									0.07			0.09
v/c Ratio	0.68	0.49		0.69	0.81		0.45	0.75	0.23	0.61	0.57	0.27
Uniform Delay, d1	41.7	30.3		41.4	33.7		50.5	33.0	27.4	48.5	28.7	25.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.2	0.4		5.5	4.4		2.2	2.9	0.2	7.0	0.6	0.3
Delay (s)	46.9	30.6		46.9	38.2		52.7	35.9	27.6	55.5	29.3	25.8
Level of Service	D	C		D	D		D	D	C	E	C	C
Approach Delay (s)		35.1			39.8			35.0			30.4	
Approach LOS		D			D			C			C	

Intersection Summary				
HCM Average Control Delay	35.2	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.75			
Actuated Cycle Length (s)	105.9	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	70.7%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	62	30	7	63	333	26	941	11	204	818	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5	4.0	4.5		4.0	4.5	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1763			1852	1545	1767	3532		1769	3510	
Flt Permitted		0.87			0.96	1.00	0.31	1.00		0.15	1.00	
Satd. Flow (perm)		1564			1790	1545	571	3532		274	3510	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	67	33	8	68	362	28	1023	12	222	889	42
RTOR Reduction (vph)	0	12	0	0	0	300	0	1	0	0	2	0
Lane Group Flow (vph)	0	134	0	0	76	62	28	1034	0	222	929	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm		Perm	pm+pt			pm+pt		
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		4	6			2		
Actuated Green, G (s)		10.7			10.7	10.7	29.2	27.5		43.0	37.3	
Effective Green, g (s)		10.7			10.7	10.7	29.2	27.5		43.0	37.3	
Actuated g/C Ratio		0.17			0.17	0.17	0.47	0.44		0.69	0.59	
Clearance Time (s)		4.5			4.5	4.5	4.0	4.5		4.0	4.5	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		267			305	264	298	1549		462	2088	
v/s Ratio Prot							0.00	c0.29		c0.09	0.26	
v/s Ratio Perm		c0.09			0.04	0.04	0.04			0.24		
v/c Ratio		0.50			0.25	0.23	0.09	0.67		0.48	0.44	
Uniform Delay, d1		23.6			22.5	22.5	9.1	14.0		6.6	7.0	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.5			0.2	0.2	0.1	1.2		0.3	0.2	
Delay (s)		24.1			22.7	22.6	9.1	15.2		6.9	7.2	
Level of Service		C			C	C	A	B		A	A	
Approach Delay (s)		24.1			22.6			15.0			7.1	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	62.7	Sum of lost time (s)	13.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	20	65	280	20	60	85	1210	280	60	1010	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.0	4.0	4.0	4.5		4.0	4.5	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97		1.00	0.97	1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1793	1544		1760	1544	1770	3405		1770	3496	
Flt Permitted		0.56	1.00		0.69	1.00	0.15	1.00		0.07	1.00	
Satd. Flow (perm)		1036	1544		1269	1544	277	3405		137	3496	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	22	71	304	22	65	92	1315	304	65	1098	71
RTOR Reduction (vph)	0	0	50	0	0	30	0	14	0	0	3	0
Lane Group Flow (vph)	0	71	21	0	326	35	92	1605	0	65	1166	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)		29.9	29.9		30.4	30.4	60.6	55.1		59.4	54.5	
Effective Green, g (s)		29.9	29.9		30.4	30.4	60.6	55.1		59.4	54.5	
Actuated g/C Ratio		0.29	0.29		0.30	0.30	0.59	0.54		0.58	0.53	
Clearance Time (s)		4.5	4.5		4.0	4.0	4.0	4.5		4.0	4.5	
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		301	449		375	456	243	1823		157	1852	
v/s Ratio Prot							c0.02	c0.47		0.02	0.33	
v/s Ratio Perm		0.07	0.01		c0.26	0.02	0.20			0.22		
v/c Ratio		0.24	0.05		0.87	0.08	0.38	0.88		0.41	0.63	
Uniform Delay, d1		27.8	26.2		34.4	26.1	11.9	21.0		17.7	17.1	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1	0.0		18.2	0.0	0.4	5.3		0.6	0.7	
Delay (s)		27.9	26.3		52.6	26.2	12.3	26.3		18.3	17.8	
Level of Service		C	C		D	C	B	C		B	B	
Approach Delay (s)		27.1			48.2			25.6			17.8	
Approach LOS		C			D			C			B	

Intersection Summary			
HCM Average Control Delay	25.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	102.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	60	280	1250	60	280	1065
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.5		4.0	4.5
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3507		1770	3539
Flt Permitted	0.95	1.00	1.00		0.09	1.00
Satd. Flow (perm)	1770	1583	3507		168	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	304	1359	65	304	1158
RTOR Reduction (vph)	0	268	3	0	0	0
Lane Group Flow (vph)	65	36	1421	0	304	1158
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type		Prot			pm+pt	
Protected Phases	4	4	6		5	2
Permitted Phases					2	
Actuated Green, G (s)	9.7	9.7	40.4		64.7	64.7
Effective Green, g (s)	9.7	9.7	40.4		64.7	64.7
Actuated g/C Ratio	0.12	0.12	0.49		0.78	0.78
Clearance Time (s)	4.0	4.0	4.5		4.0	4.5
Vehicle Extension (s)	2.0	2.0	3.0		2.0	3.0
Lane Grp Cap (vph)	207	185	1709		523	2762
v/s Ratio Prot	c0.04	0.02	c0.41		c0.14	0.33
v/s Ratio Perm					0.31	
v/c Ratio	0.31	0.19	0.83		0.58	0.42
Uniform Delay, d1	33.6	33.1	18.3		17.9	3.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.2	3.6		1.1	0.1
Delay (s)	33.9	33.2	21.9		19.0	3.1
Level of Service	C	C	C		B	A
Approach Delay (s)	33.4		21.9			6.4
Approach LOS	C		C			A

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	82.9	Sum of lost time (s)	12.5
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	355	8	1	478	4	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	386	9	1	520	4	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	1175			262		
pX, platoon unblocked					0.94	
vC, conflicting volume			395		912	390
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			395		872	390
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	99
cM capacity (veh/h)			1164		300	658

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	395	521	9
Volume Left	0	1	4
Volume Right	9	0	4
cSH	1700	1164	413
Volume to Capacity	0.23	0.00	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	13.9
Lane LOS		A	B
Approach Delay (s)	0.0	0.0	13.9
Approach LOS			B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	677	10	10	1019	10	10	10	10	10	10	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	736	11	11	1108	11	11	11	11	11	11	11
Pedestrians		10			10			10			10	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)					349							
pX, platoon unblocked	0.77						0.77	0.77		0.77	0.77	0.77
vC, conflicting volume	1128			757			1375	1923	393	1561	1923	579
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	564			757			884	1598	393	1126	1598	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			93	86	98	89	86	99
cM capacity (veh/h)	765			843			154	77	596	102	77	819

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	379	379	565	565	33	33
Volume Left	11	0	11	0	11	11
Volume Right	0	11	0	11	11	11
cSH	765	1700	843	1700	142	125
Volume to Capacity	0.01	0.22	0.01	0.33	0.23	0.26
Queue Length 95th (ft)	1	0	1	0	21	24
Control Delay (s)	0.5	0.0	0.4	0.0	37.7	43.5
Lane LOS	A		A		E	E
Approach Delay (s)	0.2		0.2		37.7	43.5
Approach LOS					E	E

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	294	459	21	139	418	83	41	932	116	89	528	477
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	5.0		4.0	5.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3511		1770	3437		1770	3469		1770	3539	1554
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3511		1770	3437		1770	3469		1770	3539	1554
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	320	499	23	151	454	90	45	1013	126	97	574	518
RTOR Reduction (vph)	0	2	0	0	10	0	0	5	0	0	0	107
Lane Group Flow (vph)	320	520	0	151	534	0	45	1134	0	97	574	411
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		pm+ov
Protected Phases	3	8		7	4		5	2		1	6	3
Permitted Phases												6
Actuated Green, G (s)	26.4	36.2		14.5	24.3		5.9	45.0		10.6	49.7	76.1
Effective Green, g (s)	26.4	36.2		14.5	24.3		5.9	45.0		10.6	49.7	76.1
Actuated g/C Ratio	0.21	0.29		0.12	0.20		0.05	0.36		0.09	0.40	0.61
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	5.0		4.0	5.0	4.0
Vehicle Extension (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	1.0
Lane Grp Cap (vph)	377	1027		207	675		84	1261		152	1421	955
v/s Ratio Prot	c0.18	0.15		0.09	c0.16		0.03	c0.33		c0.05	0.16	0.09
v/s Ratio Perm												0.17
v/c Ratio	0.85	0.51		0.73	0.79		0.54	0.90		0.64	0.40	0.43
Uniform Delay, d1	46.8	36.4		52.8	47.3		57.6	37.3		54.7	26.5	12.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	15.5	0.1		10.4	5.9		3.3	8.6		6.3	0.1	0.1
Delay (s)	62.3	36.5		63.1	53.2		60.9	45.8		61.1	26.5	12.6
Level of Service	E	D		E	D		E	D		E	C	B
Approach Delay (s)		46.3			55.4			46.4			23.3	
Approach LOS		D			E			D			C	

Intersection Summary			
HCM Average Control Delay	41.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	123.8	Sum of lost time (s)	17.5
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	229	134	0	43	188	8	4	652	21	9	996	287
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1763	1863		1760	1850		1765	3519		1762	3539	1528
Flt Permitted	0.61	1.00		0.66	1.00		0.18	1.00		0.33	1.00	1.00
Satd. Flow (perm)	1125	1863		1230	1850		329	3519		603	3539	1528
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	249	146	0	47	204	9	4	709	23	10	1083	312
RTOR Reduction (vph)	0	0	0	0	2	0	0	3	0	0	0	80
Lane Group Flow (vph)	249	146	0	47	211	0	4	729	0	10	1083	232
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	21.5	21.5		21.5	21.5		29.3	29.3		29.3	29.3	29.3
Effective Green, g (s)	21.5	21.5		21.5	21.5		29.3	29.3		29.3	29.3	29.3
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.49	0.49		0.49	0.49	0.49
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	404	670		442	665		161	1724		295	1734	749
v/s Ratio Prot		0.08			0.11			0.21			c0.31	
v/s Ratio Perm	c0.22			0.04			0.01			0.02		0.15
v/c Ratio	0.62	0.22		0.11	0.32		0.02	0.42		0.03	0.62	0.31
Uniform Delay, d1	15.8	13.3		12.8	13.8		7.9	9.8		7.9	11.2	9.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.0	0.3		0.2	0.6		0.1	0.4		0.1	1.0	0.5
Delay (s)	19.8	13.7		13.0	14.4		8.0	10.2		8.0	12.2	9.7
Level of Service	B	B		B	B		A	B		A	B	A
Approach Delay (s)		17.5			14.2			10.2			11.6	
Approach LOS		B			B			B			B	

Intersection Summary				
HCM Average Control Delay	12.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	67.2%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	533	4	43	6	5	6	22	526	3	5	336	369
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5		4.0	4.5		4.5	4.5	4.5
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00		0.99		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00		1.00		1.00	1.00		0.99	1.00	1.00
Frt	1.00	1.00	0.85		0.95		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1686	1583		1726		1770	3536		1753	3539	1528
Flt Permitted	0.95	0.95	1.00		0.98		0.95	1.00		0.44	1.00	1.00
Satd. Flow (perm)	1681	1686	1583		1726		1770	3536		804	3539	1528
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	579	4	47	7	5	7	24	572	3	5	365	401
RTOR Reduction (vph)	0	0	28	0	7	0	0	0	0	0	0	268
Lane Group Flow (vph)	289	294	19	0	12	0	24	575	0	5	365	133
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Split		Prot	Split			Prot			Perm		Perm
Protected Phases	3	3	3	4	4		5	2			6	
Permitted Phases										6		6
Actuated Green, G (s)	17.2	17.2	17.2		3.5		1.8	25.7		19.9	19.9	19.9
Effective Green, g (s)	17.2	17.2	17.2		3.5		1.8	25.7		19.9	19.9	19.9
Actuated g/C Ratio	0.29	0.29	0.29		0.06		0.03	0.43		0.33	0.33	0.33
Clearance Time (s)	4.5	4.5	4.5		4.5		4.0	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0		2.0		2.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)	483	484	455		101		53	1517		267	1176	508
v/s Ratio Prot	0.17	c0.17	0.01		c0.01		0.01	c0.16			0.10	
v/s Ratio Perm										0.01		0.09
v/c Ratio	0.60	0.61	0.04		0.12		0.45	0.38		0.02	0.31	0.26
Uniform Delay, d1	18.4	18.4	15.4		26.7		28.6	11.7		13.4	14.9	14.6
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.3	1.5	0.0		0.2		2.2	0.2		0.0	0.2	0.4
Delay (s)	19.7	19.9	15.4		26.9		30.8	11.9		13.5	15.1	15.0
Level of Service	B	B	B		C		C	B		B	B	B
Approach Delay (s)		19.5			26.9			12.6			15.0	
Approach LOS		B			C			B			B	

Intersection Summary				
HCM Average Control Delay	15.8	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.44			
Actuated Cycle Length (s)	59.9	Sum of lost time (s)	13.5	
Intersection Capacity Utilization	47.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	103	4	89	238	72	1	179	167	117	0	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.97	1.00	0.97	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00	1.00	0.99	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1762	1851		1758	1787		1759	1863	1540	1759	1541	
Flt Permitted	0.56	1.00		0.68	1.00		0.73	1.00	1.00	0.64	1.00	
Satd. Flow (perm)	1035	1851		1263	1787		1346	1863	1540	1176	1541	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	112	4	97	259	78	1	195	182	127	0	46
RTOR Reduction (vph)	0	2	0	0	14	0	0	0	127	0	32	0
Lane Group Flow (vph)	46	114	0	97	323	0	1	195	55	127	14	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4		4	8		
Actuated Green, G (s)	14.8	14.8		14.8	14.8		10.3	10.3	10.3	10.3	10.3	
Effective Green, g (s)	14.8	14.8		14.8	14.8		10.3	10.3	10.3	10.3	10.3	
Actuated g/C Ratio	0.43	0.43		0.43	0.43		0.30	0.30	0.30	0.30	0.30	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	449	803		548	776		407	563	465	355	465	
v/s Ratio Prot		0.06			c0.18			0.10			0.01	
v/s Ratio Perm	0.04			0.08			0.00		0.04	c0.11		
v/c Ratio	0.10	0.14		0.18	0.42		0.00	0.35	0.12	0.36	0.03	
Uniform Delay, d1	5.7	5.8		5.9	6.7		8.3	9.3	8.6	9.3	8.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.1		0.2	0.5		0.0	0.1	0.0	0.2	0.0	
Delay (s)	5.9	5.9		6.1	7.2		8.3	9.4	8.7	9.5	8.4	
Level of Service	A	A		A	A		A	A	A	A	A	
Approach Delay (s)		5.9			6.9			9.0			9.2	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	34.1	Sum of lost time (s)	9.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	320	228	817	248	340	705
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.5	4.0	4.0	4.5
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1568	3539	1541	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.11	1.00
Satd. Flow (perm)	1770	1568	3539	1541	203	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	348	248	888	270	370	766
RTOR Reduction (vph)	0	127	0	58	0	0
Lane Group Flow (vph)	348	121	888	212	370	766
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type		pm+ov		pm+ov	pm+pt	
Protected Phases	4	1	2	4	1	6
Permitted Phases		4		2	6	
Actuated Green, G (s)	35.7	64.6	42.7	78.4	75.6	75.6
Effective Green, g (s)	35.7	64.6	42.7	78.4	75.6	75.6
Actuated g/C Ratio	0.27	0.49	0.32	0.59	0.57	0.57
Clearance Time (s)	4.0	4.0	4.5	4.0	4.0	4.5
Vehicle Extension (s)	3.0	2.0	4.0	3.0	2.0	4.0
Lane Grp Cap (vph)	479	815	1145	915	459	2027
v/s Ratio Prot	c0.20	0.03	0.25	0.06	c0.18	0.22
v/s Ratio Perm		0.04		0.07	c0.29	
v/c Ratio	0.73	0.15	0.78	0.23	0.81	0.38
Uniform Delay, d1	43.7	18.6	40.3	12.6	33.8	15.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.4	0.0	3.6	0.1	9.4	0.2
Delay (s)	49.1	18.6	43.9	12.7	43.2	15.5
Level of Service	D	B	D	B	D	B
Approach Delay (s)	36.4		36.6			24.6
Approach LOS	D		D			C

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	132.0	Sum of lost time (s)	20.2
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	50	15	582	50	810	3	760	282	1179	448	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		5.3	5.3	5.3	4.5	4.6	4.6	4.5	4.6	
Lane Util. Factor		0.95		0.95	0.95	0.88	1.00	0.86	1.00	0.97	0.95	
Frpb, ped/bikes		0.99		1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.98		0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3374		1681	1698	2787	1770	6408	1518	3433	3497	
Flt Permitted		0.98		0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		3374		1681	1698	2787	1770	6408	1518	3433	3497	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	62	54	16	633	54	880	3	826	307	1282	487	26
RTOR Reduction (vph)	0	7	0	0	0	200	0	0	244	0	2	0
Lane Group Flow (vph)	0	125	0	342	345	680	3	826	63	1282	511	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Split			Split		pt+ov	Prot		Perm	Prot		
Protected Phases	4	4		3	3	3 5	1	6		5	2	
Permitted Phases									6			
Actuated Green, G (s)		11.2		41.3	41.3	97.0	1.3	32.5	32.5	55.7	86.9	
Effective Green, g (s)		11.2		41.3	41.3	97.0	1.3	32.5	32.5	55.7	86.9	
Actuated g/C Ratio		0.07		0.26	0.26	0.61	0.01	0.20	0.20	0.35	0.54	
Clearance Time (s)		4.5		5.3	5.3		4.5	4.6	4.6	4.5	4.6	
Vehicle Extension (s)		3.0		3.8	3.8		3.0	3.8	3.8	3.8	3.8	
Lane Grp Cap (vph)		237		435	439	1694	14	1305	309	1198	1904	
v/s Ratio Prot		c0.04		c0.20	0.20	0.24	0.00	c0.13		c0.37	0.15	
v/s Ratio Perm									0.04			
v/c Ratio		0.53		0.79	0.79	0.40	0.21	0.63	0.20	1.07	0.27	
Uniform Delay, d1		71.7		55.0	55.0	16.2	78.6	58.1	52.8	52.0	19.4	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.1		9.5	9.4	0.2	7.6	1.1	0.4	47.0	0.1	
Delay (s)		73.8		64.5	64.4	16.4	86.2	59.2	53.2	98.9	19.5	
Level of Service		E		E	E	B	F	E	D	F	B	
Approach Delay (s)		73.8			37.5			57.7			76.2	
Approach LOS		E			D			E			E	

Intersection Summary			
HCM Average Control Delay	58.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	159.6	Sum of lost time (s)	18.9
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	872	762	758	1357	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	4.5	4.5	
Lane Util. Factor		0.88	0.97	0.95	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	
Frt		0.85	1.00	1.00	0.99	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		2787	3433	3539	5054	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		2787	3433	3539	5054	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	948	828	824	1475	54
RTOR Reduction (vph)	0	6	0	0	4	0
Lane Group Flow (vph)	0	942	828	824	1525	0
Confl. Peds. (#/hr)	10	10	10			10
Turn Type		Over	Prot			
Protected Phases		4	4	6 4	2	
Permitted Phases						
Actuated Green, G (s)		27.9	27.9	62.7	24.3	
Effective Green, g (s)		27.9	27.9	56.7	24.3	
Actuated g/C Ratio		0.44	0.44	0.90	0.39	
Clearance Time (s)		6.0	6.0		4.5	
Vehicle Extension (s)		2.0	2.0		2.0	
Lane Grp Cap (vph)		1240	1528	3200	1959	
v/s Ratio Prot		c0.34	0.24	0.23	c0.30	
v/s Ratio Perm						
v/c Ratio		0.76	0.54	0.26	0.78	
Uniform Delay, d1		14.6	12.7	0.4	16.8	
Progression Factor		1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.4	0.2	0.0	1.8	
Delay (s)		17.0	12.9	0.4	18.7	
Level of Service		B	B	A	B	
Approach Delay (s)	17.0			6.7	18.7	
Approach LOS	B			A	B	

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	62.7	Sum of lost time (s)	10.5
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	319	875	779	33	37	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5	4.5		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1769	3539	3512		1770	1583
Flt Permitted	0.17	1.00	1.00		0.95	1.00
Satd. Flow (perm)	316	3539	3512		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	347	951	847	36	40	386
RTOR Reduction (vph)	0	0	3	0	0	47
Lane Group Flow (vph)	347	951	880	0	40	339
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	pm+pt					pt+ov
Protected Phases	1	6	2		8	8 1
Permitted Phases	6					
Actuated Green, G (s)	33.1	33.1	19.6		12.4	25.9
Effective Green, g (s)	33.1	33.1	19.6		12.4	25.9
Actuated g/C Ratio	0.61	0.61	0.36		0.23	0.48
Clearance Time (s)	4.0	4.5	4.5		4.0	
Vehicle Extension (s)	1.0	2.0	2.0		2.0	
Lane Grp Cap (vph)	449	2169	1275		406	759
v/s Ratio Prot	c0.14	0.27	0.25		0.02	c0.21
v/s Ratio Perm	c0.34					
v/c Ratio	0.77	0.44	0.69		0.10	0.45
Uniform Delay, d1	8.8	5.5	14.6		16.4	9.3
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	7.4	0.1	1.3		0.0	0.2
Delay (s)	16.2	5.6	15.9		16.4	9.5
Level of Service	B	A	B		B	A
Approach Delay (s)		8.4	15.9		10.1	
Approach LOS		A	B		B	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	54.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	210	45	101	100	370	31	865	104	255	1170	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5	4.0	4.0	4.5	4.5	4.0	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3432		1770	1863	1566	1769	3539	1541	1770	3539	1514
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.17	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	1770	3432		1770	1863	1566	321	3539	1541	204	3539	1514
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	228	49	110	109	402	34	940	113	277	1272	103
RTOR Reduction (vph)	0	11	0	0	0	22	0	0	66	0	0	21
Lane Group Flow (vph)	168	266	0	110	109	380	34	940	47	277	1272	82
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		pm+ov	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8	5	1	6		5	2	
Permitted Phases						8	6		6	2		2
Actuated Green, G (s)	17.3	22.7		11.5	16.9	38.8	41.1	38.5	38.5	64.4	57.8	57.8
Effective Green, g (s)	17.3	22.7		11.5	16.9	38.8	41.1	38.5	38.5	64.4	57.8	57.8
Actuated g/C Ratio	0.16	0.20		0.10	0.15	0.35	0.37	0.34	0.34	0.58	0.52	0.52
Clearance Time (s)	4.0	4.5		4.0	4.5	4.0	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	1.0	2.0		1.0	2.0	1.0	1.0	2.0	2.0	1.0	2.0	2.0
Lane Grp Cap (vph)	274	698		182	282	544	152	1221	532	425	1833	784
v/s Ratio Prot	c0.09	0.08		0.06	0.06	c0.14	0.01	c0.27		0.13	0.36	
v/s Ratio Perm						0.11	0.08		0.03	0.25		0.05
v/c Ratio	0.61	0.38		0.60	0.39	0.70	0.22	0.77	0.09	0.65	0.69	0.10
Uniform Delay, d1	44.0	38.4		47.9	42.7	31.4	23.0	32.6	24.7	23.5	20.2	13.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.1		3.8	0.3	3.2	0.3	2.7	0.0	2.7	0.9	0.0
Delay (s)	46.9	38.5		51.7	43.0	34.5	23.3	35.3	24.7	26.2	21.2	13.7
Level of Service	D	D		D	D	C	C	D	C	C	C	B
Approach Delay (s)		41.7			39.1			33.8			21.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	30.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	111.6	Sum of lost time (s)	16.5
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	465	0	491	138	0	94	369	776	10	0	778	501
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5		4.5	5.0	4.5			6.0	6.0
Lane Util. Factor	0.95	0.95	1.00	1.00		1.00	0.97	0.95			0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00	1.00	1.00			1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00		0.85	1.00	1.00			1.00	0.85
Flt Protected	0.95	0.95	1.00	0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1681	1681	1583	1770		1583	3433	3529			3539	1529
Flt Permitted	0.95	0.95	1.00	0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)	1681	1681	1583	1770		1583	3433	3529			3539	1529
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	505	0	534	150	0	102	401	843	11	0	846	545
RTOR Reduction (vph)	0	0	108	0	0	88	0	0	0	0	0	380
Lane Group Flow (vph)	252	253	426	150	0	14	401	854	0	0	846	165
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Split		pt+ov	Prot		custom	Prot			Prot		Perm
Protected Phases	4	4	4 5	3		3	5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	30.4	30.4	57.9	17.5		17.5	23.0	68.9			39.4	39.4
Effective Green, g (s)	30.4	30.4	57.9	17.5		17.5	23.0	68.9			39.4	39.4
Actuated g/C Ratio	0.23	0.23	0.44	0.13		0.13	0.18	0.53			0.30	0.30
Clearance Time (s)	4.5	4.5		4.5		4.5	5.0	4.5			6.0	6.0
Vehicle Extension (s)	4.0	4.0		2.0		2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	392	392	703	238		213	606	1866			1070	462
v/s Ratio Prot	0.15	0.15	c0.27	c0.08		0.01	0.12	0.24			c0.24	
v/s Ratio Perm												0.11
v/c Ratio	0.64	0.65	0.61	0.63		0.06	0.66	0.46			0.79	0.36
Uniform Delay, d1	45.1	45.1	27.5	53.3		49.3	50.0	19.1			41.7	35.5
Progression Factor	1.00	1.00	1.00	1.00		1.00	1.00	1.00			1.00	1.00
Incremental Delay, d2	4.0	4.0	1.7	4.0		0.0	2.1	0.1			3.8	0.2
Delay (s)	49.1	49.1	29.2	57.3		49.3	52.1	19.1			45.5	35.7
Level of Service	D	D	C	E		D	D	B			D	D
Approach Delay (s)		38.9			54.1			29.7			41.6	
Approach LOS		D			D			C			D	

Intersection Summary				
HCM Average Control Delay	37.9	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	130.3	Sum of lost time (s)	15.0	
Intersection Capacity Utilization	74.3%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	871	104	181	689	148	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.98		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3470		1769	3539	1770	1552
Flt Permitted	1.00		0.14	1.00	0.95	1.00
Satd. Flow (perm)	3470		252	3539	1770	1552
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	947	113	197	749	161	176
RTOR Reduction (vph)	8	0	0	0	0	142
Lane Group Flow (vph)	1052	0	197	749	161	34
Confl. Peds. (#/hr)		10	10		10	10
Turn Type			pm+pt			Perm
Protected Phases	6		5	2	4	
Permitted Phases			2			4
Actuated Green, G (s)	25.6		40.7	40.7	11.7	11.7
Effective Green, g (s)	25.6		40.7	40.7	11.7	11.7
Actuated g/C Ratio	0.42		0.67	0.67	0.19	0.19
Clearance Time (s)	4.5		4.0	4.5	4.0	4.0
Vehicle Extension (s)	4.0		1.0	4.0	2.0	2.0
Lane Grp Cap (vph)	1459		445	2365	340	298
v/s Ratio Prot	c0.30		c0.08	0.21	c0.09	
v/s Ratio Perm			0.22			0.02
v/c Ratio	0.72		0.44	0.32	0.47	0.11
Uniform Delay, d1	14.7		6.9	4.2	21.9	20.3
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9		0.3	0.1	0.4	0.1
Delay (s)	16.6		7.1	4.4	22.2	20.4
Level of Service	B		A	A	C	C
Approach Delay (s)	16.6			4.9	21.3	
Approach LOS	B			A	C	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	12.5
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	11	10	455	12	209	10	794	392	254	918	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0	5.0	4.5	4.5	4.5	4.0	4.5	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.99		1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00		0.99	0.99	1.00	0.99	1.00	1.00	1.00	1.00	
Frt		0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1737		1665	1674	1547	1758	3539	1541	1770	3532	
Flt Permitted		0.89		0.73	0.71	1.00	0.28	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1570		1288	1248	1547	526	3539	1541	1770	3532	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	12	11	495	13	227	11	863	426	276	998	11
RTOR Reduction (vph)	0	8	0	0	0	163	0	0	288	0	1	0
Lane Group Flow (vph)	0	26	0	252	256	64	11	863	138	276	1008	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm		Perm	Perm		Perm	Prot		
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2			
Actuated Green, G (s)		21.0		21.0	21.0	21.0	24.1	24.1	24.1	15.9	44.0	
Effective Green, g (s)		21.0		21.0	21.0	21.0	24.1	24.1	24.1	15.9	44.0	
Actuated g/C Ratio		0.28		0.28	0.28	0.28	0.32	0.32	0.32	0.21	0.59	
Clearance Time (s)		5.0		5.0	5.0	5.0	4.5	4.5	4.5	4.0	4.5	
Vehicle Extension (s)		2.0		2.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
Lane Grp Cap (vph)		443		363	352	436	170	1145	498	378	2086	
v/s Ratio Prot								c0.24		c0.16	0.29	
v/s Ratio Perm		0.02		0.20	c0.21	0.04	0.02		0.09			
v/c Ratio		0.06		0.69	0.73	0.15	0.06	0.75	0.28	0.73	0.48	
Uniform Delay, d1		19.5		23.9	24.2	20.0	17.4	22.5	18.7	27.3	8.7	
Progression Factor		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		0.0		4.6	6.2	0.1	0.1	2.5	0.1	6.1	0.1	
Delay (s)		19.6		28.5	30.4	20.1	17.5	25.1	18.8	33.4	8.8	
Level of Service		B		C	C	C	B	C	B	C	A	
Approach Delay (s)		19.6			26.6			23.0			14.1	
Approach LOS		B			C			C			B	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	74.5	Sum of lost time (s)	13.5
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	964	74	59	778	12	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3495		1767	3539	1770	1559
Flt Permitted	1.00		0.26	1.00	0.95	1.00
Satd. Flow (perm)	3495		480	3539	1770	1559
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1048	80	64	846	13	12
RTOR Reduction (vph)	8	0	0	0	0	11
Lane Group Flow (vph)	1120	0	64	846	13	1
Confl. Peds. (#/hr)		10	10		10	10
Turn Type			Perm			Perm
Protected Phases	6			2	4	
Permitted Phases			2			4
Actuated Green, G (s)	15.5		15.5	15.5	2.8	2.8
Effective Green, g (s)	15.5		15.5	15.5	2.8	2.8
Actuated g/C Ratio	0.57		0.57	0.57	0.10	0.10
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	1984		273	2009	182	160
v/s Ratio Prot	c0.32			0.24	c0.01	
v/s Ratio Perm			0.13			0.00
v/c Ratio	0.56		0.23	0.42	0.07	0.01
Uniform Delay, d1	3.8		2.9	3.4	11.1	11.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2		0.2	0.1	0.1	0.0
Delay (s)	4.0		3.1	3.4	11.1	11.0
Level of Service	A		A	A	B	B
Approach Delay (s)	4.0			3.4	11.1	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	3.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	27.3	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	351	24	89	207	97	79	1048	35	135	969	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1761	1863	1543	1769	1863	1543	1770	3517		1770	3525	
Flt Permitted	0.55	1.00	1.00	0.17	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1014	1863	1543	317	1863	1543	1770	3517		1770	3525	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	39	382	26	97	225	105	86	1139	38	147	1053	23
RTOR Reduction (vph)	0	0	12	0	0	79	0	2	0	0	1	0
Lane Group Flow (vph)	39	382	14	97	225	26	86	1175	0	147	1075	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	pm+pt		Perm	pm+pt		custom	Prot			Prot		
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		8						
Actuated Green, G (s)	29.1	25.6	25.6	35.5	28.8	25.6	7.6	41.3		12.7	46.4	
Effective Green, g (s)	29.1	25.6	25.6	35.5	28.8	25.6	7.6	41.3		12.7	46.4	
Actuated g/C Ratio	0.28	0.25	0.25	0.34	0.28	0.25	0.07	0.40		0.12	0.45	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	2.0		1.5	2.0	
Lane Grp Cap (vph)	311	462	382	203	519	382	130	1406		218	1583	
v/s Ratio Prot	0.00	c0.21		c0.03	0.12		0.05	c0.33		c0.08	0.30	
v/s Ratio Perm	0.03		0.01	0.13		0.02						
v/c Ratio	0.13	0.83	0.04	0.48	0.43	0.07	0.66	0.84		0.67	0.68	
Uniform Delay, d1	27.3	36.8	29.5	25.6	30.6	29.7	46.6	27.9		43.3	22.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	11.0	0.0	0.6	0.2	0.0	9.4	4.3		6.3	0.9	
Delay (s)	27.4	47.8	29.5	26.3	30.8	29.8	56.0	32.2		49.6	23.5	
Level of Service	C	D	C	C	C	C	E	C		D	C	
Approach Delay (s)		44.9			29.5			33.8			26.6	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	32.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	103.3	Sum of lost time (s)	21.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBR	SEL	SER	SWL	SWR
Lane Configurations						
Volume (vph)	593	497	34	537	257	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5	5.0	
Lane Util. Factor	0.97		1.00	0.88	0.97	
Frpb, ped/bikes	0.99		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.93		1.00	0.85	0.98	
Flt Protected	0.97		0.95	1.00	0.96	
Satd. Flow (prot)	3231		1770	2787	3391	
Flt Permitted	0.97		0.95	1.00	0.96	
Satd. Flow (perm)	3231		1770	2787	3391	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	645	540	37	584	279	34
RTOR Reduction (vph)	131	0	0	220	8	0
Lane Group Flow (vph)	1054	0	37	364	305	0
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type				custom		
Protected Phases	2		1	6	4	
Permitted Phases						
Actuated Green, G (s)	20.5		1.9	26.4	10.8	
Effective Green, g (s)	20.5		1.9	26.4	10.8	
Actuated g/C Ratio	0.44		0.04	0.57	0.23	
Clearance Time (s)	4.5		4.0	4.5	5.0	
Vehicle Extension (s)	2.0		1.0	2.0	2.0	
Lane Grp Cap (vph)	1418		72	1576	784	
v/s Ratio Prot	c0.33		c0.02	0.13	c0.09	
v/s Ratio Perm						
v/c Ratio	0.74		0.51	0.23	0.39	
Uniform Delay, d1	10.9		21.9	5.1	15.2	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	1.9		2.6	0.0	0.1	
Delay (s)	12.8		24.5	5.1	15.3	
Level of Service	B		C	A	B	
Approach Delay (s)	12.8		6.3		15.3	
Approach LOS	B		A		B	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	46.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	367	304	491	64	122	362
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.97	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.90	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	1863	1616	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1583	1770	1863	1616	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	399	330	534	70	133	393
RTOR Reduction (vph)	0	124	0	0	89	0
Lane Group Flow (vph)	399	206	534	70	437	0
Confl. Peds. (#/hr)	10	10	10			10
Turn Type		pt+ov	Prot			
Protected Phases	4	4 1	1	6	2	
Permitted Phases						
Actuated Green, G (s)	28.3	68.2	35.9	72.6	32.2	
Effective Green, g (s)	28.3	68.2	35.9	72.6	32.2	
Actuated g/C Ratio	0.26	0.62	0.33	0.66	0.29	
Clearance Time (s)	4.0		4.5	4.5	4.5	
Vehicle Extension (s)	2.0		1.0	2.0	2.0	
Lane Grp Cap (vph)	458	987	581	1236	476	
v/s Ratio Prot	c0.23	0.13	c0.30	0.04	c0.27	
v/s Ratio Perm						
v/c Ratio	0.87	0.21	0.92	0.06	0.92	
Uniform Delay, d1	38.8	8.9	35.4	6.4	37.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	16.0	0.0	19.3	0.0	22.2	
Delay (s)	54.8	9.0	54.6	6.4	59.5	
Level of Service	D	A	D	A	E	
Approach Delay (s)	34.0			49.1	59.5	
Approach LOS	C			D	E	

Intersection Summary			
HCM Average Control Delay	46.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	109.4	Sum of lost time (s)	13.0
Intersection Capacity Utilization	87.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	75	402	207	255	360	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1768	1863	1820	
Flt Permitted	0.95	1.00	0.26	1.00	1.00	
Satd. Flow (perm)	1770	1583	485	1863	1820	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	437	225	277	391	63
RTOR Reduction (vph)	0	113	0	0	5	0
Lane Group Flow (vph)	82	324	225	277	449	0
Confl. Peds. (#/hr)	10	10	10			10
Turn Type		pt+ov	pm+pt			
Protected Phases	4	4 1	1	6	2	
Permitted Phases			6			
Actuated Green, G (s)	10.1	21.0	27.5	27.5	16.6	
Effective Green, g (s)	10.1	21.0	27.5	27.5	16.6	
Actuated g/C Ratio	0.22	0.45	0.59	0.59	0.36	
Clearance Time (s)	4.5		4.5	4.5	4.5	
Vehicle Extension (s)	2.0		1.0	2.0	2.0	
Lane Grp Cap (vph)	384	713	462	1099	648	
v/s Ratio Prot	0.05	c0.20	0.07	0.15	c0.25	
v/s Ratio Perm			0.22			
v/c Ratio	0.21	0.45	0.49	0.25	0.69	
Uniform Delay, d1	15.0	8.8	5.9	4.6	12.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.2	0.3	0.0	2.6	
Delay (s)	15.1	9.0	6.2	4.6	15.4	
Level of Service	B	A	A	A	B	
Approach Delay (s)	10.0			5.4	15.4	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	46.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	385	23	571	397	22	589
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1844		1770	1863	1770	1560
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	1844		1770	1863	1770	1560
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	418	25	621	432	24	640
RTOR Reduction (vph)	2	0	0	0	0	0
Lane Group Flow (vph)	441	0	621	432	24	640
Confl. Peds. (#/hr)		10	10		10	10
Turn Type			Prot			Free
Protected Phases	2		1	6	4	
Permitted Phases						Free
Actuated Green, G (s)	23.0		37.7	64.7	5.1	78.3
Effective Green, g (s)	23.0		37.7	64.7	5.1	78.3
Actuated g/C Ratio	0.29		0.48	0.83	0.07	1.00
Clearance Time (s)	4.5		4.0	4.5	4.0	
Vehicle Extension (s)	2.0		1.0	2.0	2.0	
Lane Grp Cap (vph)	542		852	1539	115	1560
v/s Ratio Prot	c0.24		c0.35	0.23	0.01	
v/s Ratio Perm						c0.41
v/c Ratio	0.81		0.73	0.28	0.21	0.41
Uniform Delay, d1	25.7		16.2	1.5	34.7	0.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	8.6		2.7	0.0	0.3	0.8
Delay (s)	34.3		18.9	1.6	35.0	0.8
Level of Service	C		B	A	D	A
Approach Delay (s)	34.3			11.8	2.0	
Approach LOS	C			B	A	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	78.3	Sum of lost time (s)	8.5
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	1	808	165	127	740	2	12	20	2	226	30	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.0	4.5			4.5			4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.96	1.00	1.00			1.00			1.00	0.98
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00			1.00			0.99	1.00
Frt	1.00	1.00	0.85	1.00	1.00			0.99			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			0.96	1.00
Satd. Flow (prot)	1754	3539	1517	1770	3537			1811			1769	1547
Flt Permitted	0.35	1.00	1.00	0.95	1.00			0.88			0.72	1.00
Satd. Flow (perm)	641	3539	1517	1770	3537			1629			1339	1547
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	878	179	138	804	2	13	22	2	246	33	101
RTOR Reduction (vph)	0	0	53	0	0	0	0	1	0	0	0	70
Lane Group Flow (vph)	1	878	126	138	806	0	0	36	0	0	279	31
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm		Perm	Prot			Perm			Perm		Perm
Protected Phases		6		5	2			8			4	
Permitted Phases	6		6				8			4		4
Actuated Green, G (s)	33.7	33.7	33.7	12.4	50.1			26.0			26.0	26.0
Effective Green, g (s)	33.7	33.7	33.7	12.4	50.1			26.0			26.0	26.0
Actuated g/C Ratio	0.40	0.40	0.40	0.15	0.59			0.31			0.31	0.31
Clearance Time (s)	4.5	4.5	4.5	4.0	4.5			4.5			4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	2.0	4.0			3.0			3.0	3.0
Lane Grp Cap (vph)	254	1401	601	258	2082			498			409	473
v/s Ratio Prot		c0.25		c0.08	0.23							
v/s Ratio Perm	0.00		0.08					0.02			c0.21	0.02
v/c Ratio	0.00	0.63	0.21	0.53	0.39			0.07			0.68	0.07
Uniform Delay, d1	15.5	20.6	16.9	33.7	9.3			21.0			25.9	20.9
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2	0.0	1.0	0.2	1.1	0.2			0.1			4.6	0.1
Delay (s)	15.6	21.7	17.2	34.7	9.5			21.0			30.6	21.0
Level of Service	B	C	B	C	A			C			C	C
Approach Delay (s)		20.9			13.2			21.0			28.0	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	85.1	Sum of lost time (s)	13.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	0	5	45	10	56	2	901	0	0	819	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0		4.5	4.5			4.5	
Lane Util. Factor	1.00		1.00	1.00	1.00		1.00	0.95			0.95	
Frpb, ped/bikes	1.00		1.00	1.00	0.96		1.00	1.00			1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00		0.85	1.00	0.87		1.00	1.00			1.00	
Flt Protected	0.95		1.00	0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	1770		1583	1770	1568		1763	3539			3529	
Flt Permitted	0.95		1.00	0.95	1.00		0.27	1.00			1.00	
Satd. Flow (perm)	1770		1583	1770	1568		498	3539			3529	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	0	5	49	11	61	2	979	0	0	890	14
RTOR Reduction (vph)	0	0	5	0	55	0	0	0	0	0	0	0
Lane Group Flow (vph)	10	0	0	49	17	0	2	979	0	0	904	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		custom	Split			Perm					
Protected Phases	3		3	4	4			6			2	
Permitted Phases							6					
Actuated Green, G (s)	1.7		1.7	5.9	5.9		34.2	34.2			34.2	
Effective Green, g (s)	1.7		1.7	5.9	5.9		34.2	34.2			34.2	
Actuated g/C Ratio	0.03		0.03	0.10	0.10		0.56	0.56			0.56	
Clearance Time (s)	4.0		4.0	4.0	4.0		4.5	4.5			4.5	
Vehicle Extension (s)	2.0		2.0	2.0	2.0		4.0	4.0			4.0	
Lane Grp Cap (vph)	49		44	171	152		280	1987			1982	
v/s Ratio Prot	c0.01		0.00	c0.03	0.01			c0.28			0.26	
v/s Ratio Perm							0.00					
v/c Ratio	0.20		0.00	0.29	0.11		0.01	0.49			0.46	
Uniform Delay, d1	28.9		28.8	25.5	25.1		5.9	8.1			7.9	
Progression Factor	1.00		1.00	1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.8		0.0	0.3	0.1		0.0	0.3			0.2	
Delay (s)	29.7		28.8	25.9	25.2		5.9	8.4			8.1	
Level of Service	C		C	C	C		A	A			A	
Approach Delay (s)		29.4			25.5			8.4			8.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	19.1
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	86	39	34	932	793	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1553	1763	3539	3492	
Flt Permitted	0.95	1.00	0.29	1.00	1.00	
Satd. Flow (perm)	1770	1553	541	3539	3492	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	42	37	1013	862	68
RTOR Reduction (vph)	0	35	0	0	4	0
Lane Group Flow (vph)	93	7	37	1013	926	0
Confl. Peds. (#/hr)	10	10	10			10
Turn Type		Perm	Perm			
Protected Phases	4			6	2	
Permitted Phases		4	6			
Actuated Green, G (s)	8.0	8.0	32.8	32.8	32.8	
Effective Green, g (s)	8.0	8.0	32.8	32.8	32.8	
Actuated g/C Ratio	0.16	0.16	0.67	0.67	0.67	
Clearance Time (s)	4.0	4.0	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	287	252	360	2355	2323	
v/s Ratio Prot	c0.05			c0.29	0.27	
v/s Ratio Perm		0.00	0.07			
v/c Ratio	0.32	0.03	0.10	0.43	0.40	
Uniform Delay, d1	18.3	17.4	3.0	3.9	3.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.0	0.2	0.2	0.2	
Delay (s)	18.9	17.4	3.1	4.0	3.9	
Level of Service	B	B	A	A	A	
Approach Delay (s)	18.5			4.0	3.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	4.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	49.3	Sum of lost time (s)	8.5
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	28	10	15	235	20	74	4	815	147	46	606	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.5	4.5		4.0	4.5	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		0.97			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1735			1781	1583	1748	3432		1770	3526	
Flt Permitted		0.97			0.96	1.00	0.40	1.00		0.95	1.00	
Satd. Flow (perm)		1735			1781	1583	729	3432		1770	3526	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	11	16	255	22	80	4	886	160	50	659	13
RTOR Reduction (vph)	0	12	0	0	0	61	0	10	0	0	1	0
Lane Group Flow (vph)	0	45	0	0	277	19	4	1036	0	50	671	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Split			Split		Prot	Perm			Prot		
Protected Phases	4	4		3	3	3		6		5	2	
Permitted Phases							6					
Actuated Green, G (s)		7.3			20.2	20.2	35.3	35.3		5.7	45.0	
Effective Green, g (s)		7.3			20.2	20.2	35.3	35.3		5.7	45.0	
Actuated g/C Ratio		0.09			0.24	0.24	0.42	0.42		0.07	0.53	
Clearance Time (s)		4.0			4.0	4.0	4.5	4.5		4.0	4.5	
Vehicle Extension (s)		2.0			2.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		149			423	376	303	1425		119	1867	
v/s Ratio Prot		c0.03			c0.16	0.01		c0.30		0.03	c0.19	
v/s Ratio Perm							0.01					
v/c Ratio		0.30			0.65	0.05	0.01	0.73		0.42	0.36	
Uniform Delay, d1		36.5			29.3	25.0	14.6	20.8		38.1	11.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.4			2.8	0.0	0.0	1.9		0.9	0.1	
Delay (s)		36.9			32.0	25.0	14.6	22.7		38.9	11.7	
Level of Service		D			C	C	B	C		D	B	
Approach Delay (s)		36.9			30.5			22.7			13.6	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	24	9	84	76	174	21	816	80	210	571	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.5	4.5		4.0	4.5	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	0.99	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.99			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1778			1807	1550	1754	3480		1769	3526	
Flt Permitted		0.93			0.81	1.00	0.41	1.00		0.16	1.00	
Satd. Flow (perm)		1672			1505	1550	760	3480		302	3526	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	26	10	91	83	189	23	887	87	228	621	12
RTOR Reduction (vph)	0	8	0	0	0	153	0	6	0	0	1	0
Lane Group Flow (vph)	0	38	0	0	174	36	23	968	0	228	632	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4		4	6			2		
Actuated Green, G (s)		13.4			13.4	13.4	29.9	29.9		47.5	47.5	
Effective Green, g (s)		13.4			13.4	13.4	29.9	29.9		47.5	47.5	
Actuated g/C Ratio		0.19			0.19	0.19	0.43	0.43		0.68	0.68	
Clearance Time (s)		4.0			4.0	4.0	4.5	4.5		4.0	4.5	
Vehicle Extension (s)		2.0			2.0	2.0	4.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		323			291	299	327	1499		494	2413	
v/s Ratio Prot								c0.28		c0.09	0.18	
v/s Ratio Perm		0.02			c0.12	0.02	0.03			0.23		
v/c Ratio		0.12			0.60	0.12	0.07	0.65		0.46	0.26	
Uniform Delay, d1		23.1			25.5	23.1	11.6	15.6		6.8	4.2	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			2.2	0.1	0.1	1.1		0.2	0.1	
Delay (s)		23.2			27.7	23.2	11.7	16.6		7.1	4.3	
Level of Service		C			C	C	B	B		A	A	
Approach Delay (s)		23.2			25.4			16.5			5.0	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	69.4	Sum of lost time (s)	12.5
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	701	10	14	367	30	553	87	4	28	111	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1748	3529		1760	3487		1770	1850		1770	1789	
Flt Permitted	0.41	1.00		0.17	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	759	3529		308	3487		1770	1850		1770	1789	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	762	11	15	399	33	601	95	4	30	121	36
RTOR Reduction (vph)	0	1	0	0	6	0	0	1	0	0	11	0
Lane Group Flow (vph)	11	772	0	15	426	0	601	98	0	30	146	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Split			Split		
Protected Phases		8			4		5	5		6	6	
Permitted Phases	8			4								
Actuated Green, G (s)	25.1	25.1		25.1	25.1		36.1	36.1		12.0	12.0	
Effective Green, g (s)	25.1	25.1		25.1	25.1		36.1	36.1		12.0	12.0	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.42	0.42		0.14	0.14	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		2.0	2.0	
Lane Grp Cap (vph)	220	1022		89	1010		737	770		245	248	
v/s Ratio Prot		c0.22			0.12		c0.34	0.05		0.02	c0.08	
v/s Ratio Perm	0.01			0.05								
v/c Ratio	0.05	0.76		0.17	0.42		0.82	0.13		0.12	0.59	
Uniform Delay, d1	22.2	28.0		23.0	24.9		22.4	15.6		32.7	35.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	3.4		1.2	0.4		7.3	0.1		0.1	2.3	
Delay (s)	22.3	31.4		24.2	25.3		29.6	15.7		32.8	37.3	
Level of Service	C	C		C	C		C	B		C	D	
Approach Delay (s)		31.3			25.3			27.7			36.6	
Approach LOS		C			C			C			D	

Intersection Summary				
HCM Average Control Delay	29.3	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.76			
Actuated Cycle Length (s)	86.7	Sum of lost time (s)	13.5	
Intersection Capacity Utilization	72.4%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	676	15	286	422	0	12	4	352	0	4	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5			4.5	4.0		4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		1.00	1.00
Satd. Flow (prot)	1766	3527		1769	3539			1786	1577		1863	1555
Flt Permitted	0.49	1.00		0.27	1.00			1.00	1.00		1.00	1.00
Satd. Flow (perm)	906	3527		495	3539			1854	1577		1863	1555
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	735	16	311	459	0	13	4	383	0	4	1
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	46	0	0	1
Lane Group Flow (vph)	11	750	0	311	459	0	0	17	337	0	4	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		Perm
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	22.2	21.6		37.1	32.5			2.3	13.8		2.3	2.3
Effective Green, g (s)	22.2	21.6		37.1	32.5			2.3	13.8		2.3	2.3
Actuated g/C Ratio	0.46	0.45		0.77	0.67			0.05	0.29		0.05	0.05
Clearance Time (s)	4.0	4.5		4.0	4.5			4.5	4.0		4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	426	1574		682	2376			88	450		89	74
v/s Ratio Prot	0.00	0.21		0.11	0.13				c0.18		0.00	
v/s Ratio Perm	0.01			c0.24				0.01	0.04			0.00
v/c Ratio	0.03	0.48		0.46	0.19			0.19	0.75		0.04	0.00
Uniform Delay, d1	7.2	9.4		2.5	3.0			22.2	15.7		22.0	22.0
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.0	0.2		0.5	0.0			1.1	6.7		0.2	0.0
Delay (s)	7.2	9.7		3.0	3.0			23.2	22.5		22.2	22.0
Level of Service	A	A		A	A			C	C		C	C
Approach Delay (s)		9.6			3.0			22.5			22.2	
Approach LOS		A			A			C			C	

Intersection Summary				
HCM Average Control Delay	9.7	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.53			
Actuated Cycle Length (s)	48.4	Sum of lost time (s)	8.0	
Intersection Capacity Utilization	61.6%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	230	699	99	115	421	254	139	888	103	236	713	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1766	3464		1769	3539	1550	1769	3477		1769	3436	
Flt Permitted	0.49	1.00		0.14	1.00	1.00	0.14	1.00		0.14	1.00	
Satd. Flow (perm)	907	3464		255	3539	1550	261	3477		261	3436	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	760	108	125	458	276	151	965	112	257	775	161
RTOR Reduction (vph)	0	13	0	0	0	99	0	9	0	0	18	0
Lane Group Flow (vph)	250	855	0	125	458	177	151	1068	0	257	918	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	pm+pt			pm+pt		Perm	pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	29.2	25.2		38.1	30.1	30.1	32.5	28.5		32.5	28.5	
Effective Green, g (s)	29.2	25.2		38.1	30.1	30.1	32.5	28.5		32.5	28.5	
Actuated g/C Ratio	0.35	0.30		0.46	0.36	0.36	0.39	0.34		0.39	0.34	
Clearance Time (s)	4.0	4.5		4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	358	1044		277	1274	558	174	1185		174	1171	
v/s Ratio Prot	c0.03	c0.25		c0.05	0.13		0.04	0.31		c0.07	0.27	
v/s Ratio Perm	0.21			0.16		0.11	0.30			c0.50		
v/c Ratio	0.70	0.82		0.45	0.36	0.32	0.87	0.90		1.48	0.78	
Uniform Delay, d1	21.8	27.1		16.0	19.7	19.3	21.4	26.2		25.0	24.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.8	5.1		1.2	0.2	0.3	33.7	9.6		243.0	3.5	
Delay (s)	27.6	32.2		17.2	19.8	19.7	55.1	35.8		268.0	28.3	
Level of Service	C	C		B	B	B	E	D		F	C	
Approach Delay (s)		31.2			19.4			38.1			79.9	
Approach LOS		C			B			D			E	

Intersection Summary			
HCM Average Control Delay	44.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	83.6	Sum of lost time (s)	16.5
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	31	29	15	27	24	14	712	1	41	1602	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.93			0.95			1.00			1.00	
Flt Protected		1.00			0.99			1.00			1.00	
Satd. Flow (prot)		1724			1735			3535			3526	
Flt Permitted		1.00			0.91			0.91			0.92	
Satd. Flow (perm)		1724			1604			3206			3243	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	34	32	16	29	26	15	774	1	45	1741	24
RTOR Reduction (vph)	0	28	0	0	10	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	38	0	0	61	0	0	790	0	0	1809	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		7.8			7.8			42.7			42.7	
Effective Green, g (s)		7.8			7.8			42.7			42.7	
Actuated g/C Ratio		0.13			0.13			0.72			0.72	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		2.0			2.0			4.0			4.0	
Lane Grp Cap (vph)		226			210			2301			2327	
v/s Ratio Prot		0.02										
v/s Ratio Perm					c0.04			0.25			c0.56	
v/c Ratio		0.17			0.29			0.34			0.78	
Uniform Delay, d1		23.0			23.3			3.1			5.4	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.1			0.3			0.1			1.8	
Delay (s)		23.1			23.6			3.3			7.2	
Level of Service		C			C			A			A	
Approach Delay (s)		23.1			23.6			3.3			7.2	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	6.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	59.5	Sum of lost time (s)	9.0
Intersection Capacity Utilization	91.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	748	10	10	107	167	880
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		4.5	4.5	4.5	4.0
Lane Util. Factor	0.97		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00		0.99	1.00	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	0.95		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3436		1760	1863	1863	1560
Flt Permitted	0.95		0.64	1.00	1.00	1.00
Satd. Flow (perm)	3436		1191	1863	1863	1560
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	813	11	11	116	182	957
RTOR Reduction (vph)	2	0	0	0	0	0
Lane Group Flow (vph)	822	0	11	116	182	957
Confl. Peds. (#/hr)	10	10	10			10
Turn Type			Perm			Free
Protected Phases	4			2	2	
Permitted Phases			2			Free
Actuated Green, G (s)	18.5		10.9	10.9	10.9	38.9
Effective Green, g (s)	18.5		10.9	10.9	10.9	38.9
Actuated g/C Ratio	0.48		0.28	0.28	0.28	1.00
Clearance Time (s)	5.0		4.5	4.5	4.5	
Vehicle Extension (s)	3.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	1634		334	522	522	1560
v/s Ratio Prot	0.24			0.06	0.10	
v/s Ratio Perm			0.01			c0.61
v/c Ratio	0.50		0.03	0.22	0.35	0.61
Uniform Delay, d1	7.0		10.2	10.7	11.2	0.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2		0.1	0.3	0.6	1.8
Delay (s)	7.3		10.2	11.0	11.7	1.8
Level of Service	A		B	B	B	A
Approach Delay (s)	7.3			11.0	3.4	
Approach LOS	A			B	A	

Intersection Summary			
HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	38.9	Sum of lost time (s)	0.0
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Volume (vph)	758	708	0	980	986	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	5.0	
Lane Util. Factor	0.95	1.00		0.95	0.97	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3539	1549		3539	3433	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3539	1549		3539	3433	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	824	770	0	1065	1072	0
RTOR Reduction (vph)	0	404	0	0	0	0
Lane Group Flow (vph)	824	366	0	1065	1072	0
Confl. Peds. (#/hr)		10	10		10	10
Turn Type		Perm				
Protected Phases	1			1	2	
Permitted Phases		1				
Actuated Green, G (s)	32.0	32.0		32.0	25.8	
Effective Green, g (s)	32.0	32.0		32.0	25.8	
Actuated g/C Ratio	0.48	0.48		0.48	0.38	
Clearance Time (s)	4.5	4.5		4.5	5.0	
Vehicle Extension (s)	4.0	4.0		4.0	2.0	
Lane Grp Cap (vph)	1683	737		1683	1316	
v/s Ratio Prot	0.23			c0.30	c0.31	
v/s Ratio Perm		0.24				
v/c Ratio	0.49	0.50		0.63	0.81	
Uniform Delay, d1	12.1	12.1		13.2	18.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.7		0.9	3.8	
Delay (s)	12.4	12.8		14.1	22.4	
Level of Service	B	B		B	C	
Approach Delay (s)	12.6			14.1	22.4	
Approach LOS	B			B	C	

Intersection Summary			
HCM Average Control Delay	15.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	67.3	Sum of lost time (s)	9.5
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	176	1245	1653	313	221	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	
Frpb, ped/bikes	1.00	1.00	1.00	0.95	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.99	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1770	3539	3539	1512	3401	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	1770	3539	3539	1512	3401	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	191	1353	1797	340	240	22
RTOR Reduction (vph)	0	0	0	137	8	0
Lane Group Flow (vph)	191	1353	1797	203	254	0
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Perm		
Protected Phases	1	6	2		8	
Permitted Phases				2		
Actuated Green, G (s)	12.1	62.0	45.9	45.9	11.7	
Effective Green, g (s)	12.1	62.0	45.9	45.9	11.7	
Actuated g/C Ratio	0.15	0.75	0.56	0.56	0.14	
Clearance Time (s)	4.0	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	1.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	259	2653	1964	839	481	
v/s Ratio Prot	c0.11	0.38	c0.51		c0.07	
v/s Ratio Perm				0.13		
v/c Ratio	0.74	0.51	0.91	0.24	0.53	
Uniform Delay, d1	33.8	4.2	16.6	9.5	32.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.1	0.1	7.0	0.1	0.5	
Delay (s)	42.8	4.3	23.6	9.5	33.4	
Level of Service	D	A	C	A	C	
Approach Delay (s)		9.0	21.4		33.4	
Approach LOS		A	C		C	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	82.7	Sum of lost time (s)	13.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	1389	10	24	1629	10	10	20	21	11	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)	1770	3534		1769	3535			1826	1547		1824	1548
Flt Permitted	0.09	1.00		0.13	1.00			0.89	1.00		0.89	1.00
Satd. Flow (perm)	169	3534		235	3535			1657	1547		1644	1548
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1510	11	26	1771	11	11	22	23	12	22	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	21	0	0	10
Lane Group Flow (vph)	11	1521	0	26	1782	0	0	33	2	0	34	1
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		Perm
Protected Phases	3!	4!		7!	8!			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	44.7	44.1		44.7	44.0			6.7	6.7		6.7	6.7
Effective Green, g (s)	44.7	44.1		44.7	44.0			6.7	6.7		6.7	6.7
Actuated g/C Ratio	0.70	0.69		0.70	0.69			0.10	0.10		0.10	0.10
Clearance Time (s)	4.0	4.5		4.0	4.5			4.0	4.0		4.0	4.0
Vehicle Extension (s)	1.0	2.0		1.0	2.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	133	2439		181	2434			174	162		172	162
v/s Ratio Prot	0.00	0.43		c0.00	c0.50							
v/s Ratio Perm	0.06			0.10				0.02	0.00		c0.02	0.00
v/c Ratio	0.08	0.62		0.14	0.73			0.19	0.01		0.20	0.01
Uniform Delay, d1	5.3	5.4		4.0	6.2			26.1	25.6		26.1	25.6
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.1	0.4		0.1	1.0			0.2	0.0		0.2	0.0
Delay (s)	5.4	5.7		4.1	7.2			26.3	25.7		26.3	25.6
Level of Service	A	A		A	A			C	C		C	C
Approach Delay (s)		5.7			7.2			26.0			26.2	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	12.5
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	1328	14	45	1540	64	12	15	16	65	18	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		0.99	1.00
Frt	1.00	1.00		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00		0.96	1.00
Satd. Flow (prot)	1768	3532		1766	3514			1816	1552		1782	1552
Flt Permitted	0.10	1.00		0.15	1.00			0.86	1.00		0.75	1.00
Satd. Flow (perm)	177	3532		271	3514			1596	1552		1396	1552
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	1443	15	49	1674	70	13	16	17	71	20	64
RTOR Reduction (vph)	0	1	0	0	3	0	0	0	15	0	0	19
Lane Group Flow (vph)	17	1457	0	49	1741	0	0	29	2	0	91	45
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm		Perm	Perm		Perm
Protected Phases		8			4			6			6	
Permitted Phases	8			4			6		6	6		6
Actuated Green, G (s)	42.1	42.1		42.1	42.1			8.5	8.5		8.5	8.5
Effective Green, g (s)	42.1	42.1		42.1	42.1			8.5	8.5		8.5	8.5
Actuated g/C Ratio	0.71	0.71		0.71	0.71			0.14	0.14		0.14	0.14
Clearance Time (s)	4.5	4.5		4.5	4.5			4.0	4.0		4.0	4.0
Vehicle Extension (s)	5.0	5.0		5.0	5.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	126	2516		193	2503			230	223		201	223
v/s Ratio Prot		0.41			c0.50							
v/s Ratio Perm	0.10			0.18				0.02	0.00		c0.07	0.03
v/c Ratio	0.13	0.58		0.25	0.70			0.13	0.01		0.45	0.20
Uniform Delay, d1	2.7	4.2		3.0	4.8			22.1	21.7		23.2	22.3
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.0	0.5		1.5	1.1			0.1	0.0		0.6	0.2
Delay (s)	3.7	4.7		4.4	5.9			22.2	21.7		23.8	22.5
Level of Service	A	A		A	A			C	C		C	C
Approach Delay (s)		4.7			5.9			22.0			23.2	
Approach LOS		A			A			C			C	

Intersection Summary				
HCM Average Control Delay	6.4	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.65			
Actuated Cycle Length (s)	59.1	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	71.2%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	186	1192	72	221	1198	193	136	245	98	68	204	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5	4.5	4.0	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3499		1770	3439		1766	1863	1538	1764	1863	1536
Flt Permitted	0.95	1.00		0.95	1.00		0.25	1.00	1.00	0.37	1.00	1.00
Satd. Flow (perm)	1770	3499		1770	3439		463	1863	1538	680	1863	1536
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	1296	78	240	1302	210	148	266	107	74	222	91
RTOR Reduction (vph)	0	2	0	0	7	0	0	0	85	0	0	76
Lane Group Flow (vph)	202	1372	0	240	1505	0	148	266	22	74	222	15
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			pm+pt		Perm	pm+pt		Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	18.5	60.4		21.5	63.4		37.5	26.9	26.9	27.9	21.3	21.3
Effective Green, g (s)	18.5	60.4		21.5	63.4		37.5	26.9	26.9	27.9	21.3	21.3
Actuated g/C Ratio	0.14	0.46		0.16	0.48		0.28	0.20	0.20	0.21	0.16	0.16
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	1.0	4.0		1.0	4.0		1.0	2.0	2.0	1.0	2.0	2.0
Lane Grp Cap (vph)	247	1596		287	1647		251	379	312	197	300	247
v/s Ratio Prot	0.11	0.39		c0.14	c0.44		c0.05	c0.14		0.02	0.12	
v/s Ratio Perm							0.11		0.01	0.06		0.01
v/c Ratio	0.82	0.86		0.84	0.91		0.59	0.70	0.07	0.38	0.74	0.06
Uniform Delay, d1	55.3	32.2		53.7	32.0		38.1	49.0	42.6	43.3	52.9	47.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	17.7	5.0		17.9	8.3		2.3	4.8	0.0	0.4	8.3	0.0
Delay (s)	73.0	37.3		71.6	40.3		40.4	53.8	42.7	43.8	61.2	47.1
Level of Service	E	D		E	D		D	D	D	D	E	D
Approach Delay (s)		41.8			44.6			47.7			54.6	
Approach LOS		D			D			D			D	

Intersection Summary				
HCM Average Control Delay	44.9	HCM Level of Service	D	
HCM Volume to Capacity ratio	0.82			
Actuated Cycle Length (s)	132.4	Sum of lost time (s)	12.5	
Intersection Capacity Utilization	84.3%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	153	1182	51	73	1123	222	38	64	75	193	85	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.92		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3514		1770	3439		1758	3214		1755	3200	
Flt Permitted	0.95	1.00		0.95	1.00		0.62	1.00		0.66	1.00	
Satd. Flow (perm)	1770	3514		1770	3439		1145	3214		1211	3200	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	166	1285	55	79	1221	241	41	70	82	210	92	120
RTOR Reduction (vph)	0	2	0	0	11	0	0	63	0	0	93	0
Lane Group Flow (vph)	166	1338	0	79	1451	0	41	89	0	210	119	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	11.1	42.0		6.2	37.1		18.1	18.1		18.1	18.1	
Effective Green, g (s)	11.1	42.0		6.2	37.1		18.1	18.1		18.1	18.1	
Actuated g/C Ratio	0.14	0.53		0.08	0.47		0.23	0.23		0.23	0.23	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	1.0	4.0		1.0	4.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	248	1861		138	1609		261	734		276	730	
v/s Ratio Prot	c0.09	0.38		0.04	c0.42			0.03			0.04	
v/s Ratio Perm							0.04			c0.17		
v/c Ratio	0.67	0.72		0.57	0.90		0.16	0.12		0.76	0.16	
Uniform Delay, d1	32.4	14.2		35.3	19.4		24.5	24.3		28.6	24.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.2	1.5		3.5	8.6		0.1	0.0		10.6	0.0	
Delay (s)	37.6	15.6		38.8	28.0		24.6	24.3		39.2	24.6	
Level of Service	D	B		D	C		C	C		D	C	
Approach Delay (s)		18.0			28.6			24.4			31.8	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	79.3	Sum of lost time (s)	13.0
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	55	1251	1206	65	85	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.5	
Lane Util. Factor		0.95	0.95		1.00	
Frpb, ped/bikes		1.00	1.00		0.99	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		1.00	0.99		0.96	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		3532	3507		1718	
Flt Permitted		0.82	1.00		0.97	
Satd. Flow (perm)		2917	3507		1718	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	1360	1311	71	92	38
RTOR Reduction (vph)	0	0	3	0	27	0
Lane Group Flow (vph)	0	1420	1379	0	103	0
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Perm					
Protected Phases		1	1		2	
Permitted Phases	1					
Actuated Green, G (s)		40.8	40.8		8.4	
Effective Green, g (s)		40.8	40.8		8.4	
Actuated g/C Ratio		0.68	0.68		0.14	
Clearance Time (s)		5.0	5.0		5.5	
Vehicle Extension (s)		2.0	2.0		2.0	
Lane Grp Cap (vph)		1994	2397		242	
v/s Ratio Prot			0.39		c0.06	
v/s Ratio Perm		c0.49				
v/c Ratio		0.71	0.58		0.43	
Uniform Delay, d1		5.8	4.9		23.5	
Progression Factor		1.00	1.00		1.00	
Incremental Delay, d2		1.0	0.2		0.4	
Delay (s)		6.8	5.1		23.9	
Level of Service		A	A		C	
Approach Delay (s)		6.8	5.1		23.9	
Approach LOS		A	A		C	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	59.7	Sum of lost time (s)	10.5
Intersection Capacity Utilization	93.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	14	1082	115	295	926	20	112	38	260	38	32	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00	1.00	0.98	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3470		1770	3524		1735	1863	1532	1735	1757	
Flt Permitted	0.95	1.00		0.95	1.00		0.72	1.00	1.00	0.73	1.00	
Satd. Flow (perm)	1770	3470		1770	3524		1322	1863	1532	1334	1757	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	15	1176	125	321	1007	22	122	41	283	41	35	16
RTOR Reduction (vph)	0	5	0	0	1	0	0	0	238	0	13	0
Lane Group Flow (vph)	15	1296	0	321	1028	0	122	41	45	41	38	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Turn Type	custom			custom			Perm		Perm	Perm		
Protected Phases	3	8		7	4			2			6	
Permitted Phases	3			7			2		2	6		
Actuated Green, G (s)	2.3	46.8		21.7	66.2		15.6	15.6	15.6	15.6	15.6	
Effective Green, g (s)	2.3	46.8		21.7	66.2		15.6	15.6	15.6	15.6	15.6	
Actuated g/C Ratio	0.02	0.48		0.22	0.68		0.16	0.16	0.16	0.16	0.16	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	42	1672		396	2403		212	299	246	214	282	
v/s Ratio Prot	0.01	c0.37		c0.18	0.29			0.02			0.02	
v/s Ratio Perm							c0.09		0.03	0.03		
v/c Ratio	0.36	0.78		0.81	0.43		0.58	0.14	0.18	0.19	0.14	
Uniform Delay, d1	46.7	20.8		35.8	6.9		37.7	35.0	35.2	35.3	35.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.9	2.5		11.3	0.2		4.5	0.3	0.5	0.6	0.3	
Delay (s)	48.6	23.3		47.1	7.1		42.2	35.3	35.7	35.9	35.3	
Level of Service	D	C		D	A		D	D	D	D	D	
Approach Delay (s)		23.5			16.6			37.5			35.5	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	97.1	Sum of lost time (s)	13.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	49	32	140	61	59	72	189	239	48	144	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.99		1.00	0.99		1.00	0.98		1.00	1.00	
Flpb, ped/bikes		1.00		0.99	1.00		0.99	1.00		1.00	1.00	
Frt		0.95		1.00	0.93		1.00	0.92		1.00	0.99	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1745		1758	1701		1755	1680		1762	1847	
Flt Permitted		0.97		0.69	1.00		0.65	1.00		0.43	1.00	
Satd. Flow (perm)		1704		1286	1701		1206	1680		790	1847	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	8	53	35	152	66	64	78	205	260	52	157	8
RTOR Reduction (vph)	0	25	0	0	45	0	0	57	0	0	2	0
Lane Group Flow (vph)	0	71	0	152	85	0	78	408	0	52	163	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		10.2		10.2	10.2		15.5	15.5		15.5	15.5	
Effective Green, g (s)		10.2		10.2	10.2		15.5	15.5		15.5	15.5	
Actuated g/C Ratio		0.29		0.29	0.29		0.45	0.45		0.45	0.45	
Clearance Time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		501		378	500		539	750		353	825	
v/s Ratio Prot					0.05			c0.24			0.09	
v/s Ratio Perm		0.04		c0.12			0.06			0.07		
v/c Ratio		0.14		0.40	0.17		0.14	0.54		0.15	0.20	
Uniform Delay, d1		9.0		9.8	9.1		5.7	7.0		5.7	5.8	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.0		0.3	0.1		0.0	0.4		0.1	0.0	
Delay (s)		9.1		10.1	9.2		5.7	7.5		5.8	5.9	
Level of Service		A		B	A		A	A		A	A	
Approach Delay (s)		9.1			9.6			7.2			5.8	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	34.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	234	18	32	162	14	4	69	17	15	48	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.99	
Flt Protected		1.00			0.99			1.00			0.99	
Satd. Flow (prot)		1834			1827			1803			1810	
Flt Permitted		0.96			0.91			0.99			0.94	
Satd. Flow (perm)		1763			1668			1788			1713	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	254	20	35	176	15	4	75	18	16	52	8
RTOR Reduction (vph)	0	4	0	0	4	0	0	12	0	0	5	0
Lane Group Flow (vph)	0	295	0	0	222	0	0	85	0	0	71	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		9.8			9.8			10.6			10.6	
Effective Green, g (s)		9.8			9.8			10.6			10.6	
Actuated g/C Ratio		0.33			0.33			0.36			0.36	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		588			556			645			618	
v/s Ratio Prot												
v/s Ratio Perm		c0.17			0.13			c0.05			0.04	
v/c Ratio		0.50			0.40			0.13			0.11	
Uniform Delay, d1		7.8			7.5			6.3			6.3	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		0.2			0.2			0.0			0.0	
Delay (s)		8.1			7.7			6.3			6.3	
Level of Service		A			A			A			A	
Approach Delay (s)		8.1			7.7			6.3			6.3	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	29.4	Sum of lost time (s)	9.0
Intersection Capacity Utilization	38.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	901	38	98	902	134	34	153	93	200	105	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00	0.99	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3513		1770	3455		1756	1863	1549	1756	1767	
Flt Permitted	0.95	1.00		0.95	1.00		0.64	1.00	1.00	0.63	1.00	
Satd. Flow (perm)	1770	3513		1770	3455		1175	1863	1549	1166	1767	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	979	41	107	980	146	37	166	101	217	114	49
RTOR Reduction (vph)	0	2	0	0	8	0	0	0	71	0	13	0
Lane Group Flow (vph)	37	1018	0	107	1118	0	37	166	30	217	150	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	3.3	31.1		7.2	35.0		21.8	21.8	21.8	21.8	21.8	
Effective Green, g (s)	3.3	31.1		7.2	35.0		21.8	21.8	21.8	21.8	21.8	
Actuated g/C Ratio	0.05	0.43		0.10	0.48		0.30	0.30	0.30	0.30	0.30	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	1.0	4.0		1.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	80	1495		174	1654		350	556	462	348	527	
v/s Ratio Prot	0.02	0.29		c0.06	c0.32			0.09			0.09	
v/s Ratio Perm							0.03		0.02	c0.19		
v/c Ratio	0.46	0.68		0.61	0.68		0.11	0.30	0.07	0.62	0.29	
Uniform Delay, d1	34.0	17.0		31.6	14.7		18.6	19.8	18.4	22.1	19.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.5	1.4		4.5	1.2		0.0	0.1	0.0	2.5	0.1	
Delay (s)	35.6	18.4		36.1	15.9		18.6	19.9	18.4	24.6	19.8	
Level of Service	D	B		D	B		B	B	B	C	B	
Approach Delay (s)		19.0			17.6			19.2			22.5	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	73.1	Sum of lost time (s)	13.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	119	105	13	121	107	53	48	802	56	31	932	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.95		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1755	1828		1754	1757		1765	3497		1770	3455	
Flt Permitted	0.63	1.00		0.67	1.00		0.24	1.00		0.95	1.00	
Satd. Flow (perm)	1165	1828		1246	1757		439	3497		1770	3455	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	129	114	14	132	116	58	52	872	61	34	1013	152
RTOR Reduction (vph)	0	5	0	0	20	0	0	4	0	0	13	0
Lane Group Flow (vph)	129	123	0	132	154	0	52	929	0	34	1152	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4			6					
Actuated Green, G (s)	13.3	13.3		13.3	13.3		30.1	30.1		2.2	36.3	
Effective Green, g (s)	13.3	13.3		13.3	13.3		30.1	30.1		2.2	36.3	
Actuated g/C Ratio	0.23	0.23		0.23	0.23		0.51	0.51		0.04	0.62	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	264	415		283	399		225	1796		66	2140	
v/s Ratio Prot		0.07			0.09			0.27		0.02	c0.33	
v/s Ratio Perm	c0.11			0.11			0.12					
v/c Ratio	0.49	0.30		0.47	0.39		0.23	0.52		0.52	0.54	
Uniform Delay, d1	19.7	18.8		19.6	19.2		7.9	9.4		27.7	6.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	0.4		1.2	0.6		1.1	0.5		2.8	0.5	
Delay (s)	21.1	19.2		20.8	19.8		9.0	9.9		30.5	6.8	
Level of Service	C	B		C	B		A	A		C	A	
Approach Delay (s)		20.2			20.2			9.9			7.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	9.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	423	47	101	317	40	84	145	112	89	150	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5	4.5	4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1764	3475		1766	3468		1765	1863	1553	1763	1773	
Flt Permitted	0.52	1.00		0.41	1.00		0.50	1.00	1.00	0.64	1.00	
Satd. Flow (perm)	970	3475		762	3468		936	1863	1553	1194	1773	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	460	51	110	345	43	91	158	122	97	163	65
RTOR Reduction (vph)	0	10	0	0	11	0	0	0	101	0	21	0
Lane Group Flow (vph)	85	501	0	110	377	0	91	158	21	97	207	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	22.2	17.5		22.6	17.7		14.0	9.3	9.3	14.4	9.5	
Effective Green, g (s)	22.2	17.5		22.6	17.7		14.0	9.3	9.3	14.4	9.5	
Actuated g/C Ratio	0.41	0.33		0.42	0.33		0.26	0.17	0.17	0.27	0.18	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5	4.5	4.0	4.5	
Vehicle Extension (s)	2.0	2.5		2.0	2.5		2.0	2.5	2.5	2.0	2.5	
Lane Grp Cap (vph)	471	1135		413	1145		317	323	269	373	314	
v/s Ratio Prot	0.02	c0.14		c0.02	0.11		c0.03	0.08		0.02	c0.12	
v/s Ratio Perm	0.06			0.09			0.05		0.01	0.05		
v/c Ratio	0.18	0.44		0.27	0.33		0.29	0.49	0.08	0.26	0.66	
Uniform Delay, d1	9.7	14.2		9.6	13.5		15.5	20.0	18.6	15.2	20.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.2		0.1	0.1		0.2	0.9	0.1	0.1	4.6	
Delay (s)	9.7	14.4		9.7	13.6		15.6	20.9	18.7	15.3	25.2	
Level of Service	A	B		A	B		B	C	B	B	C	
Approach Delay (s)		13.7			12.8			18.9			22.2	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	53.6	Sum of lost time (s)	12.5
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	13	695	56	186	752	243	56	215	184	246	226	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		4.0	5.0	5.0	6.0	6.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1764	3492		1770	3539	1583	1770	3251		1610	3308	
Flt Permitted	0.20	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	377	3492		1770	3539	1583	1770	3251		1610	3308	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	755	61	202	817	264	61	234	200	267	246	25
RTOR Reduction (vph)	0	4	0	0	0	97	0	128	0	0	4	0
Lane Group Flow (vph)	14	812	0	202	817	167	61	306	0	176	358	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Prot		custom	Split			Split		
Protected Phases		2		1	2	4 6	3	3		4	4	
Permitted Phases	2	2										
Actuated Green, G (s)	37.4	37.4		15.3	37.4	64.6	14.2	14.2		15.2	15.2	
Effective Green, g (s)	37.4	37.4		15.3	37.4	64.6	14.2	14.2		15.2	15.2	
Actuated g/C Ratio	0.37	0.37		0.15	0.37	0.63	0.14	0.14		0.15	0.15	
Clearance Time (s)	5.0	5.0		4.0	5.0		6.0	6.0		5.0	5.0	
Vehicle Extension (s)	4.0	4.0		1.0	4.0		2.0	2.0		1.0	1.0	
Lane Grp Cap (vph)	138	1279		265	1296	1002	246	452		240	492	
v/s Ratio Prot		c0.23		c0.11	0.23	0.11	0.03	c0.09		c0.11	0.11	
v/s Ratio Perm	0.04											
v/c Ratio	0.10	0.64		0.76	0.63	0.17	0.25	0.68		0.73	0.73	
Uniform Delay, d1	21.3	26.7		41.7	26.7	7.7	39.2	41.8		41.5	41.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.2		11.1	1.1	0.0	0.2	3.1		9.6	4.5	
Delay (s)	21.7	27.9		52.7	27.8	7.7	39.4	44.9		51.1	46.0	
Level of Service	C	C		D	C	A	D	D		D	D	
Approach Delay (s)		27.8			27.6			44.2			47.6	
Approach LOS		C			C			D			D	

Intersection Summary				
HCM Average Control Delay	33.7	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.68			
Actuated Cycle Length (s)	102.1	Sum of lost time (s)	20.0	
Intersection Capacity Utilization	73.3%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	89	162	99	39	140	50	109	1023	10	14	991	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1548	1770	1863	1548	1770	3533		1770	3491	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1548	1770	1863	1548	1770	3533		1770	3491	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	176	108	42	152	54	118	1112	11	15	1077	84
RTOR Reduction (vph)	0	0	86	0	0	45	0	0	0	0	4	0
Lane Group Flow (vph)	97	176	22	42	152	9	118	1123	0	15	1157	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	7.7	18.5	18.5	4.0	14.8	14.8	10.7	48.5		2.0	39.8	
Effective Green, g (s)	7.7	18.5	18.5	4.0	14.8	14.8	10.7	48.5		2.0	39.8	
Actuated g/C Ratio	0.09	0.21	0.21	0.04	0.16	0.16	0.12	0.54		0.02	0.44	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	2.0		1.5	2.0	
Lane Grp Cap (vph)	151	383	318	79	306	255	210	1904		39	1544	
v/s Ratio Prot	c0.05	c0.09		0.02	0.08		c0.07	0.32		0.01	c0.33	
v/s Ratio Perm			0.01			0.01						
v/c Ratio	0.64	0.46	0.07	0.53	0.50	0.03	0.56	0.59		0.38	0.75	
Uniform Delay, d1	39.8	31.4	28.8	42.1	34.2	31.6	37.4	14.0		43.4	20.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.8	0.3	0.0	3.4	0.5	0.0	2.0	0.3		2.3	1.8	
Delay (s)	46.6	31.7	28.8	45.5	34.7	31.6	39.5	14.3		45.7	22.7	
Level of Service	D	C	C	D	C	C	D	B		D	C	
Approach Delay (s)		34.7			35.8			16.7			23.0	
Approach LOS		C			D			B			C	

Intersection Summary				
HCM Average Control Delay	23.0	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.66			
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	67.1%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	36	0	31	29	247	0	60	10	249	30	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5		4.5			4.5	
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00			1.00	0.99		0.99			1.00	
Flpb, ped/bikes	0.98	1.00			0.99	1.00		1.00			1.00	
Frt	1.00	1.00			1.00	0.85		0.98			0.99	
Flt Protected	0.95	1.00			0.97	1.00		1.00			0.96	
Satd. Flow (prot)	1742	1863			1801	1573		1817			1768	
Flt Permitted	0.77	1.00			0.82	1.00		1.00			0.96	
Satd. Flow (perm)	1410	1863			1510	1573		1817			1768	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	39	0	34	32	268	0	65	11	271	33	22
RTOR Reduction (vph)	0	0	0	0	0	103	0	6	0	0	2	0
Lane Group Flow (vph)	5	39	0	0	66	165	0	70	0	0	324	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm		pm+ov	Split			Split		
Protected Phases		2			6	4	8	8		4	4	
Permitted Phases	2			6		6						
Actuated Green, G (s)	5.2	5.2			5.2	29.9		5.3			24.7	
Effective Green, g (s)	5.2	5.2			5.2	29.9		5.3			24.7	
Actuated g/C Ratio	0.11	0.11			0.11	0.61		0.11			0.51	
Clearance Time (s)	4.5	4.5			4.5	4.5		4.5			4.5	
Vehicle Extension (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)	151	199			161	1111		198			897	
v/s Ratio Prot		0.02				0.08		c0.04			c0.18	
v/s Ratio Perm	0.00				c0.04	0.03						
v/c Ratio	0.03	0.20			0.41	0.15		0.35			0.36	
Uniform Delay, d1	19.5	19.8			20.3	4.0		20.1			7.2	
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	0.7			2.3	0.1		1.5			0.3	
Delay (s)	19.6	20.5			22.6	4.1		21.6			7.6	
Level of Service	B	C			C	A		C			A	
Approach Delay (s)		20.4			7.7			21.6			7.6	
Approach LOS		C			A			C			A	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	13.5
Intersection Capacity Utilization	44.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized						
Volume (veh/h)	112	264	160	132	96	120
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	122	287	174	143	104	130
Approach Volume (veh/h)		409	317		235	
Crossing Volume (veh/h)		104	122		174	
High Capacity (veh/h)		1276	1259		1209	
High v/c (veh/h)		0.32	0.25		0.19	
Low Capacity (veh/h)		1063	1047		1001	
Low v/c (veh/h)		0.38	0.30		0.23	

Intersection Summary			
Maximum v/c High	0.32		
Maximum v/c Low	0.38		
Intersection Capacity Utilization	60.3%	ICU Level of Service	B

Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Volume (vph)	6	0	47	2	717	3	58	420	118	90	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00			1.00	0.95		1.00	0.95			1.00	
Frpb, ped/bikes	0.98			1.00	1.00		1.00	0.99			1.00	
Flpb, ped/bikes	1.00			1.00	1.00		1.00	1.00			0.99	
Frt	0.88			1.00	1.00		1.00	0.97			1.00	
Flt Protected	0.99			0.95	1.00		0.95	1.00			0.95	
Satd. Flow (prot)	1605			1762	3537		1770	3401			1760	
Flt Permitted	0.94			0.95	1.00		0.95	1.00			0.95	
Satd. Flow (perm)	1518			1762	3537		1770	3401			1760	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	51	2	779	3	63	457	128	98	0	2
RTOR Reduction (vph)	45	0	0	0	1	0	0	42	0	0	2	0
Lane Group Flow (vph)	13	0	0	2	781	0	63	543	0	0	98	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type				Prot			Prot			Perm		
Protected Phases				5	2		1	6			4	
Permitted Phases	8									4		
Actuated Green, G (s)	3.8			0.5	14.3		1.0	14.8			3.8	
Effective Green, g (s)	3.8			0.5	14.3		1.0	14.8			3.8	
Actuated g/C Ratio	0.12			0.02	0.46		0.03	0.48			0.12	
Clearance Time (s)	4.0			4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0			3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	185			28	1626		57	1618			215	
v/s Ratio Prot				0.00	c0.22		c0.04	0.16				
v/s Ratio Perm	0.01										0.06	
v/c Ratio	0.07			0.07	0.48		1.11	0.34			0.46	
Uniform Delay, d1	12.1			15.1	5.8		15.0	5.1			12.7	
Progression Factor	1.00			1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.2			1.1	0.2		151.2	0.1			1.5	
Delay (s)	12.3			16.2	6.0		166.3	5.2			14.2	
Level of Service	B			B	A		F	A			B	
Approach Delay (s)	12.3				6.1			20.9			14.2	
Approach LOS	B				A			C			B	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	31.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	932	23	12	453	15	25	10	5	30	10	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1759	3524		1765	3519		1759	1766		1759	1619	
Flt Permitted	0.47	1.00		0.26	1.00		0.72	1.00		0.75	1.00	
Satd. Flow (perm)	861	3524		483	3519		1339	1766		1383	1619	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	1013	25	13	492	16	27	11	5	33	11	41
RTOR Reduction (vph)	0	2	0	0	3	0	0	4	0	0	35	0
Lane Group Flow (vph)	40	1036	0	13	505	0	27	12	0	33	17	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	26.8	26.8		26.8	26.8		6.0	6.0		6.0	6.0	
Effective Green, g (s)	26.8	26.8		26.8	26.8		6.0	6.0		6.0	6.0	
Actuated g/C Ratio	0.64	0.64		0.64	0.64		0.14	0.14		0.14	0.14	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	552	2259		310	2256		192	253		199	232	
v/s Ratio Prot		c0.29			0.14			0.01			0.01	
v/s Ratio Perm	0.05			0.03			0.02			c0.02		
v/c Ratio	0.07	0.46		0.04	0.22		0.14	0.05		0.17	0.07	
Uniform Delay, d1	2.8	3.8		2.8	3.1		15.6	15.4		15.7	15.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.2		0.1	0.1		0.3	0.1		0.4	0.1	
Delay (s)	2.9	4.0		2.8	3.2		16.0	15.5		16.1	15.6	
Level of Service	A	A		A	A		B	B		B	B	
Approach Delay (s)		4.0			3.2			15.8			15.8	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	4.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	41.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	794	7	17	947	118	3	4	12	26	6	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	1.00		1.00	0.98			0.91			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.99			0.97	
Satd. Flow (prot)	1770	1860		1770	1832			1687			1773	
Flt Permitted	0.17	1.00		0.29	1.00			0.94			0.82	
Satd. Flow (perm)	313	1860		541	1832			1595			1503	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	863	8	18	1029	128	3	4	13	28	7	4
RTOR Reduction (vph)	0	0	0	0	4	0	0	12	0	0	4	0
Lane Group Flow (vph)	7	871	0	18	1153	0	0	8	0	0	35	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	50.9	50.9		50.9	50.9			4.2			4.2	
Effective Green, g (s)	50.9	50.9		50.9	50.9			4.2			4.2	
Actuated g/C Ratio	0.81	0.81		0.81	0.81			0.07			0.07	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	252	1500		436	1478			106			100	
v/s Ratio Prot		0.47			c0.63							
v/s Ratio Perm	0.02			0.03				0.00			c0.02	
v/c Ratio	0.03	0.58		0.04	0.78			0.07			0.35	
Uniform Delay, d1	1.2	2.2		1.2	3.2			27.6			28.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.6		0.0	2.7			0.3			2.1	
Delay (s)	1.3	2.8		1.3	5.9			27.9			30.3	
Level of Service	A	A		A	A			C			C	
Approach Delay (s)		2.8			5.9			27.9			30.3	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	5.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	63.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	62	242	82	90	226	315	283	650	25	116	767	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.91		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3385		1770	3189		1770	3517		1770	3497	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3385		1770	3189		1770	3517		1770	3497	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	67	263	89	98	246	342	308	707	27	126	834	62
RTOR Reduction (vph)	0	35	0	0	257	0	0	2	0	0	4	0
Lane Group Flow (vph)	67	317	0	98	331	0	308	732	0	126	892	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.1	19.1		8.1	22.1		22.7	53.1		11.7	42.1	
Effective Green, g (s)	5.1	19.1		8.1	22.1		22.7	53.1		11.7	42.1	
Actuated g/C Ratio	0.05	0.17		0.07	0.20		0.21	0.48		0.11	0.38	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)	82	588		130	641		365	1698		188	1338	
v/s Ratio Prot	0.04	0.09		c0.06	c0.10		c0.17	0.21		0.07	c0.26	
v/s Ratio Perm												
v/c Ratio	0.82	0.54		0.75	0.52		0.84	0.43		0.67	0.67	
Uniform Delay, d1	52.0	41.4		50.0	39.2		41.9	18.6		47.3	28.1	
Progression Factor	0.82	0.83		0.84	0.86		0.78	1.10		1.01	0.76	
Incremental Delay, d2	41.8	1.2		19.1	0.9		14.6	0.7		4.9	1.8	
Delay (s)	84.4	35.7		61.2	34.5		47.3	21.2		52.9	23.3	
Level of Service	F	D		E	C		D	C		D	C	
Approach Delay (s)		43.5			38.3			28.9			26.9	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	32.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	77.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	623	0	55	556	68	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0	5.0	5.0	5.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3539		1768	3539	1770	1554
Flt Permitted	1.00		0.29	1.00	0.95	1.00
Satd. Flow (perm)	3539		545	3539	1770	1554
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	677	0	60	604	74	65
RTOR Reduction (vph)	0	0	0	0	0	52
Lane Group Flow (vph)	677	0	60	604	74	13
Confl. Peds. (#/hr)		10	10		10	10
Turn Type			pm+pt			Perm
Protected Phases	2		1	6	4	
Permitted Phases			6			4
Actuated Green, G (s)	20.0		26.9	26.9	9.2	9.2
Effective Green, g (s)	20.0		26.9	26.9	9.2	9.2
Actuated g/C Ratio	0.43		0.58	0.58	0.20	0.20
Clearance Time (s)	5.0		5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.5		2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	1535		368	2065	353	310
v/s Ratio Prot	c0.19		0.01	c0.17	c0.04	
v/s Ratio Perm			0.09			0.01
v/c Ratio	0.44		0.16	0.29	0.21	0.04
Uniform Delay, d1	9.1		4.6	4.8	15.4	14.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		0.2	0.1	0.2	0.0
Delay (s)	9.3		4.8	4.9	15.6	14.9
Level of Service	A		A	A	B	B
Approach Delay (s)	9.3			4.9	15.3	
Approach LOS	A			A	B	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	46.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (vph)	813	23	192	929	41	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5	4.5	4.5
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3520		1767	3539	1770	1583
Flt Permitted	1.00		0.27	1.00	0.95	1.00
Satd. Flow (perm)	3520		509	3539	1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	884	25	209	1010	45	162
RTOR Reduction (vph)	1	0	0	0	0	77
Lane Group Flow (vph)	908	0	209	1010	45	85
Confl. Peds. (#/hr)		10	10		10	10
Turn Type			pm+pt			pt+ov
Protected Phases	6		5	2	4	4 5
Permitted Phases			2			
Actuated Green, G (s)	79.2		91.0	91.0	10.0	22.3
Effective Green, g (s)	79.2		91.0	91.0	10.0	22.3
Actuated g/C Ratio	0.72		0.83	0.83	0.09	0.20
Clearance Time (s)	4.5		4.0	4.5	4.5	
Vehicle Extension (s)	5.0		2.0	5.0	3.0	
Lane Grp Cap (vph)	2534		510	2928	161	321
v/s Ratio Prot	0.26		c0.03	0.29	0.03	c0.05
v/s Ratio Perm			c0.31			
v/c Ratio	0.36		0.41	0.34	0.28	0.26
Uniform Delay, d1	5.8		2.7	2.3	46.6	36.9
Progression Factor	0.70		0.95	1.18	0.81	0.59
Incremental Delay, d2	0.4		0.2	0.3	0.8	0.4
Delay (s)	4.4		2.7	3.0	38.6	22.2
Level of Service	A		A	A	D	C
Approach Delay (s)	4.4			3.0	25.8	
Approach LOS	A			A	C	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	136	355	55	108	340	98	43	346	122	178	334	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3455		1770	3401		1770	3376		1770	3410	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3455		1770	3401		1770	3376		1770	3410	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	148	386	60	117	370	107	47	376	133	193	363	95
RTOR Reduction (vph)	0	9	0	0	20	0	0	33	0	0	24	0
Lane Group Flow (vph)	148	437	0	117	457	0	47	476	0	193	434	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	1	6		5	2		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	12.6	45.6		10.7	43.7		5.7	21.3		15.4	31.0	
Effective Green, g (s)	12.6	45.6		10.7	43.7		5.7	21.3		15.4	31.0	
Actuated g/C Ratio	0.11	0.41		0.10	0.40		0.05	0.19		0.14	0.28	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	4.0		1.0	4.0		1.0	3.0		1.0	3.0	
Lane Grp Cap (vph)	203	1432		172	1351		92	654		248	961	
v/s Ratio Prot	c0.08	0.13		0.07	c0.13		0.03	c0.14		c0.11	0.13	
v/s Ratio Perm												
v/c Ratio	0.73	0.30		0.68	0.34		0.51	0.73		0.78	0.45	
Uniform Delay, d1	47.1	21.6		48.0	23.1		50.8	41.6		45.7	32.5	
Progression Factor	0.68	1.02		0.62	1.21		0.85	0.96		1.00	1.00	
Incremental Delay, d2	8.5	0.4		8.5	0.7		1.9	4.0		13.1	0.3	
Delay (s)	40.6	22.4		38.1	28.5		45.3	43.7		58.7	32.8	
Level of Service	D	C		D	C		D	D		E	C	
Approach Delay (s)		26.9			30.4			43.9			40.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	35.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	89	707	30	42	625	245	492	298	44	64	330	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5	4.5	4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.91	0.91		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	0.98		0.95	1.00	
Satd. Flow (prot)	1770	3513		1770	3539	1540	1610	3279		1770	3494	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	0.98		0.95	1.00	
Satd. Flow (perm)	1770	3513		1770	3539	1540	1610	3279		1770	3494	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	97	768	33	46	679	266	535	324	48	70	359	27
RTOR Reduction (vph)	0	2	0	0	0	154	0	6	0	0	5	0
Lane Group Flow (vph)	97	799	0	46	679	112	300	601	0	70	381	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		Perm	Split			Split		
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases						6						
Actuated Green, G (s)	9.8	43.0		5.5	38.7	38.7	28.5	28.5		15.5	15.5	
Effective Green, g (s)	9.8	43.0		5.5	38.7	38.7	28.5	28.5		15.5	15.5	
Actuated g/C Ratio	0.09	0.39		0.05	0.35	0.35	0.26	0.26		0.14	0.14	
Clearance Time (s)	4.0	4.5		4.0	4.5	4.5	4.5	4.5		4.5	4.5	
Vehicle Extension (s)	2.0	4.0		2.0	4.0	4.0	3.0	3.0		2.0	2.0	
Lane Grp Cap (vph)	158	1373		89	1245	542	417	850		249	492	
v/s Ratio Prot	c0.05	c0.23		0.03	0.19		c0.19	0.18		0.04	c0.11	
v/s Ratio Perm						0.07						
v/c Ratio	0.61	0.58		0.52	0.55	0.21	0.72	0.71		0.28	0.77	
Uniform Delay, d1	48.3	26.4		51.0	28.6	24.9	37.1	37.0		42.3	45.6	
Progression Factor	0.74	0.91		1.10	0.85	1.07	0.56	0.56		0.92	0.94	
Incremental Delay, d2	4.7	1.7		2.0	1.6	0.8	5.7	2.6		0.2	6.6	
Delay (s)	40.4	25.9		58.2	26.0	27.5	26.3	23.4		39.3	49.2	
Level of Service	D	C		E	C	C	C	C		D	D	
Approach Delay (s)		27.5			27.9			24.4			47.7	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	34	110	315	34	176	57	362	652	40	21	498	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5	4.5	4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1621		1770	1863	1539	1770	3498		1770	3484	
Flt Permitted	0.52	1.00		0.14	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	952	1621		268	1863	1539	1770	3498		1770	3484	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	120	342	37	191	62	393	709	43	23	541	45
RTOR Reduction (vph)	0	105	0	0	0	46	0	3	0	0	4	0
Lane Group Flow (vph)	37	357	0	37	191	16	393	749	0	23	582	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm		Perm	Prot			Prot		
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		4						
Actuated Green, G (s)	27.8	27.8		27.8	27.8	27.8	27.3	67.1		2.1	41.9	
Effective Green, g (s)	27.8	27.8		27.8	27.8	27.8	27.3	67.1		2.1	41.9	
Actuated g/C Ratio	0.25	0.25		0.25	0.25	0.25	0.25	0.61		0.02	0.38	
Clearance Time (s)	4.5	4.5		4.5	4.5	4.5	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0	1.0	2.0		1.0	2.0	
Lane Grp Cap (vph)	241	410		68	471	389	439	2134		34	1327	
v/s Ratio Prot		c0.22			0.10		c0.22	0.21		0.01	c0.17	
v/s Ratio Perm	0.04			0.14		0.01						
v/c Ratio	0.15	0.87		0.54	0.41	0.04	0.90	0.35		0.68	0.44	
Uniform Delay, d1	32.0	39.4		35.6	34.2	31.0	40.0	10.6		53.6	25.3	
Progression Factor	0.93	0.94		0.93	0.92	0.88	0.59	0.42		1.07	0.96	
Incremental Delay, d2	0.1	17.4		4.6	0.2	0.0	16.3	0.4		29.9	0.9	
Delay (s)	29.9	54.6		37.7	31.6	27.5	39.8	4.8		87.3	25.2	
Level of Service	C	D		D	C	C	D	A		F	C	
Approach Delay (s)		52.8			31.5			16.8			27.5	
Approach LOS		D			C			B			C	

Intersection Summary				
HCM Average Control Delay	28.1	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.69			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	74.3%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	100	13	163	88	215	16	817	172	225	598	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1825		1770	1863	1539	1770	3429		1770	3512	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1825		1770	1863	1539	1770	3429		1770	3512	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	109	14	177	96	234	17	888	187	245	650	25
RTOR Reduction (vph)	0	4	0	0	0	183	0	14	0	0	2	0
Lane Group Flow (vph)	24	119	0	177	96	51	17	1061	0	245	673	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8						
Actuated Green, G (s)	3.0	13.8		13.1	23.9	23.9	2.1	48.2		17.9	64.0	
Effective Green, g (s)	3.0	13.8		13.1	23.9	23.9	2.1	48.2		17.9	64.0	
Actuated g/C Ratio	0.03	0.13		0.12	0.22	0.22	0.02	0.44		0.16	0.58	
Clearance Time (s)	4.0	4.5		4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	2.0		1.0	2.0	2.0	1.0	2.0		1.0	2.0	
Lane Grp Cap (vph)	48	229		211	405	334	34	1503		288	2043	
v/s Ratio Prot	0.01	c0.06		c0.10	0.05		0.01	c0.31		c0.14	0.19	
v/s Ratio Perm						0.03						
v/c Ratio	0.50	0.52		0.84	0.24	0.15	0.50	0.71		0.85	0.33	
Uniform Delay, d1	52.8	45.0		47.4	35.5	34.8	53.4	25.1		44.8	11.9	
Progression Factor	1.00	1.00		0.90	0.97	2.45	1.28	0.38		0.98	0.37	
Incremental Delay, d2	3.0	0.8		23.0	0.1	0.1	3.8	2.6		17.4	0.4	
Delay (s)	55.7	45.8		65.8	34.6	85.3	72.2	12.2		61.2	4.7	
Level of Service	E	D		E	C	F	E	B		E	A	
Approach Delay (s)		47.4			68.9			13.2			19.8	
Approach LOS		D			E			B			B	

Intersection Summary				
HCM Average Control Delay	27.9	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	67.5%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	15	84	2	0	38	98	280	17	19	236	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.97			0.95		1.00	1.00		1.00	0.99	
Flpb, ped/bikes		0.99			1.00		0.99	1.00		0.99	1.00	
Frt		0.91			0.87		1.00	0.99		1.00	0.97	
Flt Protected		0.99			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1609			1535		1753	1842		1749	1792	
Flt Permitted		0.93			0.97		0.54	1.00		0.57	1.00	
Satd. Flow (perm)		1515			1487		989	1842		1041	1792	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	33	16	91	2	0	41	107	304	18	21	257	59
RTOR Reduction (vph)	0	78	0	0	38	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	62	0	0	5	0	107	321	0	21	312	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		9.3			9.3		91.2	85.9		84.2	82.4	
Effective Green, g (s)		9.3			9.3		91.2	85.9		84.2	82.4	
Actuated g/C Ratio		0.08			0.08		0.83	0.78		0.77	0.75	
Clearance Time (s)		4.5			4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)		2.0			2.0		1.5	2.0		1.5	2.0	
Lane Grp Cap (vph)		128			126		857	1438		808	1342	
v/s Ratio Prot							c0.01	0.17		0.00	c0.17	
v/s Ratio Perm		c0.04			0.00		0.10			0.02		
v/c Ratio		0.49			0.04		0.12	0.22		0.03	0.23	
Uniform Delay, d1		48.1			46.3		1.8	3.2		3.1	4.2	
Progression Factor		1.00			1.00		0.50	0.43		0.80	0.79	
Incremental Delay, d2		1.1			0.1		0.0	0.3		0.0	0.4	
Delay (s)		49.1			46.3		0.9	1.7		2.5	3.7	
Level of Service		D			D		A	A		A	A	
Approach Delay (s)		49.1			46.3			1.5			3.6	
Approach LOS		D			D			A			A	

Intersection Summary				
HCM Average Control Delay	11.3	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.26			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	47.1%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	217	242	7	180	10	319	37	24	2	58	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.0	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	0.98	1.00	1.00	0.98	1.00		0.98	1.00		0.98	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1731	1863	1507	1735	1843		1735	1722		1729	1852	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.71	1.00		0.71	1.00	
Satd. Flow (perm)	1731	1863	1507	1735	1843		1305	1722		1300	1852	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	236	263	8	196	11	347	40	26	2	63	2
RTOR Reduction (vph)	0	0	214	0	2	0	0	8	0	0	1	0
Lane Group Flow (vph)	7	236	49	8	205	0	347	58	0	2	64	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot			Perm			Perm		
Protected Phases	3	8		7	4			2			6	
Permitted Phases			8				2			6		
Actuated Green, G (s)	0.9	20.5	20.5	0.8	19.9		75.7	75.7		75.7	75.7	
Effective Green, g (s)	0.9	20.5	20.5	0.8	19.9		75.7	75.7		75.7	75.7	
Actuated g/C Ratio	0.01	0.19	0.19	0.01	0.18		0.69	0.69		0.69	0.69	
Clearance Time (s)	4.5	4.5	4.5	4.0	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	1.0	4.0	4.0	1.0	4.0		1.0	1.0		1.0	1.0	
Lane Grp Cap (vph)	14	347	281	13	333		898	1185		895	1275	
v/s Ratio Prot	0.00	c0.13		c0.00	0.11			0.03			0.03	
v/s Ratio Perm			0.03				c0.27			0.00		
v/c Ratio	0.50	0.68	0.17	0.62	0.61		0.39	0.05		0.00	0.05	
Uniform Delay, d1	54.3	41.7	37.6	54.4	41.5		7.3	5.5		5.4	5.5	
Progression Factor	1.20	0.87	0.34	1.10	0.83		0.82	0.79		1.00	1.00	
Incremental Delay, d2	9.8	5.8	0.4	46.6	3.7		1.2	0.1		0.0	0.1	
Delay (s)	75.2	42.0	13.2	106.3	38.2		7.2	4.5		5.4	5.6	
Level of Service	E	D	B	F	D		A	A		A	A	
Approach Delay (s)		27.5			40.8			6.8			5.6	
Approach LOS		C			D			A			A	

Intersection Summary				
HCM Average Control Delay	21.5	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.43			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	51.9%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	88	0	222	1	0	1	216	1044	0	0	686	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.5		4.0	4.5			4.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	
Frpb, ped/bikes		1.00	0.97		0.98		1.00	1.00			1.00	
Flpb, ped/bikes		0.98	1.00		0.99		1.00	1.00			1.00	
Frt		1.00	0.85		0.93		1.00	1.00			0.99	
Flt Protected		0.95	1.00		0.98		0.95	1.00			1.00	
Satd. Flow (prot)		1742	1540		1653		1766	3539			3497	
Flt Permitted		0.76	1.00		0.91		0.31	1.00			1.00	
Satd. Flow (perm)		1387	1540		1546		572	3539			3497	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	0	241	1	0	1	235	1135	0	0	746	47
RTOR Reduction (vph)	0	0	211	0	1	0	0	0	0	0	2	0
Lane Group Flow (vph)	0	96	30	0	1	0	235	1135	0	0	791	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm		Perm	Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		13.6	13.6		13.6		87.4	87.4			75.3	
Effective Green, g (s)		13.6	13.6		13.6		87.4	87.4			75.3	
Actuated g/C Ratio		0.12	0.12		0.12		0.79	0.79			0.68	
Clearance Time (s)		4.5	4.5		4.5		4.0	4.5			4.5	
Vehicle Extension (s)		3.0	3.0		3.0		2.0	4.0			4.0	
Lane Grp Cap (vph)		171	190		191		542	2812			2394	
v/s Ratio Prot							0.03	c0.32			0.23	
v/s Ratio Perm		c0.07	0.02		0.00		c0.31					
v/c Ratio		0.56	0.16		0.01		0.43	0.40			0.33	
Uniform Delay, d1		45.4	43.1		42.3		3.4	3.4			7.1	
Progression Factor		0.42	0.91		1.00		0.48	0.24			2.15	
Incremental Delay, d2		4.0	0.4		0.0		0.2	0.4			0.3	
Delay (s)		22.9	39.4		42.3		1.8	1.2			15.6	
Level of Service		C	D		D		A	A			B	
Approach Delay (s)		34.7			42.3			1.3			15.6	
Approach LOS		C			D			A			B	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	51	366	61	51	435	83	101	944	25	77	592	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3451		1770	3440		1770	3523		1770	3483	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	3451		1770	3440		1770	3523		1770	3483	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	55	398	66	55	473	90	110	1026	27	84	643	64
RTOR Reduction (vph)	0	13	0	0	15	0	0	1	0	0	5	0
Lane Group Flow (vph)	55	451	0	55	548	0	110	1052	0	84	702	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases												
Actuated Green, G (s)	5.9	22.1		5.9	22.1		9.8	57.6		7.4	55.2	
Effective Green, g (s)	5.9	22.1		5.9	22.1		9.8	57.6		7.4	55.2	
Actuated g/C Ratio	0.05	0.20		0.05	0.20		0.09	0.52		0.07	0.50	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	
Lane Grp Cap (vph)	95	693		95	691		158	1845		119	1748	
v/s Ratio Prot	c0.03	0.13		0.03	c0.16		c0.06	c0.30		0.05	0.20	
v/s Ratio Perm												
v/c Ratio	0.58	0.65		0.58	0.79		0.70	0.57		0.71	0.40	
Uniform Delay, d1	50.8	40.4		50.8	41.8		48.7	17.8		50.2	17.1	
Progression Factor	1.00	0.59		1.25	0.93		0.96	0.69		1.15	0.61	
Incremental Delay, d2	2.7	0.9		5.2	5.8		9.6	1.2		12.7	0.6	
Delay (s)	53.5	24.5		68.9	44.6		56.4	13.5		70.3	11.0	
Level of Service	D	C		E	D		E	B		E	B	
Approach Delay (s)		27.6			46.8			17.5			17.3	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	25.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	171	465	20	194	789	19	22	749	154	62	636	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5	4.5	4.0	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	0.97	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3513		1770	3524		1770	3539	1541	1770	3539	1545
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	3513		1770	3524		1770	3539	1541	1770	3539	1545
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	186	505	22	211	858	21	24	814	167	67	691	197
RTOR Reduction (vph)	0	3	0	0	1	0	0	0	71	0	0	95
Lane Group Flow (vph)	186	524	0	211	878	0	24	814	96	67	691	102
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	15.0	30.1		16.8	31.9		3.0	40.5	40.5	5.6	43.1	43.1
Effective Green, g (s)	15.0	30.1		16.8	31.9		3.0	40.5	40.5	5.6	43.1	43.1
Actuated g/C Ratio	0.14	0.27		0.15	0.29		0.03	0.37	0.37	0.05	0.39	0.39
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	2.0	3.0		2.0	3.0		1.0	3.0	3.0	1.0	3.0	3.0
Lane Grp Cap (vph)	241	961		270	1022		48	1303	567	90	1387	605
v/s Ratio Prot	0.11	0.15		c0.12	c0.25		0.01	c0.23		c0.04	c0.20	
v/s Ratio Perm									0.06			0.07
v/c Ratio	0.77	0.55		0.78	0.86		0.50	0.62	0.17	0.74	0.50	0.17
Uniform Delay, d1	45.8	34.1		44.8	36.9		52.8	28.5	23.4	51.5	25.3	21.8
Progression Factor	0.95	0.69		1.08	0.42		1.23	0.81	1.06	1.10	0.66	0.37
Incremental Delay, d2	12.5	0.6		9.7	5.6		2.5	1.9	0.5	24.0	1.2	0.6
Delay (s)	55.9	24.2		58.2	20.9		67.3	24.9	25.4	80.7	18.0	8.6
Level of Service	E	C		E	C		E	C	C	F	B	A
Approach Delay (s)		32.5			28.2			26.0			20.5	
Approach LOS		C			C			C			C	

Intersection Summary				
HCM Average Control Delay	26.5	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	71.1%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	61	32	7	64	354	27	930	11	231	808	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5	4.5	4.0	4.5		4.0	4.5	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.97			1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1753			1851	1530	1766	3532		1769	3508	
Flt Permitted		0.87			0.97	1.00	0.31	1.00		0.22	1.00	
Satd. Flow (perm)		1550			1802	1530	577	3532		412	3508	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	66	35	8	70	385	29	1011	12	251	878	41
RTOR Reduction (vph)	0	12	0	0	0	271	0	0	0	0	2	0
Lane Group Flow (vph)	0	135	0	0	78	114	29	1023	0	251	917	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm		Perm	pm+pt			pm+pt		
Protected Phases		8			4		1	6		5	2	
Permitted Phases	8			4		4	6			2		
Actuated Green, G (s)		14.6			14.6	14.6	74.8	71.7		86.4	79.3	
Effective Green, g (s)		14.6			14.6	14.6	74.8	71.7		86.4	79.3	
Actuated g/C Ratio		0.13			0.13	0.13	0.68	0.65		0.79	0.72	
Clearance Time (s)		4.5			4.5	4.5	4.0	4.5		4.0	4.5	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		206			239	203	426	2302		456	2529	
v/s Ratio Prot							0.00	0.29		c0.05	0.26	
v/s Ratio Perm		c0.09			0.04	0.07	0.04			c0.38		
v/c Ratio		0.65			0.33	0.56	0.07	0.44		0.55	0.36	
Uniform Delay, d1		45.3			43.2	44.7	5.7	9.4		5.2	5.8	
Progression Factor		1.00			0.90	1.09	1.01	0.92		1.15	0.69	
Incremental Delay, d2		5.6			0.3	2.0	0.0	0.5		0.6	0.3	
Delay (s)		50.9			39.3	50.9	5.8	9.2		6.5	4.3	
Level of Service		D			D	D	A	A		A	A	
Approach Delay (s)		50.9			48.9			9.1			4.8	
Approach LOS		D			D			A			A	

Intersection Summary				
HCM Average Control Delay	16.0	HCM Level of Service	B	
HCM Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.5	
Intersection Capacity Utilization	70.8%	ICU Level of Service	C	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	20	65	280	20	60	85	1218	280	60	1031	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5	4.5		4.0	4.0	4.0	4.5		4.0	4.5	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.97		1.00	0.97	1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1793	1542		1758	1542	1770	3404		1770	3496	
Flt Permitted		0.52	1.00		0.69	1.00	0.15	1.00		0.07	1.00	
Satd. Flow (perm)		962	1542		1268	1542	280	3404		121	3496	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	22	71	304	22	65	92	1324	304	65	1121	71
RTOR Reduction (vph)	0	0	51	0	0	34	0	17	0	0	4	0
Lane Group Flow (vph)	0	71	20	0	326	31	92	1611	0	65	1188	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm		Perm	Perm		Perm	pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8	2			6		
Actuated Green, G (s)		30.3	30.3		30.8	30.8	68.1	62.8		65.3	61.4	
Effective Green, g (s)		30.3	30.3		30.8	30.8	68.1	62.8		65.3	61.4	
Actuated g/C Ratio		0.28	0.28		0.28	0.28	0.62	0.57		0.59	0.56	
Clearance Time (s)		4.5	4.5		4.0	4.0	4.0	4.5		4.0	4.5	
Vehicle Extension (s)		2.0	2.0		2.0	2.0	2.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		265	425		355	432	245	1943		130	1951	
v/s Ratio Prot							c0.02	c0.47		0.02	0.34	
v/s Ratio Perm		0.07	0.01		c0.26	0.02	0.21			0.28		
v/c Ratio		0.27	0.05		0.92	0.07	0.38	0.83		0.50	0.61	
Uniform Delay, d1		31.2	29.2		38.4	29.1	11.4	19.2		17.3	16.3	
Progression Factor		1.00	1.00		1.00	1.00	0.76	0.96		1.42	0.88	
Incremental Delay, d2		0.2	0.0		27.4	0.0	0.3	4.0		1.0	1.3	
Delay (s)		31.4	29.3		65.8	29.1	9.0	22.5		25.7	15.6	
Level of Service		C	C		E	C	A	C		C	B	
Approach Delay (s)		30.3			59.7			21.8			16.1	
Approach LOS		C			E			C			B	

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	60	280	1258	60	280	1086
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.5		4.0	4.5
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	1583	3506		1770	3539
Flt Permitted	0.95	1.00	1.00		0.12	1.00
Satd. Flow (perm)	1770	1583	3506		216	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	304	1367	65	304	1180
RTOR Reduction (vph)	0	275	2	0	0	0
Lane Group Flow (vph)	65	29	1430	0	304	1180
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type		Prot			pm+pt	
Protected Phases	4	4	6		5	2
Permitted Phases					2	
Actuated Green, G (s)	10.6	10.6	70.4		90.9	90.9
Effective Green, g (s)	10.6	10.6	70.4		90.9	90.9
Actuated g/C Ratio	0.10	0.10	0.64		0.83	0.83
Clearance Time (s)	4.0	4.0	4.5		4.0	4.5
Vehicle Extension (s)	2.0	2.0	3.0		2.0	3.0
Lane Grp Cap (vph)	171	153	2244		412	2925
v/s Ratio Prot	c0.04	0.02	0.41		c0.11	0.33
v/s Ratio Perm					c0.50	
v/c Ratio	0.38	0.19	0.64		0.74	0.40
Uniform Delay, d1	46.6	45.8	12.0		21.0	2.5
Progression Factor	1.00	1.00	0.40		1.00	1.00
Incremental Delay, d2	0.5	0.2	0.9		5.9	0.4
Delay (s)	47.1	46.0	5.7		26.9	2.9
Level of Service	D	D	A		C	A
Approach Delay (s)	46.2		5.7			7.8
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	329	472	21	93	416	88	44	992	111	93	531	510
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	5.0		4.0	5.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3512		1770	3432		1770	3476		1770	3539	1555
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3512		1770	3432		1770	3476		1770	3539	1555
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	358	513	23	101	452	96	48	1078	121	101	577	554
RTOR Reduction (vph)	0	3	0	0	18	0	0	8	0	0	0	61
Lane Group Flow (vph)	358	533	0	101	530	0	48	1191	0	101	577	493
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Prot			Prot		pm+ov
Protected Phases	3	8		7	4		5	2		1	6	3
Permitted Phases												6
Actuated Green, G (s)	22.0	34.1		9.2	21.3		5.2	40.0		9.2	44.0	66.0
Effective Green, g (s)	22.0	34.1		9.2	21.3		5.2	40.0		9.2	44.0	66.0
Actuated g/C Ratio	0.20	0.31		0.08	0.19		0.05	0.36		0.08	0.40	0.60
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	5.0		4.0	5.0	4.0
Vehicle Extension (s)	1.0	2.0		1.0	2.0		1.0	2.0		1.0	2.0	1.0
Lane Grp Cap (vph)	354	1089		148	665		84	1264		148	1416	933
v/s Ratio Prot	c0.20	0.15		0.06	c0.15		0.03	c0.34		c0.06	0.16	c0.11
v/s Ratio Perm												0.21
v/c Ratio	1.01	0.49		0.68	0.80		0.57	0.94		0.68	0.41	0.53
Uniform Delay, d1	44.0	30.9		49.0	42.3		51.3	33.9		49.0	23.7	12.9
Progression Factor	0.63	0.83		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	48.2	0.1		9.9	6.2		5.7	14.8		9.9	0.9	0.3
Delay (s)	75.9	25.9		58.9	48.5		57.0	48.7		58.9	24.5	13.1
Level of Service	E	C		E	D		E	D		E	C	B
Approach Delay (s)		45.9			50.1			49.0			22.2	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	40.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.5
Intersection Capacity Utilization	85.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	255	134	0	43	188	8	4	666	21	9	1003	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		0.99	1.00	1.00
Frt	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1758	1863		1751	1849		1770	3518		1759	3539	1509
Flt Permitted	0.60	1.00		0.66	1.00		0.10	1.00		0.25	1.00	1.00
Satd. Flow (perm)	1103	1863		1220	1849		194	3518		465	3539	1509
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	277	146	0	47	204	9	4	724	23	10	1090	337
RTOR Reduction (vph)	0	0	0	0	1	0	0	2	0	0	0	73
Lane Group Flow (vph)	277	146	0	47	212	0	4	745	0	10	1090	264
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	57.1	57.1		57.1	57.1		43.9	43.9		43.9	43.9	43.9
Effective Green, g (s)	57.1	57.1		57.1	57.1		43.9	43.9		43.9	43.9	43.9
Actuated g/C Ratio	0.52	0.52		0.52	0.52		0.40	0.40		0.40	0.40	0.40
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	573	967		633	960		77	1404		186	1412	602
v/s Ratio Prot		0.08			0.11			0.21			c0.31	
v/s Ratio Perm	c0.25			0.04			0.02			0.02		0.17
v/c Ratio	0.48	0.15		0.07	0.22		0.05	0.53		0.05	0.77	0.44
Uniform Delay, d1	17.0	13.8		13.2	14.4		20.3	25.2		20.3	28.7	24.1
Progression Factor	1.13	1.14		1.00	1.00		0.31	0.61		0.88	0.94	0.85
Incremental Delay, d2	2.8	0.3		0.2	0.5		0.5	0.6		0.2	2.9	1.0
Delay (s)	21.9	16.1		13.5	14.9		6.9	16.1		18.1	29.8	21.4
Level of Service	C	B		B	B		A	B		B	C	C
Approach Delay (s)		19.9			14.6			16.1			27.8	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM Average Control Delay	22.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	457	4	52	6	5	6	34	563	3	5	336	396
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5		4.5		4.0	4.5		4.5	4.5	4.5
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00		0.99		1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00		1.00		1.00	1.00		0.98	1.00	1.00
Frt	1.00	1.00	0.85		0.95		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1687	1583		1722		1770	3536		1740	3539	1509
Flt Permitted	0.95	0.95	1.00		0.98		0.95	1.00		0.42	1.00	1.00
Satd. Flow (perm)	1681	1687	1583		1722		1770	3536		767	3539	1509
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	497	4	57	7	5	7	37	612	3	5	365	430
RTOR Reduction (vph)	0	0	46	0	7	0	0	0	0	0	0	197
Lane Group Flow (vph)	248	253	11	0	12	0	37	615	0	5	365	233
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Split		Prot	Split			Prot			Perm		Perm
Protected Phases	3	3	3	4	4		5	2			6	
Permitted Phases										6		6
Actuated Green, G (s)	21.0	21.0	21.0		7.2		4.8	68.3		59.5	59.5	59.5
Effective Green, g (s)	21.0	21.0	21.0		7.2		4.8	68.3		59.5	59.5	59.5
Actuated g/C Ratio	0.19	0.19	0.19		0.07		0.04	0.62		0.54	0.54	0.54
Clearance Time (s)	4.5	4.5	4.5		4.5		4.0	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0		2.0		2.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)	321	322	302		113		77	2196		415	1914	816
v/s Ratio Prot	0.15	c0.15	0.01		c0.01		c0.02	c0.17			0.10	
v/s Ratio Perm										0.01		0.15
v/c Ratio	0.77	0.79	0.04		0.11		0.48	0.28		0.01	0.19	0.29
Uniform Delay, d1	42.2	42.4	36.3		48.4		51.4	9.6		11.7	12.9	13.7
Progression Factor	0.93	0.93	0.77		1.00		1.00	1.00		0.60	0.68	1.05
Incremental Delay, d2	10.0	11.0	0.0		0.2		1.7	0.3		0.0	0.2	0.8
Delay (s)	49.2	50.3	27.9		48.5		53.1	9.9		7.1	8.9	15.2
Level of Service	D	D	C		D		D	A		A	A	B
Approach Delay (s)		47.6			48.5			12.3			12.3	
Approach LOS		D			D			B			B	

Intersection Summary				
HCM Average Control Delay	22.3	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.38			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	53.2%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	86	4	74	285	74	1	200	111	117	21	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.96	1.00	0.97	
Flpb, ped/bikes	0.99	1.00		0.98	1.00		0.98	1.00	1.00	0.98	1.00	
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1749	1848		1733	1790		1736	1863	1513	1743	1626	
Flt Permitted	0.51	1.00		0.69	1.00		0.71	1.00	1.00	0.36	1.00	
Satd. Flow (perm)	941	1848		1266	1790		1297	1863	1513	652	1626	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	93	4	80	310	80	1	217	121	127	23	49
RTOR Reduction (vph)	0	1	0	0	5	0	0	0	100	0	41	0
Lane Group Flow (vph)	49	96	0	80	385	0	1	217	21	127	31	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4		4	8		
Actuated Green, G (s)	82.3	82.3		82.3	82.3		18.7	18.7	18.7	18.7	18.7	
Effective Green, g (s)	82.3	82.3		82.3	82.3		18.7	18.7	18.7	18.7	18.7	
Actuated g/C Ratio	0.75	0.75		0.75	0.75		0.17	0.17	0.17	0.17	0.17	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	704	1383		947	1339		220	317	257	111	276	
v/s Ratio Prot		0.05			c0.22			0.12			0.02	
v/s Ratio Perm	0.05			0.06			0.00		0.01	c0.19		
v/c Ratio	0.07	0.07		0.08	0.29		0.00	0.68	0.08	1.14	0.11	
Uniform Delay, d1	3.7	3.7		3.7	4.4		37.9	42.9	38.4	45.7	38.6	
Progression Factor	0.00	0.01		0.50	0.55		1.00	1.00	1.00	0.72	0.86	
Incremental Delay, d2	0.1	0.1		0.2	0.5		0.0	4.8	0.0	126.9	0.1	
Delay (s)	0.1	0.1		2.0	3.0		37.9	47.7	38.5	159.7	33.1	
Level of Service	A	A		A	A		D	D	D	F	C	
Approach Delay (s)		0.1			2.8			44.4			113.9	
Approach LOS		A			A			D			F	

Intersection Summary				
HCM Average Control Delay	33.8	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.45			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0	
Intersection Capacity Utilization	59.2%	ICU Level of Service	B	
Analysis Period (min)	15			

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	269	262	854	164	280	777
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.5	4.0	4.0	4.5
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	0.97	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	1567	3539	1537	1770	3539
Flt Permitted	0.95	1.00	1.00	1.00	0.16	1.00
Satd. Flow (perm)	1770	1567	3539	1537	292	3539
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	292	285	928	178	304	845
RTOR Reduction (vph)	0	172	0	54	0	0
Lane Group Flow (vph)	292	113	928	124	304	845
Confl. Peds. (#/hr)	10	10		10	10	
Turn Type		pm+ov		pm+ov	pm+pt	
Protected Phases	4	1	2	4	1	6
Permitted Phases		4		2	6	
Actuated Green, G (s)	23.2	43.5	44.6	67.8	68.9	68.9
Effective Green, g (s)	23.2	43.5	44.6	67.8	68.9	68.9
Actuated g/C Ratio	0.21	0.40	0.41	0.62	0.63	0.63
Clearance Time (s)	4.0	4.0	4.5	4.0	4.0	4.5
Vehicle Extension (s)	3.0	2.0	4.0	3.0	2.0	4.0
Lane Grp Cap (vph)	373	677	1435	947	456	2217
v/s Ratio Prot	c0.17	0.03	0.26	0.03	c0.12	0.24
v/s Ratio Perm		0.04		0.05	c0.29	
v/c Ratio	0.78	0.17	0.65	0.13	0.67	0.38
Uniform Delay, d1	41.0	21.5	26.4	8.8	15.6	10.1
Progression Factor	1.00	1.00	1.10	1.32	1.12	0.66
Incremental Delay, d2	10.3	0.0	2.1	0.1	2.0	0.4
Delay (s)	51.3	21.6	31.2	11.7	19.5	7.0
Level of Service	D	C	C	B	B	A
Approach Delay (s)	36.6		28.1			10.3
Approach LOS	D		C			B

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.4
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	65	15	639	59	736	5	822	310	1295	413	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		5.3	5.3	5.3	4.5	4.6	4.0	4.5	4.6	
Lane Util. Factor		0.95		0.95	0.95	0.88	1.00	0.86	1.00	0.97	0.95	
Frpb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.98		0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3396		1681	1699	2787	1770	6408	1560	3433	3489	
Flt Permitted		0.98		0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		3396		1681	1699	2787	1770	6408	1560	3433	3489	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	71	16	695	64	800	5	893	337	1408	449	32
RTOR Reduction (vph)	0	9	0	0	0	220	0	0	0	0	4	0
Lane Group Flow (vph)	0	143	0	375	384	580	5	893	337	1408	477	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Split			Split		pt+ov	Prot		Free	Prot		
Protected Phases	4	4		3	3	3 5	1	6		5	2	
Permitted Phases									Free			
Actuated Green, G (s)		10.0		25.0	25.0	64.5	1.3	16.6	110.0	39.5	54.8	
Effective Green, g (s)		10.0		25.0	25.0	64.5	1.3	16.6	110.0	39.5	54.8	
Actuated g/C Ratio		0.09		0.23	0.23	0.59	0.01	0.15	1.00	0.36	0.50	
Clearance Time (s)		4.5		5.3	5.3		4.5	4.6		4.5	4.6	
Vehicle Extension (s)		3.0		3.8	3.8		3.0	3.8		3.8	3.8	
Lane Grp Cap (vph)		309		382	386	1634	21	967	1560	1233	1738	
v/s Ratio Prot		c0.04		0.22	c0.23	0.21	0.00	c0.14		c0.41	0.14	
v/s Ratio Perm									0.22			
v/c Ratio		0.46		0.98	0.99	0.35	0.24	0.92	0.22	1.14	0.27	
Uniform Delay, d1		47.4		42.3	42.4	11.9	53.9	46.1	0.0	35.2	16.0	
Progression Factor		1.00		1.00	1.00	1.00	1.29	0.66	1.00	0.90	0.88	
Incremental Delay, d2		1.1		41.0	44.2	0.2	5.0	13.7	0.3	71.4	0.3	
Delay (s)		48.5		83.3	86.7	12.1	74.4	44.0	0.3	103.1	14.4	
Level of Service		D		F	F	B	E	D	A	F	B	
Approach Delay (s)		48.5			47.6			32.2			80.5	
Approach LOS		D			D			C			F	

Intersection Summary			
HCM Average Control Delay	56.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	18.9
Intersection Capacity Utilization	88.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	0	947	764	743	1366	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0	4.5	4.5	
Lane Util. Factor		0.88	0.97	0.95	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	
Frt		0.85	1.00	1.00	0.99	
Flt Protected		1.00	0.95	1.00	1.00	
Satd. Flow (prot)		2787	3433	3539	5053	
Flt Permitted		1.00	0.95	1.00	1.00	
Satd. Flow (perm)		2787	3433	3539	5053	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1029	830	808	1485	54
RTOR Reduction (vph)	0	6	0	0	3	0
Lane Group Flow (vph)	0	1023	830	808	1536	0
Confl. Peds. (#/hr)	10	10	10			10
Turn Type		Over	Prot			
Protected Phases		4	4	6 4	2	
Permitted Phases						
Actuated Green, G (s)		47.7	47.7	110.0	51.8	
Effective Green, g (s)		47.7	47.7	104.0	51.8	
Actuated g/C Ratio		0.43	0.43	0.95	0.47	
Clearance Time (s)		6.0	6.0		4.5	
Vehicle Extension (s)		2.0	2.0		2.0	
Lane Grp Cap (vph)		1209	1489	3346	2380	
v/s Ratio Prot		c0.37	0.24	0.23	c0.30	
v/s Ratio Perm						
v/c Ratio		0.85	0.56	0.24	0.65	
Uniform Delay, d1		27.9	23.3	0.2	22.1	
Progression Factor		1.00	0.54	1.00	0.72	
Incremental Delay, d2		5.1	0.2	0.0	1.1	
Delay (s)		33.1	12.7	0.2	17.1	
Level of Service		C	B	A	B	
Approach Delay (s)	33.1			6.5	17.1	
Approach LOS	C			A	B	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	332	943	776	33	37	382
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5	4.5		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	3510		1770	1583
Flt Permitted	0.23	1.00	1.00		0.95	1.00
Satd. Flow (perm)	427	3539	3510		1770	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	361	1025	843	36	40	415
RTOR Reduction (vph)	0	0	2	0	0	30
Lane Group Flow (vph)	361	1025	877	0	40	385
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	pm+pt					pt+ov
Protected Phases	1	6	2		8	8 1
Permitted Phases	6					
Actuated Green, G (s)	77.4	77.4	57.1		24.1	44.4
Effective Green, g (s)	77.4	77.4	57.1		24.1	44.4
Actuated g/C Ratio	0.70	0.70	0.52		0.22	0.40
Clearance Time (s)	4.0	4.5	4.5		4.0	
Vehicle Extension (s)	1.0	2.0	2.0		2.0	
Lane Grp Cap (vph)	499	2490	1822		388	639
v/s Ratio Prot	c0.11	0.29	0.25		0.02	c0.24
v/s Ratio Perm	c0.40					
v/c Ratio	0.72	0.41	0.48		0.10	0.60
Uniform Delay, d1	9.7	6.8	17.0		34.3	25.8
Progression Factor	2.39	0.97	0.21		0.97	1.29
Incremental Delay, d2	4.0	0.5	0.8		0.0	1.1
Delay (s)	27.1	7.1	4.3		33.4	34.5
Level of Service	C	A	A		C	C
Approach Delay (s)		12.3	4.3		34.4	
Approach LOS		B	A		C	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	184	219	60	110	125	420	45	831	107	178	1153	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5	4.0	4.0	4.5	4.5	4.0	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3409		1770	1863	1566	1769	3539	1541	1770	3539	1515
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.17	1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)	1770	3409		1770	1863	1566	320	3539	1541	328	3539	1515
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	200	238	65	120	136	457	49	903	116	193	1253	120
RTOR Reduction (vph)	0	26	0	0	0	39	0	0	67	0	0	41
Lane Group Flow (vph)	200	277	0	120	136	418	49	903	49	193	1253	79
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot		pm+ov	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8	5	1	6		5	2	
Permitted Phases						8	6		6	2		2
Actuated Green, G (s)	14.9	19.4		10.0	14.5	31.6	49.9	46.5	46.5	67.6	60.2	60.2
Effective Green, g (s)	14.9	19.4		10.0	14.5	31.6	49.9	46.5	46.5	67.6	60.2	60.2
Actuated g/C Ratio	0.14	0.18		0.09	0.13	0.29	0.45	0.42	0.42	0.61	0.55	0.55
Clearance Time (s)	4.0	4.5		4.0	4.5	4.0	4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	1.0	2.0		1.0	2.0	1.0	1.0	2.0	2.0	1.0	2.0	2.0
Lane Grp Cap (vph)	240	601		161	246	450	190	1496	651	426	1937	829
v/s Ratio Prot	c0.11	0.08		0.07	0.07	c0.14	0.01	0.26		0.07	c0.35	
v/s Ratio Perm						0.12	0.11		0.03	0.21		0.05
v/c Ratio	0.83	0.46		0.75	0.55	0.93	0.26	0.60	0.08	0.45	0.65	0.10
Uniform Delay, d1	46.3	40.6		48.8	44.7	38.1	17.5	24.6	18.9	12.5	17.5	11.9
Progression Factor	0.92	0.90		1.00	1.00	1.00	0.60	0.63	0.10	0.83	1.00	1.23
Incremental Delay, d2	19.2	0.2		15.0	1.5	25.0	0.3	1.8	0.2	0.2	1.3	0.2
Delay (s)	61.9	36.9		63.8	46.2	63.1	10.7	17.4	2.2	10.6	18.8	14.9
Level of Service	E	D		E	D	E	B	B	A	B	B	B
Approach Delay (s)		46.8			60.0			15.4			17.5	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	644	0	418	138	0	94	367	817	10	0	745	589
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5		4.5	5.0	4.5			6.0	6.0
Lane Util. Factor	0.95	0.95	1.00	1.00		1.00	0.97	0.95			0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00		1.00	1.00	1.00			1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00	0.85	1.00		0.85	1.00	1.00			1.00	0.85
Flt Protected	0.95	0.95	1.00	0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)	1681	1681	1583	1770		1583	3433	3530			3539	1534
Flt Permitted	0.95	0.95	1.00	0.95		1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)	1681	1681	1583	1770		1583	3433	3530			3539	1534
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	700	0	454	150	0	102	399	888	11	0	810	640
RTOR Reduction (vph)	0	0	71	0	0	66	0	0	0	0	0	438
Lane Group Flow (vph)	350	350	383	150	0	36	399	899	0	0	810	202
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Split		pt+ov	Prot		custom	Prot			Prot		Perm
Protected Phases	4	4	4 5	3		3	5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	27.0	27.0	46.6	13.2		13.2	15.1	56.3			34.7	34.7
Effective Green, g (s)	27.0	27.0	46.6	13.2		13.2	15.1	56.3			34.7	34.7
Actuated g/C Ratio	0.25	0.25	0.42	0.12		0.12	0.14	0.51			0.32	0.32
Clearance Time (s)	4.5	4.5		4.5		4.5	5.0	4.5			6.0	6.0
Vehicle Extension (s)	4.0	4.0		2.0		2.0	2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	413	413	671	212		190	471	1807			1116	484
v/s Ratio Prot	c0.21	0.21	0.24	c0.08		0.02	c0.12	0.25			c0.23	
v/s Ratio Perm												0.13
v/c Ratio	0.85	0.85	0.57	0.71		0.19	0.85	0.50			0.73	0.42
Uniform Delay, d1	39.5	39.5	24.1	46.5		43.6	46.3	17.6			33.4	29.7
Progression Factor	0.69	0.69	1.09	1.00		1.00	1.06	1.35			0.81	1.03
Incremental Delay, d2	14.0	14.0	1.3	8.5		0.2	9.1	0.7			3.5	2.2
Delay (s)	41.3	41.3	27.5	55.0		43.8	58.3	24.4			30.7	32.9
Level of Service	D	D	C	E		D	E	C			C	C
Approach Delay (s)		35.8			50.5			34.8			31.7	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	35.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	948	104	190	754	145	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3471		1769	3539	1770	1542
Flt Permitted	1.00		0.20	1.00	0.95	1.00
Satd. Flow (perm)	3471		363	3539	1770	1542
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1030	113	207	820	158	182
RTOR Reduction (vph)	5	0	0	0	0	158
Lane Group Flow (vph)	1138	0	207	820	158	24
Confl. Peds. (#/hr)		10	10		10	10
Turn Type			pm+pt			Perm
Protected Phases	6		5	2	4	
Permitted Phases			2			4
Actuated Green, G (s)	75.1		86.7	86.7	14.8	14.8
Effective Green, g (s)	75.1		86.7	86.7	14.8	14.8
Actuated g/C Ratio	0.68		0.79	0.79	0.13	0.13
Clearance Time (s)	4.5		4.0	4.5	4.0	4.0
Vehicle Extension (s)	4.0		1.0	4.0	2.0	2.0
Lane Grp Cap (vph)	2370		383	2789	238	207
v/s Ratio Prot	0.33		c0.04	0.23	c0.09	
v/s Ratio Perm			c0.39			0.02
v/c Ratio	0.48		0.54	0.29	0.66	0.12
Uniform Delay, d1	8.2		5.2	3.2	45.2	41.9
Progression Factor	0.29		4.04	0.69	0.99	2.01
Incremental Delay, d2	0.7		0.5	0.2	5.0	0.1
Delay (s)	3.1		21.4	2.4	49.6	84.4
Level of Service	A		C	A	D	F
Approach Delay (s)	3.1			6.2	68.2	
Approach LOS	A			A	E	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	11	10	498	12	265	10	805	608	282	922	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0		5.0	5.0	5.0	4.5	4.5	4.5	4.0	4.5	
Lane Util. Factor		1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		0.99		1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	
Flpb, ped/bikes		1.00		0.99	0.99	1.00	0.99	1.00	1.00	1.00	1.00	
Frt		0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98		0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1733		1657	1666	1539	1753	3539	1530	1770	3531	
Flt Permitted		0.88		0.73	0.71	1.00	0.28	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1557		1282	1241	1539	522	3539	1530	1770	3531	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	12	11	541	13	288	11	875	661	307	1002	11
RTOR Reduction (vph)	0	8	0	0	0	214	0	0	355	0	1	0
Lane Group Flow (vph)	0	26	0	276	278	74	11	875	306	307	1012	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm		Perm	Perm		Perm	Prot		
Protected Phases		8			4			2		1	6	
Permitted Phases	8			4		4	2		2			
Actuated Green, G (s)		28.2		28.2	28.2	28.2	46.5	46.5	46.5	21.8	72.3	
Effective Green, g (s)		28.2		28.2	28.2	28.2	46.5	46.5	46.5	21.8	72.3	
Actuated g/C Ratio		0.26		0.26	0.26	0.26	0.42	0.42	0.42	0.20	0.66	
Clearance Time (s)		5.0		5.0	5.0	5.0	4.5	4.5	4.5	4.0	4.5	
Vehicle Extension (s)		2.0		2.0	2.0	2.0	2.0	2.0	2.0	1.0	2.0	
Lane Grp Cap (vph)		399		329	318	395	221	1496	647	351	2321	
v/s Ratio Prot								c0.25		c0.17	0.29	
v/s Ratio Perm		0.02		0.22	c0.22	0.05	0.02		0.20			
v/c Ratio		0.06		0.84	0.87	0.19	0.05	0.58	0.47	0.87	0.44	
Uniform Delay, d1		30.9		38.7	39.2	31.9	18.7	24.3	22.9	42.8	9.1	
Progression Factor		1.00		1.00	1.00	1.00	0.49	0.55	1.21	1.00	1.00	
Incremental Delay, d2		0.0		16.2	21.8	0.1	0.3	1.3	2.0	20.2	0.6	
Delay (s)		31.0		54.9	61.0	32.0	9.6	14.6	29.7	63.0	9.7	
Level of Service		C		D	E	C	A	B	C	E	A	
Approach Delay (s)		31.0			49.1			21.0			22.1	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	1041	74	59	838	12	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.5	4.5	4.5	4.5
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.97
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3494		1762	3539	1770	1541
Flt Permitted	1.00		0.22	1.00	0.95	1.00
Satd. Flow (perm)	3494		412	3539	1770	1541
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1132	80	64	911	13	12
RTOR Reduction (vph)	2	0	0	0	0	11
Lane Group Flow (vph)	1210	0	64	911	13	1
Confl. Peds. (#/hr)		10	10		10	10
Turn Type			Perm			Perm
Protected Phases	6			2	4	
Permitted Phases			2			4
Actuated Green, G (s)	94.4		94.4	94.4	6.6	6.6
Effective Green, g (s)	94.4		94.4	94.4	6.6	6.6
Actuated g/C Ratio	0.86		0.86	0.86	0.06	0.06
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0		2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	2998		354	3037	106	92
v/s Ratio Prot	c0.35			0.26	c0.01	
v/s Ratio Perm			0.16			0.00
v/c Ratio	0.40		0.18	0.30	0.12	0.01
Uniform Delay, d1	1.7		1.3	1.5	49.0	48.6
Progression Factor	0.69		0.48	0.48	1.00	1.00
Incremental Delay, d2	0.0		1.1	0.2	0.2	0.0
Delay (s)	1.2		1.7	1.0	49.1	48.6
Level of Service	A		A	A	D	D
Approach Delay (s)	1.2			1.0	48.9	
Approach LOS	A			A	D	

Intersection Summary			
HCM Average Control Delay	1.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	39	334	24	74	254	99	79	1069	0	135	990	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	1863	1542	1768	1863	1542	1770	3539		1770	3523	
Flt Permitted	0.39	1.00	1.00	0.17	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	718	1863	1542	323	1863	1542	1770	3539		1770	3523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	42	363	26	80	276	108	86	1162	0	147	1076	26
RTOR Reduction (vph)	0	0	14	0	0	83	0	0	0	0	2	0
Lane Group Flow (vph)	42	363	12	80	276	25	86	1162	0	147	1100	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	pm+pt		Perm	pm+pt		custom	Prot			Prot		
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		8						
Actuated Green, G (s)	29.1	25.5	25.5	32.5	27.2	25.5	7.7	50.5		11.7	54.5	
Effective Green, g (s)	29.1	25.5	25.5	32.5	27.2	25.5	7.7	50.5		11.7	54.5	
Actuated g/C Ratio	0.26	0.23	0.23	0.30	0.25	0.23	0.07	0.46		0.11	0.50	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	2.0		1.5	2.0	
Lane Grp Cap (vph)	224	432	357	165	461	357	124	1625		188	1745	
v/s Ratio Prot	0.01	c0.19		c0.02	0.15		0.05	c0.33		c0.08	c0.31	
v/s Ratio Perm	0.04		0.01	0.12		0.02						
v/c Ratio	0.19	0.84	0.03	0.48	0.60	0.07	0.69	0.72		0.78	0.63	
Uniform Delay, d1	30.8	40.3	32.7	30.3	36.6	33.0	50.0	24.0		47.9	20.4	
Progression Factor	1.00	1.00	1.00	0.86	0.92	0.88	0.93	1.12		1.28	0.53	
Incremental Delay, d2	0.1	13.2	0.0	0.8	1.4	0.0	9.3	2.0		15.2	1.5	
Delay (s)	31.0	53.5	32.7	26.9	35.0	29.2	55.7	28.8		76.3	12.2	
Level of Service	C	D	C	C	D	C	E	C		E	B	
Approach Delay (s)		50.0			32.3			30.7			19.8	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	29.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	25.5
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBR	SEL	SER	SWL	SWR
Lane Configurations						
Volume (vph)	682	558	30	639	277	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5	5.0	
Lane Util. Factor	0.97		1.00	0.88	0.97	
Frpb, ped/bikes	0.99		1.00	1.00	1.00	
Flpb, ped/bikes	1.00		1.00	1.00	1.00	
Frt	0.93		1.00	0.85	0.98	
Flt Protected	0.97		0.95	1.00	0.96	
Satd. Flow (prot)	3235		1767	2787	3395	
Flt Permitted	0.97		0.95	1.00	0.96	
Satd. Flow (perm)	3235		1767	2787	3395	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	741	607	33	695	301	34
RTOR Reduction (vph)	254	0	0	201	15	0
Lane Group Flow (vph)	1094	0	33	494	320	0
Confl. Peds. (#/hr)	10	10	10	10	10	10
Turn Type				custom		
Protected Phases	2		1	6	4	
Permitted Phases						
Actuated Green, G (s)	17.5		0.9	22.4	9.4	
Effective Green, g (s)	17.5		0.9	22.4	9.4	
Actuated g/C Ratio	0.42		0.02	0.54	0.23	
Clearance Time (s)	4.5		4.0	4.5	5.0	
Vehicle Extension (s)	2.0		1.0	2.0	2.0	
Lane Grp Cap (vph)	1371		39	1512	773	
v/s Ratio Prot	c0.34		0.02	c0.18	c0.09	
v/s Ratio Perm						
v/c Ratio	0.80		0.85	0.33	0.41	
Uniform Delay, d1	10.4		20.1	5.3	13.6	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	3.1		82.5	0.0	0.1	
Delay (s)	13.5		102.6	5.3	13.7	
Level of Service	B		F	A	B	
Approach Delay (s)	13.5		9.7		13.7	
Approach LOS	B		A		B	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	41.3	Sum of lost time (s)	14.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	379	352	540	67	123	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1550	1770	1863	1840	
Flt Permitted	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1770	1550	1770	1863	1840	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	412	383	587	73	134	11
RTOR Reduction (vph)	0	147	0	0	2	0
Lane Group Flow (vph)	412	236	587	73	143	0
Confl. Peds. (#/hr)	10	10	10			10
Turn Type		pm+ov	Prot			
Protected Phases	4	1	1	6	2	
Permitted Phases		4				
Actuated Green, G (s)	28.6	67.9	39.3	72.9	29.1	
Effective Green, g (s)	28.6	67.9	39.3	72.9	29.1	
Actuated g/C Ratio	0.26	0.62	0.36	0.66	0.26	
Clearance Time (s)	4.0	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.0	1.0	1.0	2.0	2.0	
Lane Grp Cap (vph)	460	957	632	1235	487	
v/s Ratio Prot	c0.23	0.09	c0.33	0.04	c0.08	
v/s Ratio Perm		0.06				
v/c Ratio	0.90	0.25	0.93	0.06	0.29	
Uniform Delay, d1	39.3	9.5	34.0	6.5	32.3	
Progression Factor	1.00	1.00	1.01	0.89	1.00	
Incremental Delay, d2	19.1	0.0	19.6	0.1	1.5	
Delay (s)	58.4	9.6	53.9	5.9	33.8	
Level of Service	E	A	D	A	C	
Approach Delay (s)	34.9			48.6	33.8	
Approach LOS	C			D	C	

Intersection Summary			
HCM Average Control Delay	40.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	75	449	239	306	408	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1764	1863	1820	
Flt Permitted	0.95	1.00	0.38	1.00	1.00	
Satd. Flow (perm)	1770	1583	699	1863	1820	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	488	260	333	443	63
RTOR Reduction (vph)	0	199	0	0	3	0
Lane Group Flow (vph)	82	289	260	333	503	0
Confl. Peds. (#/hr)	10	10	10			10
Turn Type		pt+ov	pm+pt			
Protected Phases	4	4 1	1	6	2	
Permitted Phases			6			
Actuated Green, G (s)	18.1	31.3	82.9	82.9	69.7	
Effective Green, g (s)	18.1	31.3	82.9	82.9	69.7	
Actuated g/C Ratio	0.16	0.28	0.75	0.75	0.63	
Clearance Time (s)	4.5		4.5	4.5	4.5	
Vehicle Extension (s)	2.0		1.0	2.0	2.0	
Lane Grp Cap (vph)	291	450	611	1404	1153	
v/s Ratio Prot	0.05	c0.18	0.03	0.18	0.28	
v/s Ratio Perm			c0.29			
v/c Ratio	0.28	0.64	0.43	0.24	0.44	
Uniform Delay, d1	40.3	34.5	5.5	4.1	10.2	
Progression Factor	1.00	1.00	1.00	1.00	0.81	
Incremental Delay, d2	0.2	2.4	0.2	0.4	1.2	
Delay (s)	40.4	36.8	5.7	4.5	9.5	
Level of Service	D	D	A	A	A	
Approach Delay (s)	37.3			5.0	9.5	
Approach LOS	D			A	A	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	4.5
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (vph)	393	27	588	382	22	643
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5		4.0	4.5	4.0	4.0
Lane Util. Factor	1.00		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00		1.00	1.00	1.00	1.00
Frt	0.99		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	1841		1770	1863	1770	1560
Flt Permitted	1.00		0.95	1.00	0.95	1.00
Satd. Flow (perm)	1841		1770	1863	1770	1560
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	427	29	639	415	24	699
RTOR Reduction (vph)	2	0	0	0	0	0
Lane Group Flow (vph)	454	0	639	415	24	699
Confl. Peds. (#/hr)		10	10		10	10
Turn Type			Prot			Free
Protected Phases	2		1	6	4	
Permitted Phases						Free
Actuated Green, G (s)	48.5		42.7	95.2	6.3	110.0
Effective Green, g (s)	48.5		42.7	95.2	6.3	110.0
Actuated g/C Ratio	0.44		0.39	0.87	0.06	1.00
Clearance Time (s)	4.5		4.0	4.5	4.0	
Vehicle Extension (s)	2.0		1.0	2.0	2.0	
Lane Grp Cap (vph)	812		687	1612	101	1560
v/s Ratio Prot	c0.25		c0.36	0.22	0.01	
v/s Ratio Perm						c0.45
v/c Ratio	0.56		0.93	0.26	0.24	0.45
Uniform Delay, d1	22.8		32.2	1.3	49.6	0.0
Progression Factor	1.00		1.14	0.89	1.00	1.00
Incremental Delay, d2	2.8		18.0	0.4	0.4	0.9
Delay (s)	25.6		54.9	1.5	50.0	0.9
Level of Service	C		D	A	D	A
Approach Delay (s)	25.6			33.9	2.6	
Approach LOS	C			C	A	

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	1	880	155	127	744	2	12	20	2	224	30	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.0	4.5			4.5			4.5	4.5
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.95	1.00	1.00			1.00			1.00	0.97
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00			1.00			0.99	1.00
Frt	1.00	1.00	0.85	1.00	1.00			0.99			1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			0.96	1.00
Satd. Flow (prot)	1750	3539	1507	1770	3537			1810			1765	1542
Flt Permitted	0.35	1.00	1.00	0.95	1.00			0.88			0.73	1.00
Satd. Flow (perm)	637	3539	1507	1770	3537			1615			1336	1542
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	957	168	138	809	2	13	22	2	243	33	105
RTOR Reduction (vph)	0	0	50	0	0	0	0	1	0	0	0	78
Lane Group Flow (vph)	1	957	118	138	811	0	0	36	0	0	276	27
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm		Perm	Prot			Perm			Perm		Perm
Protected Phases		6		5	2			8			4	
Permitted Phases	6		6				8			4		4
Actuated Green, G (s)	56.6	56.6	56.6	12.5	73.1			27.9			27.9	27.9
Effective Green, g (s)	56.6	56.6	56.6	12.5	73.1			27.9			27.9	27.9
Actuated g/C Ratio	0.51	0.51	0.51	0.11	0.66			0.25			0.25	0.25
Clearance Time (s)	4.5	4.5	4.5	4.0	4.5			4.5			4.5	4.5
Vehicle Extension (s)	4.0	4.0	4.0	2.0	4.0			3.0			3.0	3.0
Lane Grp Cap (vph)	328	1821	775	201	2350			410			339	391
v/s Ratio Prot		c0.27		c0.08	0.23							
v/s Ratio Perm	0.00		0.08					0.02			c0.21	0.02
v/c Ratio	0.00	0.53	0.15	0.69	0.35			0.09			0.81	0.07
Uniform Delay, d1	13.0	17.8	14.1	46.9	8.0			31.3			38.6	31.2
Progression Factor	0.66	0.63	0.26	0.94	0.79			1.00			1.00	1.00
Incremental Delay, d2	0.0	1.0	0.4	7.0	0.4			0.1			13.9	0.1
Delay (s)	8.5	12.1	4.0	51.1	6.7			31.4			52.5	31.3
Level of Service	A	B	A	D	A			C			D	C
Approach Delay (s)		10.9			13.1			31.4			46.6	
Approach LOS		B			B			C			D	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	28	10	15	232	20	69	4	880	147	66	606	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.5	4.5		4.0	4.5	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00	1.00	1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	0.98	1.00		1.00	1.00	
Frt		0.96			1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		0.97			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1734			1781	1583	1742	3434		1770	3525	
Flt Permitted		0.97			0.96	1.00	0.40	1.00		0.95	1.00	
Satd. Flow (perm)		1734			1781	1583	727	3434		1770	3525	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	11	16	252	22	75	4	957	160	72	659	13
RTOR Reduction (vph)	0	15	0	0	0	61	0	9	0	0	1	0
Lane Group Flow (vph)	0	42	0	0	274	14	4	1108	0	72	671	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Split			Split		Prot	Perm			Prot		
Protected Phases	4	4		3	3	3		6		5	2	
Permitted Phases							6					
Actuated Green, G (s)		9.0			20.3	20.3	57.3	57.3		6.9	68.2	
Effective Green, g (s)		9.0			20.3	20.3	57.3	57.3		6.9	68.2	
Actuated g/C Ratio		0.08			0.18	0.18	0.52	0.52		0.06	0.62	
Clearance Time (s)		4.0			4.0	4.0	4.5	4.5		4.0	4.5	
Vehicle Extension (s)		2.0			2.0	2.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)		142			329	292	379	1789		111	2186	
v/s Ratio Prot		c0.02			c0.15	0.01		c0.32		c0.04	0.19	
v/s Ratio Perm							0.01					
v/c Ratio		0.30			0.83	0.05	0.01	0.62		0.65	0.31	
Uniform Delay, d1		47.5			43.2	36.9	12.7	18.6		50.4	9.8	
Progression Factor		1.00			1.00	1.00	0.35	0.25		0.96	0.92	
Incremental Delay, d2		0.4			15.7	0.0	0.0	1.5		9.1	0.4	
Delay (s)		48.0			58.9	36.9	4.5	6.1		57.6	9.3	
Level of Service		D			E	D	A	A		E	A	
Approach Delay (s)		48.0			54.2			6.1			14.0	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	65.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	24	5	110	75	143	24	862	91	201	569	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0	4.5	4.5		4.0	4.5	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	0.97	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			0.99	1.00	0.99	1.00		1.00	1.00	
Frt		0.98			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.99			0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1800			1795	1542	1744	3472		1768	3523	
Flt Permitted		0.92			0.82	1.00	0.41	1.00		0.21	1.00	
Satd. Flow (perm)		1678			1522	1542	757	3472		394	3523	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	26	5	120	82	155	26	937	99	218	618	14
RTOR Reduction (vph)	0	4	0	0	0	128	0	5	0	0	1	0
Lane Group Flow (vph)	0	37	0	0	202	27	26	1031	0	218	631	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm		Perm	Perm			pm+pt		
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4		4	6			2		
Actuated Green, G (s)		19.2			19.2	19.2	69.2	69.2		82.3	82.3	
Effective Green, g (s)		19.2			19.2	19.2	69.2	69.2		82.3	82.3	
Actuated g/C Ratio		0.17			0.17	0.17	0.63	0.63		0.75	0.75	
Clearance Time (s)		4.0			4.0	4.0	4.5	4.5		4.0	4.5	
Vehicle Extension (s)		2.0			2.0	2.0	4.0	4.0		2.0	4.0	
Lane Grp Cap (vph)		293			266	269	476	2184		408	2636	
v/s Ratio Prot								0.30		c0.04	0.18	
v/s Ratio Perm		0.02			c0.13	0.02	0.03			c0.36		
v/c Ratio		0.13			0.76	0.10	0.05	0.47		0.53	0.24	
Uniform Delay, d1		38.3			43.2	38.1	7.8	10.8		6.3	4.2	
Progression Factor		1.00			1.00	1.00	0.17	0.14		2.71	0.78	
Incremental Delay, d2		0.1			10.5	0.1	0.2	0.6		0.6	0.2	
Delay (s)		38.4			53.7	38.2	1.5	2.2		17.7	3.5	
Level of Service		D			D	D	A	A		B	A	
Approach Delay (s)		38.4			47.0			2.1			7.2	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	753	10	14	386	28	553	89	5	28	110	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1746	3530		1770	3492		1770	1847		1770	1787	
Flt Permitted	0.36	1.00		0.14	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	659	3530		259	3492		1770	1847		1770	1787	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	818	11	15	420	30	601	97	5	30	120	36
RTOR Reduction (vph)	0	1	0	0	4	0	0	2	0	0	9	0
Lane Group Flow (vph)	11	828	0	15	446	0	601	100	0	30	147	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Split			Split		
Protected Phases		8			4		5	5		6	6	
Permitted Phases	8			4								
Actuated Green, G (s)	28.8	28.8		28.8	28.8		41.6	41.6		26.1	26.1	
Effective Green, g (s)	28.8	28.8		28.8	28.8		41.6	41.6		26.1	26.1	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.38	0.38		0.24	0.24	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		4.0	4.0		2.0	2.0	
Lane Grp Cap (vph)	173	924		68	914		669	699		420	424	
v/s Ratio Prot		c0.23			0.13		c0.34	0.05		0.02	c0.08	
v/s Ratio Perm	0.02			0.06								
v/c Ratio	0.06	0.90		0.22	0.49		0.90	0.14		0.07	0.35	
Uniform Delay, d1	30.5	39.2		31.8	34.4		32.2	22.5		32.5	34.9	
Progression Factor	1.06	1.01		0.50	0.51		0.94	1.00		0.93	0.95	
Incremental Delay, d2	0.1	8.3		1.8	0.4		14.8	0.1		0.3	2.2	
Delay (s)	32.6	48.0		17.6	18.1		45.1	22.6		30.7	35.2	
Level of Service	C	D		B	B		D	C		C	D	
Approach Delay (s)		47.8			18.1			41.8			34.5	
Approach LOS		D			B			D			C	

Intersection Summary			
HCM Average Control Delay	38.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
105: Steilacoom Blvd & Lochburn MS

City of Lakewood
Future Conditions (2030)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	758	15	312	439	0	12	4	403	0	4	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5			4.5	4.0		4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		1.00	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		1.00	1.00
Satd. Flow (prot)	1762	3527		1768	3539			1775	1579		1863	1543
Flt Permitted	0.44	1.00		0.28	1.00			0.77	1.00		1.00	1.00
Satd. Flow (perm)	824	3527		528	3539			1427	1579		1863	1543
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	824	16	339	477	0	13	4	438	0	4	1
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	35	0	0	1
Lane Group Flow (vph)	11	839	0	339	477	0	0	17	403	0	4	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		Perm
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases	2			6			8		8	4		4
Actuated Green, G (s)	55.3	55.3		90.4	89.9			6.3	41.7		6.3	6.3
Effective Green, g (s)	55.3	55.3		90.4	89.9			6.3	41.7		6.3	6.3
Actuated g/C Ratio	0.50	0.50		0.82	0.82			0.06	0.38		0.06	0.06
Clearance Time (s)	4.0	4.5		4.0	4.5			4.5	4.0		4.5	4.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	421	1773		833	2892			82	656		107	88
v/s Ratio Prot	0.00	c0.24		0.13	0.13				c0.20		0.00	
v/s Ratio Perm	0.01			0.20				0.01	0.06			0.00
v/c Ratio	0.03	0.47		0.41	0.16			0.21	0.61		0.04	0.00
Uniform Delay, d1	13.8	17.8		7.8	2.1			49.5	27.6		49.0	48.9
Progression Factor	0.51	0.51		0.67	0.64			1.33	1.27		1.00	1.00
Incremental Delay, d2	0.0	0.9		0.3	0.1			1.1	1.5		0.1	0.0
Delay (s)	7.0	10.1		5.6	1.5			67.0	36.6		49.1	48.9
Level of Service	A	B		A	A			E	D		D	D
Approach Delay (s)		10.0			3.2			37.7			49.1	
Approach LOS		B			A			D			D	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
109: Steilacoom Blvd & Lakewood Dr

City of Lakewood
Future Conditions (2030)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	255	799	107	125	485	251	133	932	119	200	725	132
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1768	3467		1769	3539	1546	1769	3470		1770	3445	
Flt Permitted	0.28	1.00		0.12	1.00	1.00	0.16	1.00		0.10	1.00	
Satd. Flow (perm)	529	3467		231	3539	1546	306	3470		180	3445	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	277	868	116	136	527	273	145	1013	129	217	788	143
RTOR Reduction (vph)	0	10	0	0	0	153	0	9	0	0	13	0
Lane Group Flow (vph)	277	974	0	136	527	120	145	1133	0	217	918	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	pm+pt			pm+pt		Perm	pm+pt			pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	46.6	36.7		38.1	32.2	32.2	47.0	38.1		53.8	41.5	
Effective Green, g (s)	46.6	36.7		38.1	32.2	32.2	47.0	38.1		53.8	41.5	
Actuated g/C Ratio	0.42	0.33		0.35	0.29	0.29	0.43	0.35		0.49	0.38	
Clearance Time (s)	4.0	4.5		4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	341	1157		163	1036	453	249	1202		266	1300	
v/s Ratio Prot	c0.08	c0.28		0.04	0.15		0.05	c0.33		c0.09	0.27	
v/s Ratio Perm	0.27			0.24		0.08	0.20			0.31		
v/c Ratio	0.81	0.84		0.83	0.51	0.27	0.58	0.94		0.82	0.71	
Uniform Delay, d1	24.4	34.0		28.2	32.3	29.8	21.6	34.9		27.4	29.1	
Progression Factor	0.97	0.88		0.90	0.95	1.57	1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.0	6.5		28.5	0.4	0.3	3.4	14.3		17.3	1.8	
Delay (s)	35.6	36.6		53.8	31.0	47.2	25.0	49.2		44.6	30.8	
Level of Service	D	D		D	C	D	C	D		D	C	
Approach Delay (s)		36.4			39.1			46.5			33.5	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	39.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.5
Intersection Capacity Utilization	87.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	32	28	15	28	23	14	707	1	38	1590	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frpb, ped/bikes		0.99			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.94			0.95			1.00			1.00	
Flt Protected		1.00			0.99			1.00			1.00	
Satd. Flow (prot)		1725			1733			3535			3526	
Flt Permitted		1.00			0.94			0.89			0.91	
Satd. Flow (perm)		1725			1650			3162			3223	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	35	30	16	30	25	15	768	1	41	1728	24
RTOR Reduction (vph)	0	23	0	0	18	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	42	0	0	53	0	0	784	0	0	1792	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		24.6			24.6			76.4			76.4	
Effective Green, g (s)		24.6			24.6			76.4			76.4	
Actuated g/C Ratio		0.22			0.22			0.69			0.69	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		2.0			2.0			4.0			4.0	
Lane Grp Cap (vph)		386			369			2196			2239	
v/s Ratio Prot		0.02										
v/s Ratio Perm					c0.03			0.25			c0.56	
v/c Ratio		0.11			0.14			0.36			0.80	
Uniform Delay, d1		34.0			34.3			6.8			11.6	
Progression Factor		1.00			1.00			0.60			0.65	
Incremental Delay, d2		0.6			0.8			0.1			2.1	
Delay (s)		34.5			35.1			4.2			9.6	
Level of Service		C			D			A			A	
Approach Delay (s)		34.5			35.1			4.2			9.6	
Approach LOS		C			D			A			A	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	96.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	747	11	12	104	166	868
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		4.5	4.5	4.5	4.0
Lane Util. Factor	0.97		1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00		1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00		0.99	1.00	1.00	1.00
Frt	1.00		1.00	1.00	1.00	0.85
Flt Protected	0.95		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3434		1743	1863	1863	1560
Flt Permitted	0.95		0.64	1.00	1.00	1.00
Satd. Flow (perm)	3434		1174	1863	1863	1560
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	812	12	13	113	180	943
RTOR Reduction (vph)	1	0	0	0	0	0
Lane Group Flow (vph)	823	0	13	113	180	943
Confl. Peds. (#/hr)	10	10	10			10
Turn Type			Perm			Free
Protected Phases	4			2	2	
Permitted Phases			2			Free
Actuated Green, G (s)	34.9		65.6	65.6	65.6	110.0
Effective Green, g (s)	34.9		65.6	65.6	65.6	110.0
Actuated g/C Ratio	0.32		0.60	0.60	0.60	1.00
Clearance Time (s)	5.0		4.5	4.5	4.5	
Vehicle Extension (s)	3.0		4.0	4.0	4.0	
Lane Grp Cap (vph)	1090		700	1111	1111	1560
v/s Ratio Prot	c0.24			0.06	0.10	
v/s Ratio Perm			0.01			c0.60
v/c Ratio	0.75		0.02	0.10	0.16	0.60
Uniform Delay, d1	33.7		9.1	9.5	9.9	0.0
Progression Factor	0.29		1.36	1.43	0.78	1.00
Incremental Delay, d2	2.7		0.0	0.2	0.2	1.1
Delay (s)	12.6		12.4	13.8	8.0	1.1
Level of Service	B		B	B	A	A
Approach Delay (s)	12.6			13.7	2.2	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	5.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NWL	NWR
Lane Configurations						
Volume (vph)	758	775	0	969	992	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	5.0	
Lane Util. Factor	0.95	1.00		0.95	0.97	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3539	1540		3539	3433	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3539	1540		3539	3433	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	824	842	0	1053	1078	0
RTOR Reduction (vph)	0	486	0	0	0	0
Lane Group Flow (vph)	824	356	0	1053	1078	0
Confl. Peds. (#/hr)		10	10		10	10
Turn Type		Perm				
Protected Phases	1			1	2	
Permitted Phases		1				
Actuated Green, G (s)	46.5	46.5		46.5	54.0	
Effective Green, g (s)	46.5	46.5		46.5	54.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.49	
Clearance Time (s)	4.5	4.5		4.5	5.0	
Vehicle Extension (s)	4.0	4.0		4.0	2.0	
Lane Grp Cap (vph)	1496	651		1496	1685	
v/s Ratio Prot	0.23			c0.30	c0.31	
v/s Ratio Perm		0.23				
v/c Ratio	0.55	0.55		0.70	0.64	
Uniform Delay, d1	23.9	23.8		26.1	20.8	
Progression Factor	0.49	4.13		0.79	0.73	
Incremental Delay, d2	0.5	1.0		1.4	1.4	
Delay (s)	12.3	99.4		22.0	16.6	
Level of Service	B	F		C	B	
Approach Delay (s)	56.3			22.0	16.6	
Approach LOS	E			C	B	

Intersection Summary			
HCM Average Control Delay	35.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.5
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	182	1311	1651	309	223	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	
Frpb, ped/bikes	1.00	1.00	1.00	0.95	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.99	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1770	3539	3539	1498	3399	
Flt Permitted	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	1770	3539	3539	1498	3399	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	198	1425	1795	336	242	22
RTOR Reduction (vph)	0	0	0	128	7	0
Lane Group Flow (vph)	198	1425	1795	208	257	0
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Prot			Perm		
Protected Phases	1	6	2		8	
Permitted Phases				2		
Actuated Green, G (s)	15.4	87.4	68.0	68.0	13.6	
Effective Green, g (s)	15.4	87.4	68.0	68.0	13.6	
Actuated g/C Ratio	0.14	0.79	0.62	0.62	0.12	
Clearance Time (s)	4.0	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	1.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	248	2812	2188	926	420	
v/s Ratio Prot	c0.11	0.40	c0.51		c0.08	
v/s Ratio Perm				0.14		
v/c Ratio	0.80	0.51	0.82	0.22	0.61	
Uniform Delay, d1	45.8	3.9	16.3	9.3	45.7	
Progression Factor	0.74	2.08	0.79	1.17	1.00	
Incremental Delay, d2	11.1	0.5	2.8	0.4	1.9	
Delay (s)	44.9	8.5	15.7	11.3	47.6	
Level of Service	D	A	B	B	D	
Approach Delay (s)		13.0	15.0		47.6	
Approach LOS		B	B		D	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	1460	10	24	1630	10	10	20	21	11	20	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97		1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		0.99	1.00
Frt	1.00	1.00		1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00		0.98	1.00
Satd. Flow (prot)	1770	3534		1770	3535			1822	1535		1819	1536
Flt Permitted	0.06	1.00		0.08	1.00			0.94	1.00		0.93	1.00
Satd. Flow (perm)	110	3534		152	3535			1740	1535		1729	1536
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	1587	11	26	1772	11	11	22	23	12	22	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	17	0	0	8
Lane Group Flow (vph)	11	1598	0	26	1783	0	0	33	6	0	34	3
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Turn Type	pm+pt			pm+pt			Perm		Perm	Perm		Perm
Protected Phases	3!	4!		7!	8!			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	68.1	67.5		68.1	66.9			29.4	29.4		29.4	29.4
Effective Green, g (s)	68.1	67.5		68.1	66.9			29.4	29.4		29.4	29.4
Actuated g/C Ratio	0.62	0.61		0.62	0.61			0.27	0.27		0.27	0.27
Clearance Time (s)	4.0	4.5		4.0	4.5			4.0	4.0		4.0	4.0
Vehicle Extension (s)	1.0	2.0		1.0	2.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	77	2169		112	2150			465	410		462	411
v/s Ratio Prot	0.00	0.45		c0.00	c0.50							
v/s Ratio Perm	0.09			0.14				0.02	0.00		c0.02	0.00
v/c Ratio	0.14	0.74		0.23	0.83			0.07	0.01		0.07	0.01
Uniform Delay, d1	16.8	15.0		13.3	17.0			30.1	29.6		30.1	29.6
Progression Factor	1.06	1.56		0.51	0.38			1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.9		0.2	1.5			0.3	0.1		0.3	0.0
Delay (s)	17.9	24.2		7.0	7.9			30.4	29.7		30.4	29.6
Level of Service	B	C		A	A			C	C		C	C
Approach Delay (s)		24.2			7.9			30.1			30.2	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	100.0%	ICU Level of Service	F
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	1403	14	45	1540	64	13	15	16	65	18	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5			4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.97		1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		0.99	1.00
Frt	1.00	1.00		1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00		0.96	1.00
Satd. Flow (prot)	1770	3532		1770	3514			1809	1541		1773	1541
Flt Permitted	0.07	1.00		0.11	1.00			0.90	1.00		0.78	1.00
Satd. Flow (perm)	130	3532		196	3514			1660	1541		1437	1541
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	17	1525	15	49	1674	70	14	16	17	71	20	64
RTOR Reduction (vph)	0	1	0	0	3	0	0	0	12	0	0	29
Lane Group Flow (vph)	17	1539	0	49	1741	0	0	30	5	0	91	35
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm		Perm	Perm		Perm
Protected Phases		8			4			6			6	
Permitted Phases	8			4			6		6	6		6
Actuated Green, G (s)	72.2	72.2		72.2	72.2			29.3	29.3		29.3	29.3
Effective Green, g (s)	72.2	72.2		72.2	72.2			29.3	29.3		29.3	29.3
Actuated g/C Ratio	0.66	0.66		0.66	0.66			0.27	0.27		0.27	0.27
Clearance Time (s)	4.5	4.5		4.5	4.5			4.0	4.0		4.0	4.0
Vehicle Extension (s)	5.0	5.0		5.0	5.0			2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	85	2318		129	2306			442	410		383	410
v/s Ratio Prot		0.44			c0.50							
v/s Ratio Perm	0.13			0.25				0.02	0.00		c0.06	0.02
v/c Ratio	0.20	0.66		0.38	0.75			0.07	0.01		0.24	0.09
Uniform Delay, d1	7.5	11.5		8.7	12.9			30.1	29.7		31.6	30.3
Progression Factor	0.85	0.57		0.01	0.09			1.00	1.00		1.00	1.00
Incremental Delay, d2	1.4	0.5		2.2	1.0			0.3	0.0		1.5	0.4
Delay (s)	7.7	7.1		2.3	2.1			30.4	29.7		33.1	30.7
Level of Service	A	A		A	A			C	C		C	C
Approach Delay (s)		7.2			2.1			30.2			32.1	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.5
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	193	1261	80	219	1200	192	143	245	103	69	203	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5	4.5	4.0	4.5	4.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.97	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3498		1770	3442		1766	1863	1542	1765	1863	1541
Flt Permitted	0.95	1.00		0.95	1.00		0.28	1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)	1770	3498		1770	3442		528	1863	1542	647	1863	1541
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	210	1371	87	238	1304	209	155	266	112	75	221	91
RTOR Reduction (vph)	0	4	0	0	11	0	0	0	90	0	0	76
Lane Group Flow (vph)	210	1454	0	238	1502	0	155	266	22	75	221	15
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			pm+pt		Perm	pm+pt		Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)	15.3	51.9		17.2	53.8		27.2	21.5	21.5	20.6	18.2	18.2
Effective Green, g (s)	15.3	51.9		17.2	53.8		27.2	21.5	21.5	20.6	18.2	18.2
Actuated g/C Ratio	0.14	0.47		0.16	0.49		0.25	0.20	0.20	0.19	0.17	0.17
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5	4.5	4.0	4.5	4.5
Vehicle Extension (s)	1.0	4.0		1.0	4.0		1.0	2.0	2.0	1.0	2.0	2.0
Lane Grp Cap (vph)	246	1650		277	1683		195	364	301	146	308	255
v/s Ratio Prot	0.12	0.42		c0.13	c0.44		c0.04	0.14		0.01	0.12	
v/s Ratio Perm							c0.16		0.01	0.09		0.01
v/c Ratio	0.85	0.88		0.86	0.89		0.79	0.73	0.07	0.51	0.72	0.06
Uniform Delay, d1	46.3	26.3		45.2	25.5		37.9	41.5	36.1	41.0	43.5	38.7
Progression Factor	0.83	1.23		1.33	0.28		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.6	5.6		16.3	5.6		18.5	6.4	0.0	1.3	6.5	0.0
Delay (s)	57.1	37.9		76.4	12.9		56.4	47.9	36.2	42.2	50.0	38.7
Level of Service	E	D		E	B		E	D	D	D	D	D
Approach Delay (s)		40.3			21.5			47.9			45.8	
Approach LOS		D			C			D			D	

Intersection Summary				
HCM Average Control Delay	34.1	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0	
Intersection Capacity Utilization	85.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	186	1261	54	73	1138	218	44	67	80	194	82	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.92		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3514		1770	3439		1754	3204		1749	3175	
Flt Permitted	0.95	1.00		0.95	1.00		0.57	1.00		0.65	1.00	
Satd. Flow (perm)	1770	3514		1770	3439		1054	3204		1198	3175	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	202	1371	59	79	1237	237	48	73	87	211	89	132
RTOR Reduction (vph)	0	2	0	0	13	0	0	69	0	0	105	0
Lane Group Flow (vph)	202	1428	0	79	1461	0	48	91	0	211	116	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	14.6	67.6		7.0	60.0		22.4	22.4		22.4	22.4	
Effective Green, g (s)	14.6	67.6		7.0	60.0		22.4	22.4		22.4	22.4	
Actuated g/C Ratio	0.13	0.61		0.06	0.55		0.20	0.20		0.20	0.20	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	1.0	4.0		1.0	4.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	235	2160		113	1876		215	652		244	647	
v/s Ratio Prot	c0.11	0.41		0.04	c0.42			0.03			0.04	
v/s Ratio Perm							0.05			c0.18		
v/c Ratio	0.86	0.66		0.70	0.78		0.22	0.14		0.86	0.18	
Uniform Delay, d1	46.7	13.8		50.5	19.8		36.5	35.9		42.3	36.2	
Progression Factor	1.11	0.81		1.06	0.42		1.00	1.00		1.00	1.00	
Incremental Delay, d2	19.5	1.2		7.7	1.7		0.2	0.0		25.0	0.0	
Delay (s)	71.3	12.4		61.3	10.1		36.7	35.9		67.3	36.2	
Level of Service	E	B		E	B		D	D		E	D	
Approach Delay (s)		19.7			12.7			36.1			51.4	
Approach LOS		B			B			D			D	

Intersection Summary				
HCM Average Control Delay	21.3	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.81			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0	
Intersection Capacity Utilization	84.4%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	55	1370	1238	65	85	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0		5.5	
Lane Util. Factor		0.95	0.95		1.00	
Frpb, ped/bikes		1.00	1.00		0.99	
Flpb, ped/bikes		1.00	1.00		1.00	
Frt		1.00	0.99		0.96	
Flt Protected		1.00	1.00		0.97	
Satd. Flow (prot)		3532	3508		1714	
Flt Permitted		0.79	1.00		0.97	
Satd. Flow (perm)		2799	3508		1714	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	60	1489	1346	71	92	38
RTOR Reduction (vph)	0	0	3	0	15	0
Lane Group Flow (vph)	0	1549	1414	0	115	0
Confl. Peds. (#/hr)	10			10	10	10
Turn Type	Perm					
Protected Phases		1	1		2	
Permitted Phases	1					
Actuated Green, G (s)		87.0	87.0		12.5	
Effective Green, g (s)		87.0	87.0		12.5	
Actuated g/C Ratio		0.79	0.79		0.11	
Clearance Time (s)		5.0	5.0		5.5	
Vehicle Extension (s)		2.0	2.0		2.0	
Lane Grp Cap (vph)		2214	2775		195	
v/s Ratio Prot			0.40		c0.07	
v/s Ratio Perm		c0.55				
v/c Ratio		0.70	0.51		0.59	
Uniform Delay, d1		5.4	4.0		46.3	
Progression Factor		0.59	0.75		1.00	
Incremental Delay, d2		1.2	0.5		2.9	
Delay (s)		4.4	3.5		49.2	
Level of Service		A	A		D	
Approach Delay (s)		4.4	3.5		49.2	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	10.5
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	1201	131	292	967	14	134	38	267	31	31	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00	0.96	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00	1.00	0.98	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3467		1770	3529		1731	1863	1528	1730	1758	
Flt Permitted	0.95	1.00		0.95	1.00		0.73	1.00	1.00	0.73	1.00	
Satd. Flow (perm)	1770	3467		1770	3529		1321	1863	1528	1330	1758	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	23	1305	142	317	1051	15	146	41	290	34	34	15
RTOR Reduction (vph)	0	7	0	0	1	0	0	0	244	0	13	0
Lane Group Flow (vph)	23	1440	0	317	1065	0	146	41	46	34	36	0
Confl. Peds. (#/hr)	15		15	15		15	15		15	15		15
Turn Type	custom			custom			Perm		Perm	Perm		
Protected Phases	3	8		7	4			2			6	
Permitted Phases	3			7			2		2	6		
Actuated Green, G (s)	2.0	57.5		22.2	77.7		17.3	17.3	17.3	17.3	17.3	
Effective Green, g (s)	2.0	57.5		22.2	77.7		17.3	17.3	17.3	17.3	17.3	
Actuated g/C Ratio	0.02	0.52		0.20	0.71		0.16	0.16	0.16	0.16	0.16	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.0	4.0		2.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Grp Cap (vph)	32	1812		357	2493		208	293	240	209	276	
v/s Ratio Prot	0.01	c0.42		c0.18	0.30			0.02			0.02	
v/s Ratio Perm							c0.11		0.03	0.03		
v/c Ratio	0.72	0.79		0.89	0.43		0.70	0.14	0.19	0.16	0.13	
Uniform Delay, d1	53.7	21.4		42.7	6.8		43.9	39.9	40.3	40.1	39.9	
Progression Factor	1.00	1.00		1.10	0.50		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	48.0	3.7		19.7	0.5		10.9	0.3	0.5	0.5	0.3	
Delay (s)	101.7	25.1		66.5	3.9		54.8	40.2	40.8	40.6	40.2	
Level of Service	F	C		E	A		D	D	D	D	D	
Approach Delay (s)		26.3			18.3			45.0			40.3	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	26.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	80.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	49	34	123	62	68	75	229	240	61	167	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.98		1.00	0.98		1.00	0.98		1.00	1.00	
Flpb, ped/bikes		1.00		0.98	1.00		0.98	1.00		0.99	1.00	
Frt		0.95		1.00	0.92		1.00	0.92		1.00	0.99	
Flt Protected		1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1729		1737	1674		1726	1680		1750	1845	
Flt Permitted		0.98		0.61	1.00		0.64	1.00		0.45	1.00	
Satd. Flow (perm)		1695		1110	1674		1158	1680		820	1845	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	53	37	134	67	74	82	249	261	66	182	9
RTOR Reduction (vph)	0	25	0	0	44	0	0	20	0	0	1	0
Lane Group Flow (vph)	0	72	0	134	97	0	82	490	0	66	190	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		8			4			2			6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)		16.1		16.1	16.1		84.9	84.9		84.9	84.9	
Effective Green, g (s)		16.1		16.1	16.1		84.9	84.9		84.9	84.9	
Actuated g/C Ratio		0.15		0.15	0.15		0.77	0.77		0.77	0.77	
Clearance Time (s)		4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)		2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)		248		162	245		894	1297		633	1424	
v/s Ratio Prot					0.06			c0.29			0.10	
v/s Ratio Perm		0.04		c0.12			0.07			0.08		
v/c Ratio		0.29		0.83	0.39		0.09	0.38		0.10	0.13	
Uniform Delay, d1		41.9		45.6	42.5		3.1	4.0		3.1	3.2	
Progression Factor		1.00		0.95	0.91		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2		26.6	0.4		0.2	0.8		0.3	0.2	
Delay (s)		42.1		69.8	39.3		3.3	4.9		3.4	3.4	
Level of Service		D		E	D		A	A		A	A	
Approach Delay (s)		42.1			54.2			4.7			3.4	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	276	19	33	190	15	3	73	20	14	51	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.5			4.5			4.5			4.5	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		1.00			1.00			0.99			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.97			0.98	
Flt Protected		1.00			0.99			1.00			0.99	
Satd. Flow (prot)		1833			1825			1789			1801	
Flt Permitted		0.97			0.92			0.99			0.93	
Satd. Flow (perm)		1782			1695			1778			1686	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	25	300	21	36	207	16	3	79	22	15	55	9
RTOR Reduction (vph)	0	1	0	0	1	0	0	12	0	0	5	0
Lane Group Flow (vph)	0	345	0	0	258	0	0	92	0	0	74	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		88.6			88.6			12.4			12.4	
Effective Green, g (s)		88.6			88.6			12.4			12.4	
Actuated g/C Ratio		0.81			0.81			0.11			0.11	
Clearance Time (s)		4.5			4.5			4.5			4.5	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		1435			1365			200			190	
v/s Ratio Prot												
v/s Ratio Perm		c0.19			0.15			c0.05			0.04	
v/c Ratio		0.24			0.19			0.46			0.39	
Uniform Delay, d1		2.6			2.5			45.7			45.3	
Progression Factor		0.74			1.00			1.00			1.00	
Incremental Delay, d2		0.4			0.3			0.6			0.5	
Delay (s)		2.3			2.8			46.3			45.8	
Level of Service		A			A			D			D	
Approach Delay (s)		2.3			2.8			46.3			45.8	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	41.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	884	38	83	949	136	34	174	37	200	126	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.97	1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00	1.00	0.99	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3511		1770	3455		1752	1863	1541	1752	1773	
Flt Permitted	0.95	1.00		0.95	1.00		0.52	1.00	1.00	0.52	1.00	
Satd. Flow (perm)	1770	3511		1770	3455		950	1863	1541	950	1773	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	961	41	90	1032	148	37	189	40	217	137	52
RTOR Reduction (vph)	0	2	0	0	8	0	0	0	30	0	14	0
Lane Group Flow (vph)	40	1000	0	90	1172	0	37	189	10	217	175	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot			Prot			Perm		Perm	Perm		
Protected Phases	1	6		5	2			8			4	
Permitted Phases							8		8	4		
Actuated Green, G (s)	4.2	61.8		8.1	65.7		27.1	27.1	27.1	27.1	27.1	
Effective Green, g (s)	4.2	61.8		8.1	65.7		27.1	27.1	27.1	27.1	27.1	
Actuated g/C Ratio	0.04	0.56		0.07	0.60		0.25	0.25	0.25	0.25	0.25	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	1.0	4.0		1.0	4.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	68	1973		130	2064		234	459	380	234	437	
v/s Ratio Prot	0.02	0.28		c0.05	c0.34			0.10			0.10	
v/s Ratio Perm							0.04		0.01	c0.23		
v/c Ratio	0.59	0.51		0.69	0.57		0.16	0.41	0.03	0.93	0.40	
Uniform Delay, d1	52.0	14.8		49.7	13.5		32.5	34.8	31.4	40.5	34.7	
Progression Factor	0.85	0.83		1.01	0.61		0.68	0.82	0.34	1.11	1.14	
Incremental Delay, d2	7.7	0.9		10.9	1.0		0.1	0.2	0.0	37.5	0.2	
Delay (s)	52.1	13.2		61.4	9.3		22.1	28.6	10.7	82.6	39.7	
Level of Service	D	B		E	A		C	C	B	F	D	
Approach Delay (s)		14.6			13.0			25.0			62.6	
Approach LOS		B			B			C			E	

Intersection Summary			
HCM Average Control Delay	21.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	114	112	13	122	114	53	48	855	55	31	977	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	0.99	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	0.95		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1747	1828		1744	1756		1761	3497		1770	3460	
Flt Permitted	0.44	1.00		0.56	1.00		0.23	1.00		0.95	1.00	
Satd. Flow (perm)	817	1828		1035	1756		425	3497		1770	3460	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	124	122	14	133	124	58	52	929	60	34	1062	137
RTOR Reduction (vph)	0	4	0	0	18	0	0	3	0	0	6	0
Lane Group Flow (vph)	124	132	0	133	164	0	52	986	0	34	1193	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases		8			4			6		5	2	
Permitted Phases	8			4			6					
Actuated Green, G (s)	18.7	18.7		18.7	18.7		73.7	73.7		4.6	82.3	
Effective Green, g (s)	18.7	18.7		18.7	18.7		73.7	73.7		4.6	82.3	
Actuated g/C Ratio	0.17	0.17		0.17	0.17		0.67	0.67		0.04	0.75	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.0	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		2.0	5.0	
Lane Grp Cap (vph)	139	311		176	299		285	2343		74	2589	
v/s Ratio Prot		0.07			0.09			0.28		0.02	c0.34	
v/s Ratio Perm	c0.15			0.13			0.12					
v/c Ratio	0.89	0.42		0.76	0.55		0.18	0.42		0.46	0.46	
Uniform Delay, d1	44.7	40.8		43.5	41.8		6.8	8.3		51.5	5.3	
Progression Factor	0.84	0.81		1.00	1.00		1.40	1.54		1.30	0.23	
Incremental Delay, d2	45.1	0.9		16.7	2.0		1.3	0.5		1.3	0.2	
Delay (s)	82.5	34.1		60.2	43.8		10.9	13.4		68.4	1.4	
Level of Service	F	C		E	D		B	B		E	A	
Approach Delay (s)		57.1			50.7			13.3			3.3	
Approach LOS		E			D			B			A	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	78	429	49	92	322	45	84	144	104	91	155	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5		4.0	4.5		4.0	4.5	4.5	4.0	4.5	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00	0.97	1.00	0.99	
Flpb, ped/bikes	0.99	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1758	3469		1762	3456		1764	1863	1542	1762	1772	
Flt Permitted	0.51	1.00		0.41	1.00		0.37	1.00	1.00	0.47	1.00	
Satd. Flow (perm)	946	3469		764	3456		681	1863	1542	867	1772	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	85	466	53	100	350	49	91	157	113	99	168	65
RTOR Reduction (vph)	0	6	0	0	7	0	0	0	94	0	15	0
Lane Group Flow (vph)	85	513	0	100	392	0	91	157	19	99	218	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)	64.1	58.3		67.1	59.8		25.9	18.4	18.4	28.9	19.9	
Effective Green, g (s)	64.1	58.3		67.1	59.8		25.9	18.4	18.4	28.9	19.9	
Actuated g/C Ratio	0.58	0.53		0.61	0.54		0.24	0.17	0.17	0.26	0.18	
Clearance Time (s)	4.0	4.5		4.0	4.5		4.0	4.5	4.5	4.0	4.5	
Vehicle Extension (s)	2.0	2.5		2.0	2.5		2.0	2.5	2.5	2.0	2.5	
Lane Grp Cap (vph)	594	1839		532	1879		234	312	258	301	321	
v/s Ratio Prot	0.01	c0.15		c0.01	0.11		0.03	0.08		c0.03	c0.12	
v/s Ratio Perm	0.08			0.10			0.06		0.01	0.06		
v/c Ratio	0.14	0.28		0.19	0.21		0.39	0.50	0.07	0.33	0.68	
Uniform Delay, d1	10.1	14.3		9.1	12.9		34.2	41.6	38.6	31.8	42.1	
Progression Factor	0.67	0.58		0.58	0.63		1.00	1.00	1.00	0.78	0.84	
Incremental Delay, d2	0.0	0.3		0.1	0.2		0.4	0.9	0.1	0.2	5.1	
Delay (s)	6.8	8.6		5.3	8.4		34.6	42.6	38.7	24.9	40.4	
Level of Service	A	A		A	A		C	D	D	C	D	
Approach Delay (s)		8.3			7.8			39.3			35.8	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	19.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.5
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	4	687	64	212	728	243	265	223	0	246	250	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		4.0	5.0	5.0	6.0	6.0		5.0	5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95		0.91	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (prot)	1770	3484		1770	3539	1583	1770	3539		1610	3318	
Flt Permitted	0.19	1.00		0.95	1.00	1.00	0.95	1.00		0.95	0.99	
Satd. Flow (perm)	347	3484		1770	3539	1583	1770	3539		1610	3318	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	4	747	70	230	791	264	288	242	0	267	272	23
RTOR Reduction (vph)	0	6	0	0	0	105	0	0	0	0	4	0
Lane Group Flow (vph)	4	811	0	230	791	159	288	242	0	184	374	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Prot		custom	Split			Split		
Protected Phases		2		1	2	4 6	3	3		4	4	
Permitted Phases	2	2										
Actuated Green, G (s)	36.4	36.4		17.1	36.4	66.1	19.9	19.9		16.6	16.6	
Effective Green, g (s)	36.4	36.4		17.1	36.4	66.1	19.9	19.9		16.6	16.6	
Actuated g/C Ratio	0.33	0.33		0.16	0.33	0.60	0.18	0.18		0.15	0.15	
Clearance Time (s)	5.0	5.0		4.0	5.0		6.0	6.0		5.0	5.0	
Vehicle Extension (s)	4.0	4.0		1.0	4.0		2.0	2.0		1.0	1.0	
Lane Grp Cap (vph)	115	1153		275	1171	951	320	640		243	501	
v/s Ratio Prot		c0.23		c0.13	0.22	0.10	c0.16	0.07		c0.11	0.11	
v/s Ratio Perm	0.01											
v/c Ratio	0.03	0.70		0.84	0.68	0.17	0.90	0.38		0.76	0.75	
Uniform Delay, d1	24.9	32.1		45.1	31.7	9.7	44.1	39.6		44.8	44.7	
Progression Factor	0.61	0.69		1.04	0.59	2.75	1.00	1.00		0.75	0.76	
Incremental Delay, d2	0.5	3.3		14.8	2.4	0.0	26.2	0.1		10.7	5.0	
Delay (s)	15.8	25.4		61.8	21.1	26.8	70.3	39.7		44.4	38.8	
Level of Service	B	C		E	C	C	E	D		D	D	
Approach Delay (s)		25.3			29.6			56.4			40.6	
Approach LOS		C			C			E			D	

Intersection Summary			
HCM Average Control Delay	34.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	115	137	55	131	51	123	1107	30	13	1097	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1863	1544	1770	1863	1544	1770	3521		1770	3495	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1770	1863	1544	1770	1863	1544	1770	3521		1770	3495	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	125	149	60	142	55	134	1203	33	14	1192	84
RTOR Reduction (vph)	0	0	107	0	0	41	0	2	0	0	5	0
Lane Group Flow (vph)	98	125	42	60	142	14	134	1234	0	14	1271	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases			2			6						
Actuated Green, G (s)	8.3	30.7	30.7	6.0	28.4	28.4	10.3	53.9		2.4	46.0	
Effective Green, g (s)	8.3	30.7	30.7	6.0	28.4	28.4	10.3	53.9		2.4	46.0	
Actuated g/C Ratio	0.08	0.28	0.28	0.05	0.26	0.26	0.09	0.49		0.02	0.42	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5		4.0	4.5	
Vehicle Extension (s)	1.5	2.0	2.0	1.5	2.0	2.0	1.5	2.0		1.5	2.0	
Lane Grp Cap (vph)	134	520	431	97	481	399	166	1725		39	1462	
v/s Ratio Prot	c0.06	0.07		0.03	c0.08		c0.08	0.35		0.01	c0.36	
v/s Ratio Perm			0.03			0.01						
v/c Ratio	0.73	0.24	0.10	0.62	0.30	0.04	0.81	0.72		0.36	0.87	
Uniform Delay, d1	49.8	30.6	29.4	50.9	32.8	30.5	48.9	22.0		53.0	29.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.10	0.58	
Incremental Delay, d2	16.1	1.1	0.4	8.0	1.6	0.2	23.0	1.2		1.8	4.9	
Delay (s)	65.9	31.7	29.8	58.9	34.3	30.7	71.9	23.2		60.2	21.7	
Level of Service	E	C	C	E	C	C	E	C		E	C	
Approach Delay (s)		40.0			39.3			28.0			22.2	
Approach LOS		D			D			C			C	

Intersection Summary				
HCM Average Control Delay	27.9	HCM Level of Service	C	
HCM Volume to Capacity ratio	0.67			
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0	
Intersection Capacity Utilization	79.7%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	36	0	31	29	252	0	60	10	261	30	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5	4.5		4.5			4.5	
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Frpb, ped/bikes	1.00	1.00			1.00	0.99		0.99			1.00	
Flpb, ped/bikes	0.99	1.00			0.99	1.00		1.00			1.00	
Frt	1.00	1.00			1.00	0.85		0.98			0.99	
Flt Protected	0.95	1.00			0.97	1.00		1.00			0.96	
Satd. Flow (prot)	1743	1863			1801	1573		1817			1768	
Flt Permitted	0.78	1.00			0.82	1.00		1.00			0.96	
Satd. Flow (perm)	1439	1863			1510	1573		1817			1768	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	39	0	34	32	274	0	65	11	284	33	22
RTOR Reduction (vph)	0	0	0	0	0	111	0	10	0	0	3	0
Lane Group Flow (vph)	5	39	0	0	66	163	0	66	0	0	336	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm		pm+ov	Split			Split		
Protected Phases		2			6	4	8	8		4	4	
Permitted Phases	2			6		6						
Actuated Green, G (s)	5.1	5.1			5.1	27.4		5.1			22.3	
Effective Green, g (s)	5.1	5.1			5.1	27.4		5.1			22.3	
Actuated g/C Ratio	0.11	0.11			0.11	0.60		0.11			0.48	
Clearance Time (s)	4.5	4.5			4.5	4.5		4.5			4.5	
Vehicle Extension (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)	160	207			167	1091		201			857	
v/s Ratio Prot		0.02				0.07		c0.04			c0.19	
v/s Ratio Perm	0.00				c0.04	0.03						
v/c Ratio	0.03	0.19			0.40	0.15		0.33			0.39	
Uniform Delay, d1	18.2	18.6			19.0	4.1		18.9			7.5	
Progression Factor	1.00	1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2	0.1	0.6			2.1	0.1		1.3			0.4	
Delay (s)	18.4	19.2			21.1	4.2		20.2			7.9	
Level of Service	B	B			C	A		C			A	
Approach Delay (s)		19.1			7.5			20.2			7.9	
Approach LOS		B			A			C			A	

Intersection Summary				
HCM Average Control Delay	9.5	HCM Level of Service	A	
HCM Volume to Capacity ratio	0.38			
Actuated Cycle Length (s)	46.0	Sum of lost time (s)	13.5	
Intersection Capacity Utilization	44.3%	ICU Level of Service	A	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Right Turn Channelized						
Volume (veh/h)	127	279	157	132	96	117
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	138	303	171	143	104	127
Approach Volume (veh/h)		441	314		232	
Crossing Volume (veh/h)		104	138		171	
High Capacity (veh/h)		1276	1243		1212	
High v/c (veh/h)		0.35	0.25		0.19	
Low Capacity (veh/h)		1063	1033		1004	
Low v/c (veh/h)		0.42	0.30		0.23	

Intersection Summary			
Maximum v/c High	0.35		
Maximum v/c Low	0.42		
Intersection Capacity Utilization	61.7%	ICU Level of Service	B

Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL2	SEL	SER
Lane Configurations												
Volume (vph)	6	0	47	4	724	3	58	418	122	96	0	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00			1.00	0.95		1.00	0.95			1.00	
Frpb, ped/bikes	0.98			1.00	1.00		1.00	0.99			1.00	
Flpb, ped/bikes	1.00			1.00	1.00		1.00	1.00			0.99	
Frt	0.88			1.00	1.00		1.00	0.97			1.00	
Flt Protected	0.99			0.95	1.00		0.95	1.00			0.95	
Satd. Flow (prot)	1605			1762	3537		1770	3396			1757	
Flt Permitted	0.95			0.95	1.00		0.95	1.00			0.95	
Satd. Flow (perm)	1528			1762	3537		1770	3396			1757	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	7	0	51	4	787	3	63	454	133	104	0	4
RTOR Reduction (vph)	45	0	0	0	1	0	0	43	0	0	4	0
Lane Group Flow (vph)	13	0	0	4	789	0	63	544	0	0	104	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type				Prot			Prot			Perm		
Protected Phases				5	2		1	6			4	
Permitted Phases	8									4		
Actuated Green, G (s)	3.9			0.5	14.7		1.5	15.7			3.9	
Effective Green, g (s)	3.9			0.5	14.7		1.5	15.7			3.9	
Actuated g/C Ratio	0.12			0.02	0.46		0.05	0.49			0.12	
Clearance Time (s)	4.0			4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0			3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	186			27	1620		83	1661			213	
v/s Ratio Prot				0.00	c0.22		c0.04	0.16				
v/s Ratio Perm	0.01										0.06	
v/c Ratio	0.07			0.15	0.49		0.76	0.33			0.49	
Uniform Delay, d1	12.5			15.6	6.1		15.1	5.0			13.2	
Progression Factor	1.00			1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.2			2.5	0.2		32.1	0.1			1.8	
Delay (s)	12.7			18.1	6.3		47.3	5.1			14.9	
Level of Service	B			B	A		D	A			B	
Approach Delay (s)	12.7				6.4			9.2			14.9	
Approach LOS	B				A			A			B	

Intersection Summary			
HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	32.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	37	979	23	12	453	15	25	10	5	30	10	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	0.98	1.00		0.99	1.00		0.98	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1741	3523		1758	3517		1742	1760		1742	1606	
Flt Permitted	0.47	1.00		0.25	1.00		0.72	1.00		0.75	1.00	
Satd. Flow (perm)	852	3523		467	3517		1326	1760		1370	1606	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	40	1064	25	13	492	16	27	11	5	33	11	41
RTOR Reduction (vph)	0	1	0	0	1	0	0	5	0	0	38	0
Lane Group Flow (vph)	40	1088	0	13	507	0	27	11	0	33	14	0
Confl. Peds. (#/hr)	10		10	10		10	10		10	10		10
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	91.9	91.9		91.9	91.9		9.1	9.1		9.1	9.1	
Effective Green, g (s)	91.9	91.9		91.9	91.9		9.1	9.1		9.1	9.1	
Actuated g/C Ratio	0.84	0.84		0.84	0.84		0.08	0.08		0.08	0.08	
Clearance Time (s)	5.0	5.0		5.0	5.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	4.0	4.0		4.0	4.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	712	2943		390	2938		110	146		113	133	
v/s Ratio Prot		c0.31			0.14			0.01			0.01	
v/s Ratio Perm	0.05			0.03			0.02			c0.02		
v/c Ratio	0.06	0.37		0.03	0.17		0.25	0.08		0.29	0.11	
Uniform Delay, d1	1.6	2.2		1.5	1.7		47.2	46.6		47.4	46.7	
Progression Factor	0.78	0.72		1.86	1.98		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.3		0.1	0.1		1.2	0.2		1.4	0.4	
Delay (s)	1.4	1.9		3.0	3.6		48.4	46.8		48.9	47.1	
Level of Service	A	A		A	A		D	D		D	D	
Approach Delay (s)		1.9			3.5			47.8			47.8	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

8.0 PUBLIC SERVICES

8.1 Introduction

~~As a new city with many start-up responsibilities, the City did not take on direct provision of the majority of public services within Lakewood. Police and fire services were initially provided by contract with the Pierce County Sheriff's Office and Lakewood Fire District #2, respectively, while other services traditionally held by other entities continue to be provided in that fashion. As the City undertakes its 2004 comprehensive plan review, Lakewood is in the process of taking its police services in-house. This is being accomplished on a short timeline and without a great deal of advance planning due to the circumstances involving contract renewal and costs with the County that led to the City's decision to begin its own department. In subsequent years, both the police services section of this chapter and the capital facilities chapter are likely to see additional amendments as an outcome of this action. However, since emphasis is being placed on actual department organization, staffing, facilities, and other aspects of start-up at this time, revisiting of strategic functions and long-range goals and policies were not undertaken as part of the 2004 review.~~

The City of Lakewood is not a full-service city. This circumstance stems from Lakewood being an unincorporated community of Pierce County up until 1996. Many public services were provided by Pierce County, the City of Tacoma, special service districts, a utility co-op (Lakeview Light and Power), and a private utility company (Puget Sound Energy). A number of these entities still provide services to Lakewood.

Since incorporation, some public services are now provided by the City of Lakewood. The table below provides information on the services the City provides, and the services provided by other public agencies and one private company.

Table 8.1
Public Service Providers

Public Service	**Provider**
General Administrative Services	City of Lakewood
Police	City of Lakewood
Public Works	City of Lakewood
Stormwater	City of Lakewood
Refuse	Waste Connections (under contract with the City of Lakewood)
Fire Protection	West Pierce Fire & Rescue
Emergency Medical Services (EMS)	West Pierce Fire & Rescue
Emergency Management	City of Lakewood
Health & Human Services	City of Lakewood
Housing and Community Development	Tacoma/Lakewood Consortium

Programs	
Schools	Clover Park School District, Pierce College, Clover Park Technical College, & private schools
Library Services	Pierce County Library
Water	Lakewood Water District
Sewer	Pierce County Public Works & Utilities; City of Tacoma provides sewers on Lakewood's northerly edge
Power (electricity & gas)	Tacoma Power, Puget Sound Energy, & Lakeview Light & Power

Many of the utility related services listed in the table are covered in other chapters of Lakewood's Comprehensive Plan, or by other agencies' planning programs. Thus, these services are not addressed in this chapter. This chapter concentrates on the following services: fire protection; emergency medical services; police; emergency management; schools and higher education; library services; health and human services; and housing and community development programs.

The City recognizes the importance of planning for ~~all public services~~ these functions in conjunction with required GMA elements to ensure that growth in the ~~city~~City is coordinated with growth in these services. This is particularly important for schools, both K-12 and post-secondary education, whose enrollment numbers, student populations, and sometimes even course emphases are strongly tied to local growth, but where "disconnects" may easily occur if planning is not coordinated. This chapter interrelates Lakewood's ~~comprehensive plan~~Comprehensive Plan to the functions of Clover Park School District, Pierce College, Clover Park Technical College, the Pierce County Library System, and various ~~providers and community members who comprise the Lakewood Human Services Collaboration. Locations of local schools and fire stations are shown in Figure 8.1.~~human services providers.

In setting goals and policies related to this final group, this chapter also sets forth the City's commitment to its citizens' well~~-~~being through its participation in community-based strategic planning efforts for health and human, and housing and community development services.

8.2 Fire Protection

GOAL PS-1: ~~Support Fire District efforts to protect~~ Protect the community through a comprehensive fire and life safety program.

Policies:

PS-1.1~~.: Achieve standards necessary to maintain~~ : Maintain a Washington Surveying and Rating Bureau ~~—~~(or successor agency) rating of ~~International Standardization Organization (~~ISO~~)~~ Class 3 or better~~, including response distance standards, apparatus, staffing levels, training, water delivery system, and the communication/ dispatch system.~~.

PS-1.2: Install and maintain traffic signal control devices responsive to emergency vehicles.

PS-1.3: Where possible, and mutually beneficial, coordinate land acquisition for emergency services facilities with other ~~-~~departments (e.g., Parks, Public Works, Police) to maximize benefits to the ~~city~~City.

PS-1.4: ~~Examine~~Continue the ~~potential~~utilization of ~~utilizing joint~~the West Pierce Fire & Rescue Fire Marshal and staff to provide fire ~~stations and operation agreements with fire departments of adjoining districts and other emergency responders where~~ and ~~when operationally and fiscally advantageous.~~
life safety inspections of occupancies

~~PS-1.5: Continue the fire inspection program~~ as a means of identifying and remedying potential fire ~~-~~hazards before fires occur.

PS-1.~~6~~5: Educate and inform the public on fire safety and hazardous materials to further protect the ~~-~~community and the environment from unnecessary ~~hazards~~damage.

GOAL PS-2: ~~Coordinate with Lakewood Fire District to ensure~~ Ensure that fire facilities and protective services are provided in conjunction with growth and development.

Policies:

PS-2.1: Periodically evaluate population growth, ~~LOS (~~community risks, emergency response ~~time~~times, apparatus deployment, and staffing~~), and fire hazards~~ levels to ~~-~~identify ~~increased~~future service and ~~facilities~~facility needs.

PS-2.2: ~~Maintain phasing and funding standards based on population, specific time projections, and buildout percentages.~~

~~PS-2.3:~~ Incorporate the fire department ~~input~~ in evaluation of proposed annexations to determine the impact ~~-~~on response standards.

PS-2.~~4~~3: Provide fire station locations, apparatus deployment, and staffing levels that ~~comply with~~support the ~~1.5 mile~~core fire service provisions and response ~~distance standard and/or four-minute response standard,~~time objectives as ~~provided~~approved in ~~the Lakewood Fire Department Master Siting Plan.~~

~~PS-2.5: Facilitate construction of new fire stations to serve underserved high growth areas such as Springbrook and Lakewood Station neighborhoods and equip and staff with fire apparatus and firefighters appropriate to~~Resolution by the ~~land uses served.~~Board of Fire Commissioners.

~~PS-2.6: Identify a need to provide Station # 2-3 with special capacity for industrial response, such as a medical unit.~~

GOAL PS-3: Ensure built-in fire protection for new development and changes or additions to existing construction.

Policies:

PS-3.1: Require all new development to provide minimum fire flow requirements as prescribed in the International ~~Codes~~Fire Code.

PS-3.2: Continue to require that all structures and facilities under City jurisdiction adhere to City, state, and national regulatory standards such as the International Building and Fire Codes and any other applicable fire safety guidelines.

PS-3.3: Require developers to install emergency access control devices to gated communities as approved by the public works director.

PS-~~PS-3.4: Require building sprinklering or other approved measures for new development in areas where response standards cannot be met.~~

~~PS-3.5~~3.4: Consider requiring assessment of a hazardous material impact fee for industrial uses.

8.3 Emergency Medical Services (EMS)

GOAL PS-4: Protect citizens through a comprehensive EMS program that maximizes available resources.

Policies:

PS-4.1: The fire department will serve as the primary and lead Basic Life Support (BLS) and Advanced Life Support (ALS) provider within the city.

PS-4.2: Provide a ~~4~~four-minute initial ~~response~~ time standard for EMS calls.

PS-4.3: Provide fire station~~/EMT~~ locations~~-~~, apparatus deployment, and staffing levels that support the core EMS service ~~providers to determine the role~~provisions and response time objectives as approved in Resolution by the Board of ~~first provider.~~Fire Commissioners.

PS-4.~~5~~4: Maintain ~~a~~ criteria-based dispatch system for determining appropriate levels of response.

PS-4.~~6~~5: Implement citizen ~~cardio-pulmonary resuscitation (~~CPR~~)~~ training programs with existing personnel and resources.

PS-4.~~7~~6: Implement and maintain a local physician ~~control~~advisor program ~~or integrate~~in conjunction with the Pierce County EMS ~~physician control program~~Medical Program Director to ensure the medical quality of emergency medical services.

8.4 Police Service

GOAL PS-5: Protect community members from criminal activity and reduce the incidence of crime in Lakewood.

Policies:

PS-5.1: Provide police protection with a three-minute response time for life-threatening emergencies (Priority 1), a six-minute response time for crimes in progress or just completed (Priority 2), and a routine/non-emergency response time of 20 minutes (Priority 3).

PS-5.2: Maintain a level of police staffing, services, and ~~administration effective~~command that is adequate to serve Lakewood's current needs and future growth.

PS-5.3: Where appropriate, participate in innovative programs and funding strategies to reduce community crime.

GOAL PS-6: Enhance the ability of citizens and the Police Department to minimize crime and provide security for all developed properties and open spaces.

Policies:

PS-6.1: Support and encourage community-based crime-prevention efforts through interaction and coordination with existing neighborhood watch groups, assistance in the formation of new neighborhood watch groups, and regular communication with neighborhood and civic organizations.

~~PS-6.2: Increase participation in the crime-free rental housing program as a means of controlling crime related to rental properties.~~

~~PS-6.3~~PS-6.2: Implement a crime prevention through environmental design program that results in the creation of well-defined and defensible spaces by reviewing such things as proposed developments' demographic settings; intended uses; and landscaping, lighting, and building layout as a means of access control.

PS-6.~~4~~3: Seek ways to involve police with youth education, such as bike safety training, anti-drug courses, "cop in school" program, etc.

8.5 Emergency Management

GOAL PS-7:— Protect the community through a comprehensive emergency management program.

Policies:

~~PS-7.1~~PS-7.1: Adopt and maintain a comprehensive emergency management plan consistent with federal and state requirements.

PS-7.2: Continue to fund and support the emergency management program, ensuring that emergency —management plans, equipment, and services are sufficient for potential disaster response.

~~PS-7.2: Provide personnel and resources in Lakewood's Fire, Police, Public Works, Community Development, and Parks and Recreation departments for participation in the preparation or amendment of any emergency management disaster response plans.~~

PS-7.3: Maintain ~~the~~ personnel, resources, and training necessary within all appropriate City departments —to provide the disaster response called for in the emergency management disaster response —plans.

~~PS-7.4: Provide for a unified emergency operations center where all City public service departments will be coordinated in the event of a disaster in accordance with the disaster plan.~~

~~PS-7.5~~PS-7.4: Coordinate with appropriate state agencies when preparing disaster response plans and when —considering floodplain or seismic ordinance standards.

PS-7.~~6~~5: Develop an interagency communications network incorporating all public service agencies within —the ~~city~~City for use during disasters.

PS-7.~~7~~6: Maintain and enhance rescue capabilities that include extrication, trench rescue, water rescue, high-—angle rescue, and urban rescue.

PS-7.~~8~~7: Develop and implement additional public education activities that promote water safety.

8.6 Schools

GOAL PS-8:— Support the maintenance and enhancement of the public education system, placing a strong emphasis on providing quality school facilities that function as focal points for family and community activity.

Policies:

PS-8.1: Support efforts of the school district to ensure that adequate school sites are provided and that the -functional capacity of schools is not exceeded.

PS-8.2: ~~Continue to work~~Work with the school district to ~~maintain its~~prepare/update a master plan for all its facilities and a capital improvement plan.

PS-8.3: Consider the impact on school enrollment and capacities when reviewing new development –proposals, higher density infill projects, zoning changes, and comprehensive plan amendments.

PS-8.4: Require that developers assist in donating or purchasing school sites identified on the facilities map ——in correlation to the demand that their developments will create.

PS-8.5: Ensure that new school sites include room for future expansion if needed.

PS-8.6: Request student generation factors from the school district for the City's use in analyzing the –impact of project proposals on schools.

~~PS-8.7: Continue to coordinate planning efforts with the Clover Park School District.~~

~~PS-8.8: Work with the Clover Park School District to consider authorization of exaction of development impact fees to finance new school facilities.~~

GOAL PS-9:— _Accommodate the maintenance and enhancement of private school opportunities for area students and residents.

Policies:

PS-9.1: Subject to specific regulatory standards, allow existing private schools to expand and new private ——schools to develop.

PS-9.2: Ensure that the comprehensive plan and development standards provide sufficient ———accommodation for the operation and expansion of private school opportunities.

~~PS-9.3: Monitor travel demand at private schools and consider special bus programs to facilitate student and faculty transportation.~~

GOAL PS-10:- _Ensure that both public and private schools are safe and accessible to students, generate a minimal need for busing, and are compatible with and complementary to surrounding neighborhoods.

Policies:

PS-10.1: Prohibit development of public and private schools on sites that present hazards, such as within Accident Potential Zones and industrial zoning districts, nuisances, or other limitations on the —normal functions of schools that are unable to be mitigated.

~~PS-10.2: Follow standardized locational criteria for placement of schools.~~

~~PS-10.3~~PS-10.2: Work with schools and neighborhoods to explore options for access to elementary and secondary schools via local streets and/or paths.

PS-10.~~4~~3: Develop specific regulatory standards to ensure that new residential development located near public schools provides adequate pedestrian and bicycle connections, signage, and traffic control measures where needed to ensure the safety of students traveling between the development and the school.

~~PS-10.5: Require school districts or private schools to meet public~~PS-10.4: Apply improvement responsibilities ~~consistent with other types of developments when~~ to school district or private school operator developing new school sites equivalent to that applied to other types of development.

PS-10.~~6~~5: Retrofit existing neighborhoods with sidewalks, crosswalks, special signage, and other traffic control measures near schools as funding becomes available or as land uses are redeveloped.

PS-10.~~7: Collocate~~6: Co-locate public school grounds and public parks whenever possible.

PS-10.~~8~~7: Encourage as appropriate the school district or private school operator to reduce high school student generated traffic impacts by implementing transportation demand management mechanisms such as limited student parking, public bus routes, and other appropriate tools.

PS-10.~~9~~8: Encourage the school district to continue to make schools available for civic functions when classes are not in session.

PS-10.~~10~~9: Establish limited parking zones around schools where parking capacity problems exist.

~~PS-10.11: Encourage appropriate setbacks, buffers, design measures and truck routing adjacent to the Woodbrook Middle School to buffer the school from excessive noise and air pollution due to industrial redevelopment in the area.~~

PS-10.10: Work with the CPSD to reuse/redevelop surplus school properties with appropriate uses consistent with the Comprehensive Plan.

8.7 Higher Education

GOAL PS-11: Maintain and enhance top-quality institutions of higher education that will meet the changing needs of Lakewood's residents and business community.

Policies:

PS-11.1: Work with colleges to prepare a master plan and policy guide addressing the location of existing and proposed on- and off-site campus structures and uses.

PS-11.2: Require new construction to be subject to requirements of the City's development standards, including adequate fire protection and emergency access, and generally consistent with the master plan.

PS-11.3: Work with colleges to enhance area infrastructure to better serve college facilities, such as improved pedestrian, bike, and bus connections, and more student housing and support services in the surrounding area.

GOAL PS-12: Maximize the ability of higher educational institutions to provide quality services while minimizing impacts on area residents and businesses.

Policies:

~~Policy:~~

PS-12.1: Participate with institutions of higher education in master planning efforts, transit programs, neighborhood plans, and other programs intended to facilitate the provision of quality education in a manner compatible with surrounding uses.

8.8 Library Services

GOAL PS-13: Ensure that high quality library services are available to Lakewood residents.

Policies:

PS-13.1: ~~Support the efforts of~~Work with the Pierce County Library System to ~~ensure that adequate library~~ address current service ~~is available, meeting community~~deficits, continued population growth, changing library services, increased and changing customer needs and ~~responsive to growth and development.~~expectations within the Lakewood service area.

PS-13.2: Promote the construction a new main library facility within the City's downtown core.

PS-13.3: Assist the Pierce County Library System in the reuse/sale of the existing library building/property located at 6300 Wildaire Rd SW.

PS-13.4~~PS-13.2~~: Work with the Library System to ensure that its facilities are located and designed to effectively serve the community.

~~PS-13.3: Maintain or exceed Pierce County's LOS standard for library facilities~~PS-13.5: Support the Pierce County Library System's service levels (seating, materials and shelving, technology guidelines, meeting rooms, square feet per

capita, and parking) as outlined in the *Pierce County Library 2030* report and as may be updated from time-to-time.

~~: Provide opportunities for the Library System's review and comment on the impact of proposed annexations on LOS.~~

~~PS-13.5: Establish a three- to five-mile service radius for library coverage.~~

PS-13.6: Work with the Library System to identify non-capital alternatives such as specialized programs, new technologies, and other alternatives to ~~achieve the~~provide up-to-date library ~~facilities LOS~~services.

PS-13.7: Establish a three- to five-mile service radius for library coverage.

PS-13-8: Continue and expand bookmobile services to underserved and/or isolated areas such as Springbrook, Tillicum, and Woodbrook.

8.9 Health and Human Services

~~**GOAL PS-14:** Improve the delivery and outcome of health and human services efforts in Lakewood.~~
GOAL PS-14: Create a community in which all members have the ability to meet their basic physical, economic, and social needs, and the opportunity to enhance their quality of life.

Policies:

PS-14.1: Assess and ~~utilize the individual and combined strengths of the Lakewood Human Services Collaboration or successor affiliations.~~

~~PS-14.2: Maintain a strategic plan to direct collaborative~~anticipate human services ~~efforts.~~

~~PS-14.3: Create a process to disburse funds to programs serving City priorities as recommended by a citizen advisory group to the City Council~~needs and develop appropriate policy~~Support the development of a central database of partner agencies~~ and ~~other pertinent information to improve communication among and between providers and consumers.~~program responses.

PS-14.2: Convene and engage others, including the Youth Council, the Lakewood Community Collaboration, and Lakewood's Promise, in community problem-solving to develop and improve social services.

PS-14.3: Disburse Community Development Block Grant and General Fund dollars to support a network of services which respond to community needs.

PS-14.4: ~~PS-14.5: Coordinate with other funding sources to apply consistent funding requirements based on best practices and evaluated outcomes.~~

~~PS-14.6: Leverage funding by promoting collaboration among agencies with complementary program objectives.~~

~~**GOAL PS-15:** Encourage the provision of collaborative, neighborhood-based services using collective resources.~~

Promote awareness of needs and resources through strengthened dialogue, effective marketing strategies, and public relations activities.

PS-14.5: Encourage services that respect the diversity and dignity of individuals and families, and foster self-determination and self-sufficiency.

PS-14.6: Foster a community free of violence, discrimination and prejudice.

PS-14.7 Encourage the location of medical clinics and services near transit facilities.

GOAL PS-15: Ensure the City's Human Services Funds are effectively and efficiently managed.

Policies:

PS-15.1: The City's role is to fund, advocate, facilitate, plan, and inform by continually engaging service ~~hubs at schools and other neighborhood centers.~~ providers and ~~working relationships among local government, including police and fire departments; businesses;~~ community~~-based~~ organizations~~;~~ in dialogue regarding the ~~military; religious institutions; educational entities; other partners; and~~ functioning of the ~~neighborhood~~present service ~~hubs.~~

~~PS-15.3: Utilize educational institutions as points for information exchange~~systems, the emerging~~Seek ways to promote communities of families and neighborhoods that take ownership of their assets,~~ needs of the community and the building of a comprehensive system of services.

PS-15.2: Develop and maintain a strategic plan to direct collaborative services efforts.

PS-15.3: Assess community needs and administer a funding allocations process to address identified community needs.

PS-15.4: Develop contract performance measures and monitor contracting agencies performance.

GOAL PS-16: Give a broad range of Lakewood citizens a voice in decision-making about how we can create a safer, healthier community.

Policies:

PS-16.1: Ensure the representation of culturally and economically diverse groups, including youth, people of color, seniors, and the disabled, in publicly appointed committees working on human ~~service~~services needs.

PS-16.2: ~~Seek ways of including non-English speakers in decision-making.~~

~~PS-16.3:~~ Develop decision-making processes that include regular feedback from the community and health/human services consumers~~, focused on integrated problem solving and co-ownership of issues~~.

~~PS-16.4: Conduct public relations~~GOAL PS-17: Participate in regional and local efforts ~~to enlist the broader community in preparing to meet~~that address human services needs in ~~Lakewood.~~

~~**GOAL PS-17:** Create conditions that contribute to a safe community and enable all citizens to access needed resources~~the region and ~~take responsibility for their own success~~in the City.

~~Policies:~~

Policies:

PS-17.1: ~~Focus on the prevention of all forms of community violence.~~
Support and actively coordinate ~~Partner~~ with ~~youth, neighborhoods, and service providers to pursue the availability of safe places for both structured~~local, regional, and ~~unstructured extra-curricular activities for youth of all ages~~national efforts that address local human services needs and ~~form supportive structures.~~

~~PS-17.4: Develop community-based forums~~ensure that ~~assist in identifying concerns about community safety~~ local services are compatible with other programs provided at the state and federal levels.

PS-17.2: ~~mobilize community/service provider partnerships to address issues.~~Continue the City's active participation in the Pierce County Continuum of Care, the Pierce County Human Services Coalition, and the 2060 and 2163 Funding Programs.

8.10 Lakewood's Housing and Community Development Programs

GOAL PS-18: Provide decent affordable housing.

Policies:

PS-18.1: Preserve existing owner-occupied housing stock.

- Provide a range of home repair assistance to qualified lower-income homeowners.

PS-18.2: Expand/sustain affordable homeownership opportunities.

- Reduce the financial burden of new homeowners through assistance with down payment for home purchases.

- Provide housing counseling to homeowners and potential homebuyers.

- Collaborate with partners and housing providers toward the goal of expanding homeownership opportunities.

PS-18.3: Provide assistance to preserve the quality and habitability of affordable rental housing.

- Provide incentives to improve properties.
- Collaborate with partners and housing providers to develop and implement strategies to preserve affordable rental housing.
- Support the crime-free housing activities.
- Support fair housing activities such as landlord/tenant counseling.

PS-18.4: Provide assistance for a continuum of housing for persons with special needs, homeless persons and people at risk of homelessness.

- Develop partnerships with housing providers and human services agencies providing emergency shelters, permanent supportive, and repaid re-housing assistance.
- Support the efforts of the Ten-Year Regional Plan to End Chronic Homelessness in Pierce County.

PS-18.5: Reduce barriers to affordable housing by supporting fair housing activities such as outreach and education.

- Support fair housing activities such as outreach and education.

PS-18.6: Develop new affordable housing options as new funding opportunities become available.

GOAL PS-19: Revitalize targeted neighborhoods.

Policies:

PS-19.1: Assist with sewer connections for single family owner-occupied units in targeted areas.

PS-19.2: Support code violation enforcement activities and activities to remove slums and blight.

GOAL PS-20: Maintain/improve community facilities and public infrastructure, particularly in underserved areas or neighborhoods.

Policies:

PS-20.1: Support public infrastructure such as streets, sidewalks, street-lighting, street-related improvements, and park facilities and improvements, and the removal of architectural barriers that impede American Disabilities Act accessibility.

PS-20.2: Support community facilities providing emergency services and basic needs.

PS-20.3: Support the delivery of human services to, and sustain a community safety net for, identified vulnerable populations.

PS-20.4: Develop and improve parks and open space in low income residential neighborhoods.

GOAL PS-21: Expand economic opportunities.

Policies:

PS-21.1: Support economic development activities that provide or retain livable wage jobs for low and moderate income persons.

- Develop a low-interest loan program, tax credits and other mechanisms to serve as incentives for businesses to create or retain jobs for low and moderate income persons.

- Develop a technical assistance program for supporting businesses for the purpose of creating or retaining jobs for low and moderate income individuals.

- Provide businesses with access to low-interest loans to expand economic opportunities through on-site infrastructure improvements, rehabilitation, acquisition, and other commercial improvements for the purpose of creating or retaining jobs for low and moderate income persons.

PS-21.2: Focus investment on housing development and infrastructure improvements in support of economic development in targeted neighborhoods.

9.0 CAPITAL FACILITIES AND IMPROVEMENTS

9.1 Introduction

Upon its incorporation, Lakewood was typical of most newly incorporated cities in Washington in that many urban services and utilities in the city were provided by special districts, other jurisdictions, or private companies. While this is still largely the case, Lakewood's decision to take its police services in-house in 2004 changed the City's position with regard to ~~poses a dramatic departure from past practices in terms of~~ capital facilities needs and funding for that service function.

A key function of this comprehensive plan is to coordinate the provision of urban~~these~~ services and utilities to fulfill Lakewood's vision. However, the City has varying levels of actual control over the urban services and utilities provided within its boundaries~~the city~~. This chapter directs how the City manages and finances capital improvements for the services and utilities directly provided by the City, and establishes the City's relationship to other services and utility providers.

The Capital Facilities Element of the Comprehensive Plan consists of two portions- the 20 year Plan and the 6-year Plan/Program. The 20 year plan portion, which is this chapter, contains capital facilities related goals and policies that are integrated with other goals and policies of the Comprehensive Plan. The program portion, which is the 6-year Capital Improvement Plan, contains inventories of existing and proposed capital facilities, identifies both regular and special maintenance requirements, forecasts future needs for facilities for six years, identifies deficiencies in capital facilities and the actions necessary to address such deficiencies, and contains a six-year financing plan and budget. The 6-year Capital Improvement Plan is a separate document.

In addition to the Capital Facilities Element, planning and programming for transportation and parks (the two largest components of City spending on capital facilities) is guided by the Transportation element of this plan, and the Legacy Parks Plan.

Planning and programming for utilities and facilities/services provided by special districts, State and Federal government, Pierce County, the City of Tacoma, and private utility companies is typically the responsibility of these providers.

~~The terminology important to this element is defined below.~~

- ~~*Capacity*. The maximum amount of service or utility that can be provided with existing capital facilities.~~

- ~~*Capital facilities*. The physical facilities and systems used to provide a service or utility.~~

- ~~*Concurrency*. The ability and financial commitment of the service provider to expand capacity or maintain the level of service for new development through capital improvements within a six-year period.~~

- ~~*Level of service (LOS)*. The minimum acceptable standard of service provision.~~

- ~~*Regulatory authority*. The jurisdiction, district, or company with basic control of the service or utility. The~~

~~authority can be vested in the state, county, City, or special district. Sometimes federal or state regulations place specific limitations on the local jurisdiction's authority to regulate a service or utility.~~

- ~~*Special district.* An independent, quasigovernmental organization that provides a public service or utility and operates under specific state regulations.~~

9.2 Urban Services and Utilities

Utilities and services in Lakewood are provided by the City, other jurisdictions, special districts, and private companies. The responsibilities of these providers are described below in terms of four types of service.

9.2.1 Type 1: City-Provided Services and Utilities

Type 1~~he~~ services and utilities (shown below) are provided directly to the resident by the City of Lakewood or City-contracted provider.

Table 9.1: Type 1 Services & Utilities.

Service Or Utility	City Regulatory Authority	Planning Responsibility	Funding Responsibility	Who Sets LOS?	Project Review
City Facilities	total	City	City	n/a	City
Parks & Recreation	total	City	City	City~~n/a~~	City
Transportation	total	City	City	City	City
Stormwater Management	total	City	City	City	City
Solid Waste	total	provider	provider	City	provider
Police	total	City	City	City~~n/a~~	City

Source: City of Lakewood

9.2.2 Type 2: Independent Special District-Provided Services

Type 2~~he~~ services ~~detailed below~~ are provided directly to the resident by a special district with independent taxing and regulatory authority. The City has land-use regulatory authority; thus, the provider must coordinate with the City for the provision of the services to support development and administration of this plan.

Table 9.2: Type 2 Services.

Service Or Utility	Agency	City Regulatory Authority	Planning Responsibility	Funding Responsibility	Who Sets LOS?	Project Review
Public Schools	Clover Park School District	land use	provider	provider	provider	provider
Fire & Medical	West Pierce Fire and Rescue	land use	provider	provider	provider	provider
Libraries	Pierce County Library District	land use	provider	provider	provider	provider
Transit	Pierce Transit and Sound Transit	land use	provider	provider	provider	provider

Source: City of Lakewood

9.2.3 Type 3: Special District, Pierce County, or Private Utilities

Type 3 services are utilities ~~A utility is~~ provided directly to the resident by a special district, county, or company. The City has land-use, right-of-way (ROW), and franchise regulatory authority; thus, the districts, county, and private companies must provide the service or utility to support development and administration of this plan. The City may also require additional considerations from the provider for use of the city right-of-way~~ROWs~~.

Table 9.3: Type 3 Utilities.

Service Or Utility	Agency	City Regulatory Authority	Planning Responsibility	Funding Responsibility	Who Sets LOS?	Project Review
Sanitary Sewer	Pierce County Public Works	land use, ROW/franchise	joint	provider	joint	provider
Water	Lakewood Water District,	land use, ROW/franchise	joint	provider	joint	provider

	Parkland Water District					
Electric	Tacoma Power, Puget Sound Energy, Lakeview Power	land use, ROW/franchise	provider	provider	joint	provider
Communications	Private communications companies, City of Tacoma (Click! Network)	land use, ROW/franchise	provider	provider	joint	provider/ City
Natural Gas	Puget Sound Energy	land use, ROW/franchise	provider	provider	joint	provider

Source: City of Lakewood

9.2.4 Type 4: Federal Service

Type 4 ~~U~~utilities and services are provided to federal military lands and utilities and services provided by the federal government to non-federal lands as~~re~~ listed below.

Table 9.4: Type 4 Utilities & Services.

	City Regulatory Authority	Planning Responsibility	Funding Responsibility	Who Sets LOS?	Project Review
Federal Military Lands	none	federal	federal	federal	federal NEPA[1]
Federal Utilities & Services to Non-Federal Lands	none	provider	provider	City	City

Source: City of Lakewood
Notes: 1. The City retains the right of comment on federal projects through the National Environmental Policy Act.

9.3 Service and Utility Goals and Policies

Specific goals and policies for Type 1 services and utilities are found in other chapters of this comprehensive plan or in plans developed by the providers. The locations of these goals and policies are identified in Table 9.5.

The following documents contain information supplemental to this plan.

Environmental Impact Statement (EIS). Through the EIS process, existing capacities are documented and a forecast of future capital improvements in services and utilities is projected. Based on the EIS analysis, capacity and locational policies for each Type 1, Type 2, Type 3, and Type 4 service and utility are incorporated in the respective service, utility, transportation, and land-use chapters of this plan. The background report includes an inventory of existing capital facilities. ~~As Lakewood continues with the process of assuming its own police services, the capital facilities inventory will be modified to include police-related elements.~~

Capital Improvement Plan (CIP). The CIP lists the planned capital investments for each Type 1 service and utility and identifies dedicated funding sources for the projects anticipated within six years. Lakewood's

CIP is procedurally modified and updated in conjunction with its budget rather than as part of the yearly comprehensive plan amendment cycle.

Table 9.5: Location of Utility and Public Service Goals and Policies.

Type 1	Subheading Addressing Primary Policies	Level of Service	Capital Improvements
Parks & Recreation[2]	3.9	n/a	City[1]
Transportation[2]	6.0	Chapter 6	City[1]
Stormwater Management[2]	7.2	Chapter 7	City[1]
Solid Waste	7.7	provider plans	City[1]
Police	8.4	Chapter 8	City[1]
Capital Facilities	9.6	n/a	City[1]
Type 2			
Public Schools[4]	8.6	provider plans[4]	provider CIP[3]
Fire	8.2	provider plans	provider CIP[3]
Emergency Medical	8.3		
Libraries	8.8	provider plans	provider CIP[3]
Type 3			
Sewer[4]	7.3	provider plans[4]	City & provider CIP[3]
Water[4]	7.4	provider plans[4]	City & provider CIP[3]
Electric	7.5	provider plans	provider CIP[3]
Communications	7.6	provider plans	provider CIP[3]
Natural Gas	7.9~~8~~	provider plans	provider CIP[3]
Location of Type 4 References			
Federal Military Lands	Installation plans	Installation plans	Federal
Federal Utilities & Services to Non-Federal Lands	Varies by utility & service	Varies by utility & service	City & provider CIPs

Source: City of Lakewood
Notes:
1: City capital improvement plan (CIP).
2: Technical plans (Legacy parks plan, stormwater management plan, transportation plans)
3: CIPs are included as an appendix to this plan.
4: Provider plans will be reviewed and approved by the City to the extent permitted under the law, and thereafter, adopted as technical plans.

9.4 General Goals and Policies

GOAL CF-1: Provide services and utilities that the City can most effectively deliver, and contract or franchise for those services and utilities that the City determines can best be provided by a special district, other jurisdiction, or the private sector. Promote demand management and the conservation of services and facilities prior to developing new facilities.

Policies:

CF-1.1: Periodically review the provision of services and utilities within the city to ensure that service is being provided in accordance with this plan.

CF-1.2: Require the provider to correct deficiencies where deficiencies in service or utility provision are identified. If the City determines that the provider is not responsive to the service needs of city residents, the City shall consider all remedies within its authority to ensure the adequate provision

of service.

CF-1.3: All services and utilities shall be provided in accordance with this plan.

CF-1.4: Develop conservation measures to reduce solid waste and increase recycling.

CF- 1.5 Promote improved conservation and more efficient use of water, as well as the increased use of reclaimed water, to reduce wastewater generation and ensure water availability.

CF-1.6: Promote the use of renewable energy resources to meet the region's energy needs.

CF-1.7: Reduce the rate of energy consumption through conservation and alternative energy forms to extend the life of existing facilities and infrastructure.

GOAL CF-2: Provide and maintain adequate Type 1 capital facilities to meet the needs of existing and new development as envisioned in this plan.

Policies:

CF-2.1: Deny land use and/or development permit requests when capacity to serve the project is projected to be inadequate, and/or LOS is projected to be unmet, at the time of occupancy.

CF-2.2: Require new development to fund a fair share of costs to provide service and utility needs generated by that development.

CF-2.3: At the City's discretion, capital improvements shall be provided by the developer to ensure that capacity is available or LOS standards are met at the time of occupancy.

CF-2.4: Concurrency may be utilized for determining transportation capacity and LOS.

CF-2.5: Provide City facilities and parks and recreation capital improvements in accordance with this plan and the Legacy parks plan.

CF-2.6: Review proposed land use permits and/or development permits or approvals for impacts to parks and recreation capacity.

CF-2.7: Require new development to fund a fair share of costs to provide parks and recreation needs generated by that development.

CF-2.8: The City may consider public, on-site open space and recreational facilities provided at the developer's expense that are substantially in excess of those required by the City, or that provide a unique attribute to the city, as a full or partial substitute for a development's fair share funding for parks and recreation.

CF-2.9: Coordinate with public schools for jointly funded parks and recreation capital improvements and inclusion of jointly funded projects in the parks and recreation CIP.

CF-2.10: Update the City's 6-year Capital Improvement Plan at least every two years in conjunction with the City's budget development and approval process. ~~Develop a discrete capital facilities needs assessment and funding plan associated with the assumption of police services.~~

GOAL CF-3: Require Type 2 providers to provide adequate service and capital facilities to meet the needs of existing and new development as envisioned in this plan.

Policies:

CF-3.1: Where land use and/or development permits or approvals must be reviewed by a Type 2 provider, the provider shall conduct such reviews in a timely manner concurrently with the City.

CF-3.2: Coordinate with fire and medical service providers for inclusion of necessary health and safety development standards into City development regulations and building codes, and support the providers' enforcement of the adopted standards.

CF-3.3: Coordinate with public school providers for the provision of capital improvements.

CF-3.4: Incorporate the public school CIPs as appendices to the City CIP following review for consistency with this plan.

CF-3.5: Following review and adoption of a District master plan and CIP, coordinate with public schools for the collection, if applicable, of school impact fees as part of the project review process.

GOAL CF-4: Require Type 3 utilities to provide adequate service and capital facilities to meet the needs of existing and new development as envisioned in this plan.

Policies:

CF-4.1: Type 3 utilities shall expedite the provision of services and capital facilities necessary to support this plan.

CF-4.2: Where land use and/or development permits or approvals must be reviewed by a Type 3 provider, the provider shall conduct such reviews in a timely manner concurrently with the City.

CF-4.3: Coordinate with providers for inclusion of necessary development standards into City development regulations and building codes, and support the providers' enforcement of the adopted standards.

CF-4.4: Deny land use and/or development permit applications unless sufficient water, sewer, and electrical capacity or LOS are available to the development at time of occupancy.

CF-4.5: At the City's discretion, the developer shall provide the necessary capital improvements to ensure that water, sewer, and electrical capacity will be available or levels of service met at the time of occupancy. Improvements shall meet the standards set forth by the utility provider.

CF-4.6: Require new development to fund a fair share of costs to provide water and sewer utilities needs generated by that development.

CF-4.7: Incorporate sewer and water provider CIPs as appendices to the City CIP, following review for consistency with this plan.

GOAL CF-5: Coordinate with Type 4 utilities and services for the provision of services to non-federal lands.

Policies:

CF-5.1: Coordinate with Type 4 providers on a case-by-case basis for the provision of services on non-federal land.

CF-5.2: Coordinate with Type 4 providers for monitoring and maintenance of provider facilities located on non-federal land.

9.5 Capital Improvement Plans

GOAL CF-6: Maintain and continually update~~Establish~~ a City CIP consisting of separate CIPs for each service

or utility that lists planned capital improvements and establishes a priority and dedicated funding source for the capital improvements for a six-year period.

Policies:

CF-6.1: Evaluate each service or utility CIP priority and funding sources at least once every two years, but not more than twice a year. Any amendment to the CIP must analyze the impacts the amendment will have on permits issued by the City based on concurrency.

CF-6.2: Provide necessary Type 1 capital improvements within the City's ability to fund or within the City's authority to require others to provide.

CF-6.3: Evaluate concurrency for transportation based on only those capital improvements identified in the CIP as fully funded within the six-year period.

CF-6.4: The City shall not provide a capital improvement, nor shall it accept the provision of a capital improvement by others, if the City or the provider is unable to pay for subsequent annual operating and maintenance costs of the improvement.

CF-6.5: The City CIP shall constitute a separate adopted appendix to this plan.

9.6 City Facilities

GOAL CF-7: Provide, maintain, and improve City facilities to ensure efficiency safety, and to provide the best possible service to residents, employees, and the city while enhancing the physical landscape and quality of life.

Policies:

CF-7.1: Provide a City Hall and other city facilities that are safe; functional; conducive to the provision of local governance, service provision, and operations; and provide a positive model of the type of development desired in the city.

CF-7.2: Maintain, and provide as needed,~~Pursue the timely acquisition and/or development of~~ adequate permanent facilities for police functions.

CF-7.3: To the extent possible, direct public investment toward the designated Regional Growth Center and residential areas targeted for high density residential growth, especially those with an existing substandard public environment, characterized by a lack of sidewalks, street lighting, open space, and other public amenities.

CF-7.4: Prioritize the acquisition and development of parks and recreation facilities to eliminate LOS deficiencies in densely populated areas of the city and provide amenities in areas designated for growth.

CF-7.5: Acquire properties and/or conservation easements in support of critical lands protection, salmon recovery, and floodplain management.

9.7 Essential Public Facilities Siting

GOAL CF-8: Provide for the siting of identified essential public facilities.

Policies:

CF-8.1: Identify and classify a list of statewide, countywide, and citywide essential public facilities.

CF-8.2: Identify facilities of a statewide nature consistent with those of the Washington State Office of Financial Management or successor agency.

CF-8.3: Identify countywide essential public facilities following a cooperative interjurisdictional agreement pursuant to GMA requirements and consistent with the guidance of the CWPP.

CF-8.4: Identify city essential public facilities pursuant to the requirements of GMA.

GOAL CF-9: Administer a process, through design and development regulations, to site essential public facilities that adequately consider impacts of specific uses.

Policies~~y~~:

CF-9.1: Address, as a priority measure, essential public facilities siting related to direct provision of police services.

CF-9.2: The proposal process for siting an essential public facility is as follows:

- The proposal must be identified on the City's essential public facilities list.
- In the siting of a statewide or countywide essential public facility, the applicant is required to provide a justifiable need for the public facility and for its location in Lakewood based upon forecasted needs and logical service area, including an analysis of alternative sites within and outside of the city.
- In the siting of a statewide or countywide essential public facility, the applicant is required to establish a public process by which the residents of the city and the affected neighborhoods have a reasonable opportunity to participate in the site selection process.
- Proposals must be consistent with this comprehensive plan and the City's design and development regulations.
- Medical clinics and services should be sited near public transit facilities and routes.
- Avoid siting essential public facilities in the 500-year floodplain or in other areas subject to environmental hazards
- If a proposal is not specifically addressed by use (or intensity of the use) in the comprehensive plan or design and development regulations, the City will make an administrative use determination in accordance with City regulations. In such cases, proposals requesting siting as an essential public facility shall be subject to a conditional use permit or public facilities permit unless otherwise determined by the City.

- The proposal will be analyzed for impacts and mitigation in accordance with City design and development regulations.

- Analysis and mitigation may include fiscal impacts of the proposal to the City.

CF 9.3: Subject to the provisions of this section, the siting of essential public facilities is not categorically precluded.

9.8 Servicing Urban Growth Areas

GOAL CF-10: Coordinate with other jurisdictions, agencies, and service and utility providers for the provision of urban services and utilities within the UGA.

Policy:

CF-10.1: Coordinate with other jurisdictions and agencies for the provision of services and utilities in accordance with the appropriate Type 1, 2, 3, or 4 goals and policies.

GOAL CF-11: Provide urban services and utilities to annexed areas that the City can most effectively deliver, and contract or franchise for those services and utilities that the City determines can best be provided by a special district, other jurisdiction, or the private sector.

Policy:

CF-11.1: Determine which service and utility providers are best suited to provide for annexed areas on a case-by-case basis prior to annexation.

10.0 IMPLEMENTATION

10.1 Introduction and Purpose

The adoption of a comprehensive plan does not complete the land-use planning process. Planning is an ongoing process, and the comprehensive plan is a living document that must respond to changing circumstances and evolving community values. The success of Lakewood's comprehensive planning effort will be measured in the end by the degree to which the plan is implemented; to ensure successful implementation, mechanisms must be in place to provide for ongoing administration, monitoring, and amendments.

This chapter has been included to assist the City and others toward that end by identifying a programmatic framework of comprehensive plan implementation. It differs in format from other chapters because it establishes specific mechanisms for responding to implementation needs. The purpose of the implementation approaches contained in this chapter is three-fold:

- To ensure effective, fair, and impartial administration and enforcement of the comprehensive plan and its implementing ordinances and programs;
- To ensure that the comprehensive plan continues to reflect the needs and desires of the Lakewood community; and
- To ensure that the comprehensive plan is regularly reviewed and amended consistent with state law.

10.2 Interpretation of Goals and Policies

The comprehensive plan provides a guide and general regulatory framework for development in Lakewood that reflects community desires. The goals and policies contained in the plan will guide public and private investments in development but, by themselves, will not ensure that Lakewood becomes the community it wants to be. The plan will be used by the City of Lakewood to help make decisions about proposed ordinances, policies, and programs. Although the plan will be used to direct the development of regulations governing land use and development, the plan will not be relied upon in reviewing applications for specific development projects, except when reference to the comprehensive plan is expressly required by an applicable development regulation.

Goals included in the plan represent the results that the City hopes to realize over time; however, it should be kept in mind that they are neither guarantees nor mandates. Accompanying policies help guide the creation or change of specific rules or strategies such as development regulations, budgets, or strategic plans. Rather than referring directly to the comprehensive plan policies, decisions on specific City actions will typically follow ordinances, resolutions, budgets, or strategic plans that, themselves, reflect relevant plan policies. Implementation of most policies involves a number of City actions over time, so often a specific action or project cannot be looked to as fulfilling a particular plan policy.

Some policies use the words "shall" or "should, "ensure" or "encourage," and so forth. In general, such words should be read to describe the relative degree of emphasis that the policy imparts, but not necessarily to establish a specific legal duty to perform a particular act, to undertake a particular program or project, or to achieve a specific result. Whether such result is intended must be determined by reading the policy in question in the context of all related policies in the plan.

Although policies are intended to be mutually supportive, a conflict may sometimes appear to arise between policies, particularly in the context of a specific situation, or as viewed from the differing perspectives of opposing interests. Because policies do not exist in isolation, it is the responsibility of City officials and policymakers to reconcile and balance the various interests represented by the policies.

The Future Land-Use Map (Figure 2.1), and any amendments that are made to that that map in the coming years, should reflect and be based on goals and policies included in the text. If conflicts arise between the Future Land-Use Map and the plan goals and policies, the map shall prevail.

Any strategies which are suggested are not intended to be directive but are included to exemplify a means of carrying out the plan. Other strategies to carry out the plan may also be available and, in some cases, may be preferred. The plan should not be construed as compelling the City to undertake a particular work program; rather, decision makers should use the plan to evaluate potential courses of action to satisfy plan goals and policies.

10.3 Administration

This chapter includes a series of four tables that link implementation mechanisms or programs to specific comprehensive plan goal areas that they are responsible for implementing. These tables are categorized according to the program or party responsible for goal implementation: current City of Lakewood programs; current City regulations; other government agencies; or private sector entities. Many goal areas are implemented by more than one mechanism, and some mechanisms implement multiple goal areas. In order to avoid redundancy, no attempt has been made to cross-reference the two.

While these tables are not a complete inventory of either available implementation mechanisms or comprehensive plan goal areas, they establish an initial implementation framework for the major issues addressed by this plan. Additional mechanisms will be made available or identified in the years ahead that will also play an important role in implementing the comprehensive plan.

10.3.1 City-Run Programs

The City of Lakewood administers a number of current ongoing programs whose missions are consistent with the purposes of the comprehensive plan, which are summarized in Table 10.1. These programs are administered by a variety of City departments and focus on a range of objectives. Their ongoing activities will gradually allow the City to achieve many of the goals identified by the plan.

Table 10.1: City-Run Programs and Goal Implementation.

PRINCIPAL IMPLEMENTATION MECHANISMS	PRIMARY GOAL AREAS
Street tree program	3.10 Isolated Areas 3.11 Environmental Quality 4.5 Focus Area Urban Design Plans
Sidewalk program	3.10 Isolated Areas 4.3 Relationship between Urban Design and Transportation 6.3 Transportation Demand and Systems Management
Significant tree ordinance	3.10 Isolated Areas 3.11 Environmental Quality 4.5 Focus Area Urban Design Plans

Crime-free rental housing program	3.2 Residential Lands and Housing
Street lighting program	3.2 Residential Lands and Housing 3.3 Commercial Lands and Uses 4.5 Focus Area Urban Design Plans
Economic development/ redevelopment program	3.4 Industrial Lands and uses 5.0 Economic Development Goals and Policies
Urban trails program	3.9 Greenspaces, Recreation, and Culture 3.10 Isolated Areas 4.4 Citywide Urban Design Framework Plan
Strategic budgeting (CIP, TIP)	6.7 Transportation Re-Assessment Strategy 9.5 Capital Improvement Plans
Stormwater and surface water management program	7.2 Stormwater

10.3.2 City Regulation

The City's zoning, land-use, and development codes are the primary regulatory vehicles for implementing many aspects of the comprehensive plan. These codes are the main translation mechanisms between the land-use designations and actual physical development (Table 10.2) and must be consistent with this plan. Since adoption of the comprehensive plan in 2000, new zoning designations have been developed to achieve the densities and development standards outlined in the comprehensive plan, and a new Title 18A setting forth zoning districts and associated permitted uses and development standards has replaced Title 18, the City's interim zoning code still in effect at the time of the plan's initial adoption.

Table 10.2: City Land-Use Regulations and Goal Implementation.

PRINCIPAL IMPLEMENTATION MECHANISMS	PRIMARY GOAL AREAS
Design standards for business districts	3.3 Commercial Lands and Uses
Sign ordinance	3.3 Commercial Lands and Uses
Subarea plans for applicable districts	3.2 Residential Lands and Housing 3.3 Commercial Lands and Uses 3.9 Greenspaces, Recreation, and Culture 3.10 Isolated Areas 3.12 Nonconformities 4.5 Focus Area Urban Design Plans
Development code	3.2 Residential Lands and Housing 3.3 Commercial Lands and Uses 3.7 Air Corridor Lands and Uses 3.9 Greenspaces, Recreation, and Culture 3.10 Isolated Areas 3.11 Environmental Quality 3.12 Nonconformities
Land use and zoning code	3.2 Residential Lands and Housing 3.3 Commercial Lands and Uses 3.4 Industrial Lands and uses 3.6 Military Lands 3.7 Air Corridor Lands and Uses 3.8 Public and Semi-Public Institutional Land Uses 3.10 Isolated Areas 3.11 Environmental Quality 3.12 Nonconformities 4.2 Relationship between Urban Design and Land-Use Designations
Uniform building, fire, mechanical, and plumbing codes	3.2 Residential Lands and Housing 3.3 Commercial Lands and Uses 3.12 Nonconformities
Critical areas ordinance	3.11 Environmental Quality
Shoreline master program	3.11 Environmental Quality
Impact fees	3.2 Residential Lands and Housing 3.11 Environmental Quality
SEPA mitigation	3.3 Commercial Lands and Uses 3.9 Greenspaces, Recreation, and Culture 3.11 Environmental Quality
NEPA mitigation	3.5 Military Lands 3.11 Environmental Quality

10.3.3 Other Government Agencies and Special Districts

Much of the public infrastructure essential to Lakewood is owned and operated by other agencies. Because the city's schools, colleges, libraries, and public transit are not controlled by the City, this plan includes policy language addressing coordination with these agencies. Table 10.3 identifies the relationship between these agencies and comprehensive plan goal areas.

Table 10.3: Non-City Agencies and Goal Implementation.

PRINCIPAL IMPLEMENTOR	PRIMARY GOAL AREAS
U. S. Department of Defense	3.6 Military Lands
Clover Park School District	8.6 Schools 3.8 Public and Semi-Public Institutional Land Uses
Clover Park Technical College	8.7 Higher Education 3.8 Public and Semi-Public Institutional Land Uses
Pierce College	8.7 Higher Education 3.8 Public and Semi-Public Institutional Land Uses
Pierce County Library System	8.8 Library System
Tacoma Pierce County Housing Authority	3.2 Residential Lands and Housing
Pierce Transit	6.2 General Transportation Goals and Policies 6.3 Transportation Demand Management (park and ride)
Sound Transit	6.2 General Transportation Goals and Policies (rail station development)
WSDOT	6.2 General Transportation Goals and Policies 6.3 Transportation Demand Management 6.5 Level of Service Standards (LOS) and Concurrency (New SR 512 interchange)
Pierce County Department of Parks and Recreation	3.8 Greenspaces, Recreation, and Culture
Pierce County Department of Public	7.3 Sanitary Sewers
Works and Utilities	7.7 Solid Waste
Town of Steilacoom	7.3 Sanitary Sewers
Lakewood Water District	7.4 Water
Tacoma Public Utilities	7.4 Water
Puget Sound Energy	7.5 Electricity
Pierce County Sheriff's Office	8.4 Police Service
Lakewood Fire District #2	8.2 Fire Protection 8.3 Emergency Medical Services (EMS)

10.3.4 Private Sector

Implementing the comprehensive plan will be the responsibility of the entire community throughout the life of the plan. Both for-profit enterprises, such as developers and other businesses, as well as non-profit organizations will play major roles in this effort. Private contributions will range from voluntary to regulatory compliance and payment of impact fees. Table 10.4 identifies some of the most important private sector responsibilities for comprehensive plan implementation.

Table 10.4: Private Sector Roles in Goal Implementation.

PRINCIPAL IMPLEMENTATION MECHANISMS OR IMPLEMENTOR	PRIMARY GOAL AREAS
St. Clare Hospital	8.9 Health and Human Services 3.8 Public and Semi-Public Institutional Land Uses
Developer agreements	3.9 Greenspaces, Recreation, and Culture 3.11 Environmental Quality
Lakewood Human Services Collaboration strategic plan	8.9 Health and Human Services

Tahoma Nature Conservancy Lakewold Gardens Other non-profits	3.8 Greenspaces, Recreation, and Culture
Private utility purveyors	7.0 Utilities

10.3.5 Initial Implementation Strategies

The following strategies exemplify how some of the central comprehensive plan elements can be implemented. These are not intended to be exhaustive, but form a critical link between policy-making and programming. They begin to translate the comprehensive plan into guidance for City's everyday work functions. The City should work to develop a limited number of high level performance measures to help track progress on the implementation strategies listed below.

Land-Use Implementation Strategies

- Target redevelopment of obsolete one-bedroom apartment complexes.
- Recognize existing programs and regulatory mechanisms such as the City's street lighting program, street tree program, sign ordinance, sidewalk program, significant tree ordinance as ongoing means of achieving land-use goals.
- Develop redevelopment and subarea plans for ~~Tillicum, American Lake Gardens,~~ the Lakewood Station D~~d~~istrict, Springbrook, the CBD, the Pacific Highway SW corridor, and selected residential arterials.
- Examine the potential for employing density bonuses in return for private development of public open space.
- Maintain and periodically update the city's~~Adopt a~~ Critical Areas and Resource Lands Ordinance and related plans as required by the GMA. The City's critical areas regulations were initially adopted in 2004.
- ~~Develop and adopt a~~ Maintain the City's Shoreline Master Program (adopted 2014) consistent with GMA and the state Shoreline Management Act, including salmon recovery provisions.
- Capitalize on historical sites in the area such as Fort Steilacoom, Lakewold Gardens, and the Lakewood Colonial Theater, as well as other local amenities like the lakes and parks.
- Work to maintain an adequate variety of land uses within the city to support development.
- Work to provide for on-line submittal of development permit and building permit application forms.
- Streamline the permit processing system wherever possible to make it easier to understand and to minimize the review time and costs.
- Develop redevelopment plans for the Lakewood Station area, the Central Business District, and the Pacific Highway southwest corridor.
- Continue to prepare the Woodbrook area for redevelopment with industrial uses and pursue opportunities to locate appropriate businesses consistent with utility extensions as described in the Woodbrook Business Park Development report issued in July, 2009.

- Continue with redevelopment efforts in Tillicum and the preparation of development regulations and design standards as described in the Tillicum Neighborhood Plan adopted in June 2011.
-

Urban Design and Community Character Implementation Strategies

- Develop and implement community design guidelines for commercial, industrial, and multi-family residential development. Identify design elements and features that give specific areas a distinctive character. Include provisions to minimize impacts to residential development adjacent to development sites.

- Include design considerations in developing subarea plans.

- Study the feasibility of creating a local improvement district in the CBD to help fund local improvements.

- Encourage ongoing development of an individual identity for the International District.

- Develop an urban design manual for commercial and industrial development to provide information to developers regarding the architectural and landscape standards that would be applied to a project in an effort to streamline the project review and application process.

Economic Development Implementation Strategies

- Develop a policy to clarify the types of economic development incentives that could be offered by the City, and work with the Enterprise Consortium to take advantage of the incentive programs available to designated areas of Lakewood.

- Maintain an active relationship with the Tacoma-Pierce County Economic Development Board and work with them to attract businesses to Lakewood.

- Identify those industries best suited to Lakewood such as military or transportation related, high-tech, medical services or biotechnology, and actively pursue ~~new~~ corporations to relocate or expand in Lakewood.

- Develop neighborhood business alliances which would focus the energy and resources of the local business community to create a sense of identity and improve communications between business owners and the City, as well as facilitate the use of business assistance resources.

- Develop and carry out periodic surveys of the business community to identify issues affecting the business community and to ensure retention efforts are focused appropriately.

- Maintain the ~~Implement a~~ business visit program by the City's Economic Development staff.

- Encourage home-based businesses which have outgrown the home to stay in Lakewood.

- Continue to develop and improve ~~Create~~ systems for information exchange between the City, real estate brokers, the development community, and the financial organizations to inform the City of new development trends, properties for sale,, vacancies, and economic development issues ~~inquiries~~.

- Take advantage of existing business assistance programs offered by partner organizations.
- In coordination with partner organizations, develop new assistance programs to fill unmet business training needs.
- Partner with educational institutions to take advantage of workforce training opportunities.
- Seek grant opportunities to support business development loan programs.
- Support existing business development loan programs to ensure their continued success.
- Devise cooperative ways to encourage small business development by working with local lending institutions.
- Develop and maintain an economic development component for the City Web site.
- Prepare profiles of successful Lakewood businesses to be used in marketing packets.
- Research and develop a demographic and economic profile as part of a marketing packet.
- Develop a promotional community brochure highlighting the special attributes of the community.
- Develop a marketing campaign targeted at regional business publications designed to attract business and promote a positive business image for Lakewood, while developing a publication and database of land available for development.
- Develop a "buy local" campaign to promote local businesses and decrease sales tax leakage.
- Create opportunities for Lakewood residents to learn how business contributes to the services and amenities enjoyed by those living in the Lakewood community.
- Create opportunities to showcase local businesses to draw attention to Lakewood's diverse business community.
- Create opportunities for the City to express support of the business community and express appreciation of its importance to the community.
- Develop relationships with other public and private organizations to capitalize on existing resources. Such partners may include the Lakewood Chamber of Commerce, Pierce County, City of Tacoma, Port of Tacoma, The Empowerment Consortium, Pierce College, Clover Park Technical College, Tacoma-Pierce County Economic Development Board as well as others.
- Explore the development of an annual "economic summit" to be conducted in association with our partner organizations and the business community in order to exchange information.
- Enhance communication linkages between the City, business community, property owners, the Korean Business Association, and other business organizations.
- Facilitate and support community events that attract visitors to the community such as LakeFolk Fest,

SummerFest, and Fort Steilacoom Days.

- Continue to work with the Tacoma-Pierce County Visitor and Convention Bureau and the Lakewood Chamber of Commerce to promote tourism.

- Create a tourism development strategy in conjunction with the Tacoma-Pierce County Visitor and Convention Bureau and Lakewood Chamber of Commerce.

- ~~Establish a~~ Maintain and develop the Lakewood Lodging Tax Advisory Board and lodging tax funding program.

- Develop and implement a communications program to "sell" Lakewood as a preferred location for development of new businesses.

- Study and report on commercial demand leakage and pursue projects and strategies to keep retail dollars in Lakewood.~~, and devise potential mechanisms to deter, commercial leakage.~~

- Identify a funding base for and provide loans for business expansion, apart from startups.

Transportation Implementation Strategies

- Develop pedestrian overlay zones for the CBD and Lakewood Station district.

- Complete funding and implementation of reconstruction of the Pacific Highway Southwest corridor to add curb, gutter and sidewalks as well as add landscaping elements and improve signage.

- Provide local support for the reconstruction of the I-5/SR 512 interchange and grade separation at 100th Street SW and Lakeview Drive.

- Provide local support for the construction of ~~the Lakewood~~ a Sounder Station in Tillicum. The station could also serve as an Amtrak station if Amtrak service is added to the Sound Transit rail line.

- Identify the gateways to Lakewood and construct entry signage and install landscaping.

Capital Facilities Implementation Strategies

- As part of the capital facilities plan, develop public policies that assign public dollars to areas targeted for redevelopment. Use the capital facilities plan to identify funding strategies including the use of public bonds, local improvement districts, public-private partnerships, and grants to focus the phased construction of public facilities and infrastructure. This policy also includes regularly updating the capital facilities plan to reflect any changes in financing strategies.

- Develop an equitable process for siting essential public facilities that balances developer certainty with the public interest.

10.4 Public Involvement

The City values the involvement and input of all its citizens in planning issues. Considerable public involvement and input has been sought and offered with regard to the comprehensive plan and its succeeding amendments, and the zoning code and development regulations. As work programs evolve to support the

plan's implementation, additional targeted public involvement processes may be used to gain further insight as to how the community might wish to achieve comprehensive plan goals and policies. As the comprehensive plan unfolds, the City should remain mindful of creating meaningful opportunities for public involvement in the creation and institution of programs and practices geared toward plan implementation. These will not be "one-size-fits-all" efforts but may use differing techniques and tools depending on the scope and nature of the issue at hand, and the level of participation being sought.

Responsibility for citizen involvement in shaping the City's activities lies not only at the City's level in creating opportunities, but also at the citizens' level in availing themselves of those opportunities. The City will make every effort to inform people of involvement and input processes; but in order to be truly effective, citizens must accept personal responsibility for informing themselves of the issues and responding to the City. The highest potential for contribution lies in early and continuous involvement.

10.5 Enforcement

At the policy level, Community Development staff will monitor the relationship of the comprehensive plan to other City activities and policy undertakings, providing information to City administration and elected officials as necessary to make informed decisions in keeping with the adopted plan. Enforcement of regulations adopted pursuant to the comprehensive plan routinely occur through the activities of the City's code enforcement staff.

10.6 Amendments

The comprehensive plan can be amended only once yearly, except as provided in state law. Changes to the comprehensive plan may occur only after analysis, full public participation, notice, and environmental review.

Proposed amendments each calendar year shall be considered not only on their own merits, but concurrently so that the cumulative effect of the proposals can be determined. To begin the process of entertaining amendments to either the plan's goals and policies or the Future Land-Use Map, staff shall promulgate an application process that involves, at minimum, the following information:

- A detailed statement of what is proposed to be changed and why;
- A statement of anticipated impacts of the change, including geographic area affected and issues presented;
- A demonstration of why the existing comprehensive plan guidance should not continue or is no longer relevant;
- A statement of how the proposed amendment complies with the state GMA's goals and specific requirements;
- A statement of how the proposed amendment complies with the CWPP; and
- Identification of any changes to zoning or development regulations, other plans, or capital improvement programs that will be necessary to support the change, together with identification of funding sources if capital change is involved.

Details for review of amendments is set forth in the Lakewood Municipal Code and details the type and level of information to be required for each type of amendment (policy or map), public notice and participation, environmental review, and methods for cumulative impact analysis of separate proposals. As with any application and review process, the City may charge fees for plan amendments, consistent with the City's approved fee schedule.

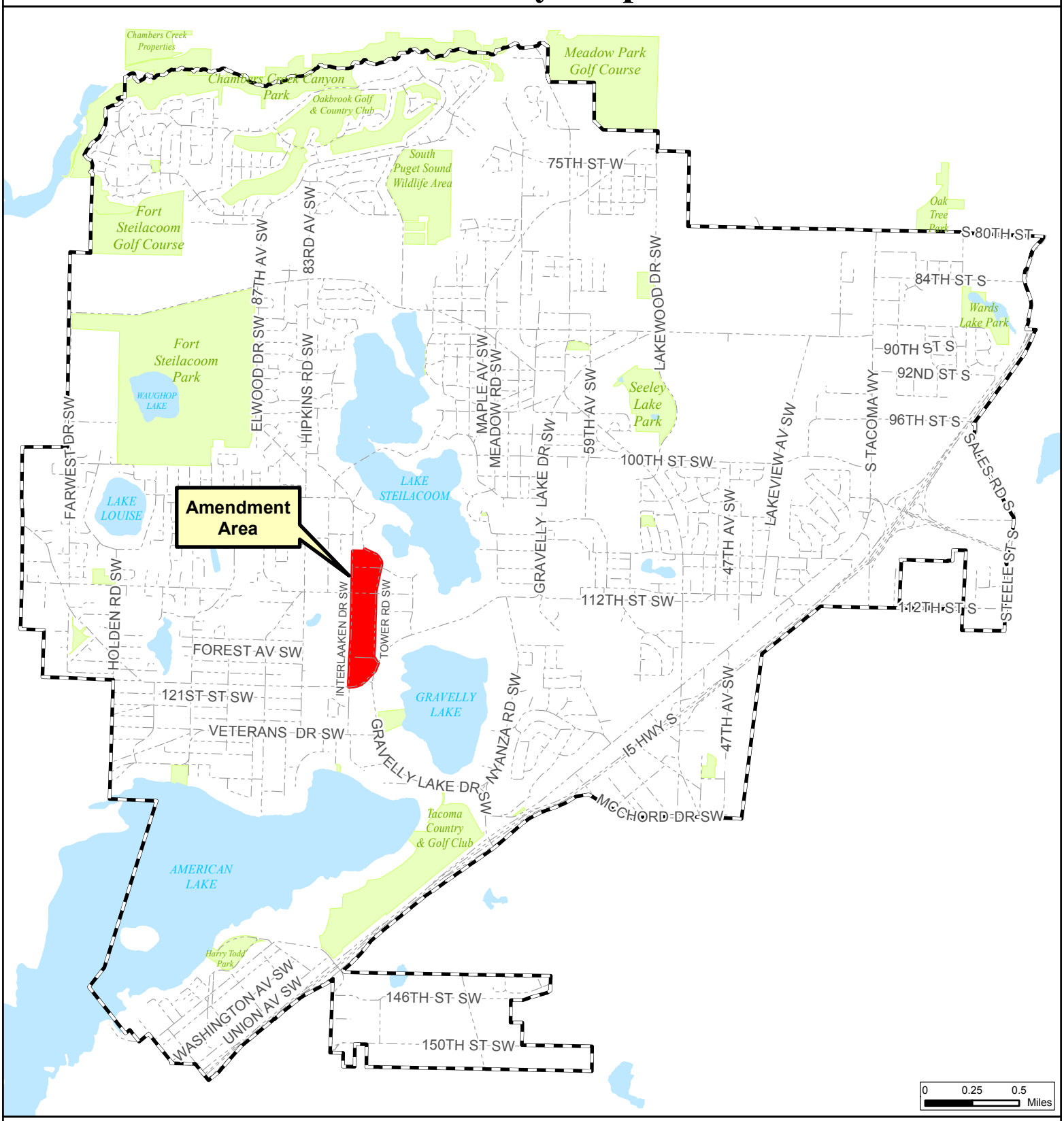
10.7 Periodic Review

The comprehensive plan, in accordance with state law, shall be formally reviewed in its entirety every seven years following the 2015 update~~04 review~~, per RCW 36.70A.130(4)(a). The review should include an analysis of the effect on various plan elements of recent demographic trends and projections, land-use trends and demand, economic trends, statutory requirements and relevant case law, and any other data that is deemed relevant at the time. Under RCW 36.70A.130(3), the County shall review its designated UGAs and densities against anticipated population growth for the succeeding 20-year period. In conjunction with this review, the City shall review its UGAs and population densities and determine the efficacy of, and any changes that may be sought to, growth boundaries.

To effectively and flexibly respond to changing conditions, the specific review approach and process is to be developed administratively and may vary from one periodic review to the next.

Monitoring to what degree the comprehensive plan is being met will be an integral part of the periodic review process. This will enable the City to make mid-course corrections to accomplish or refine goals and policies to more capably respond to local needs. For the 2004 review, an attempt to wholly revamp the plan was not seen as appropriate. In only four years since its adoption, and three since adoption of new development regulations, much of what is envisioned under the plan has not had the opportunity to come to fruition. Therefore, the initial review was quite limited in scope. For later review periods, the City may wish to consider intermediate benchmarking practices to quantifiably measure the comprehensive plan's outcomes and to identify trends that may indicate needed changes. For example, measuring the amount of vacant land used for new development each year and how dense the growth is on this land offers a picture of how quickly and efficiently that vacant land supply is being used.

Map 1
CPA 2015-01
Vicinity Map



Map Date: September 29, 2015

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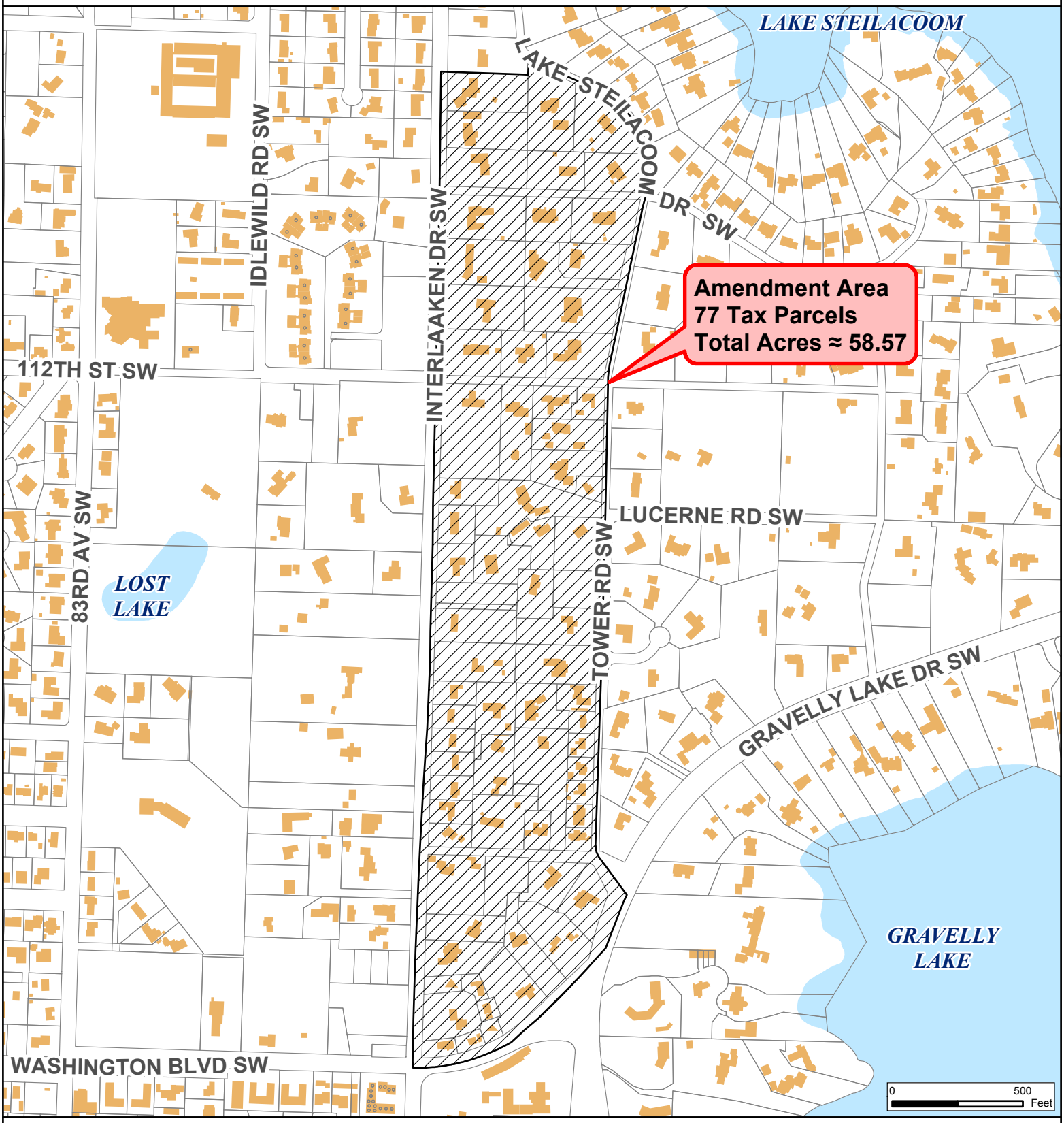
Lakewood City Limit

Map 2
CPA 2015-01
General Information



Map Date: September 30, 2015

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Amendment Area

Building

Tax Parcel

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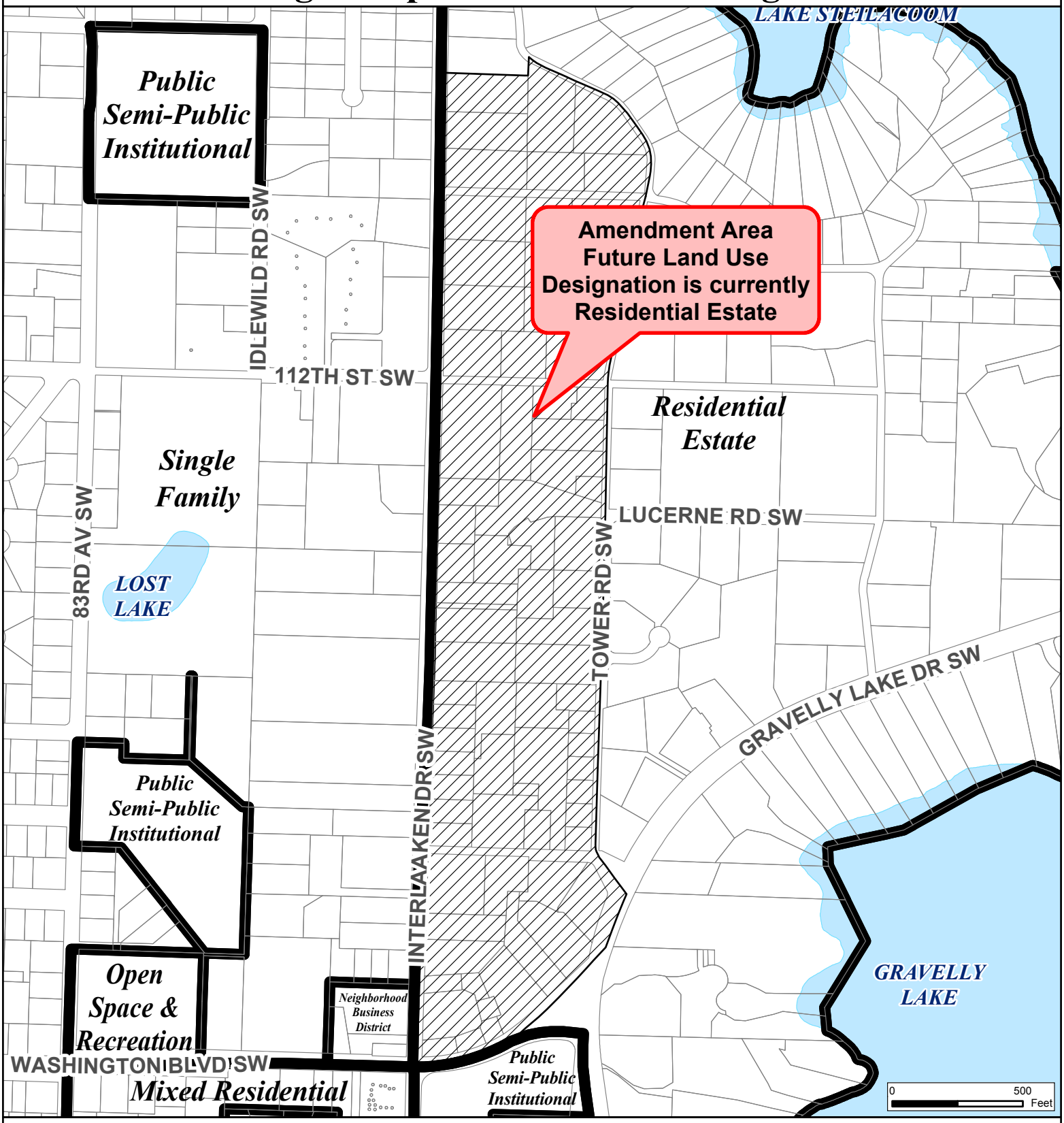
Map 3
CPA 2015-01
Existing Comprehensive Plan Designation



Map Date: September 30, 2015

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Amendment Area

Tax Parcel

Future Land Use Designation

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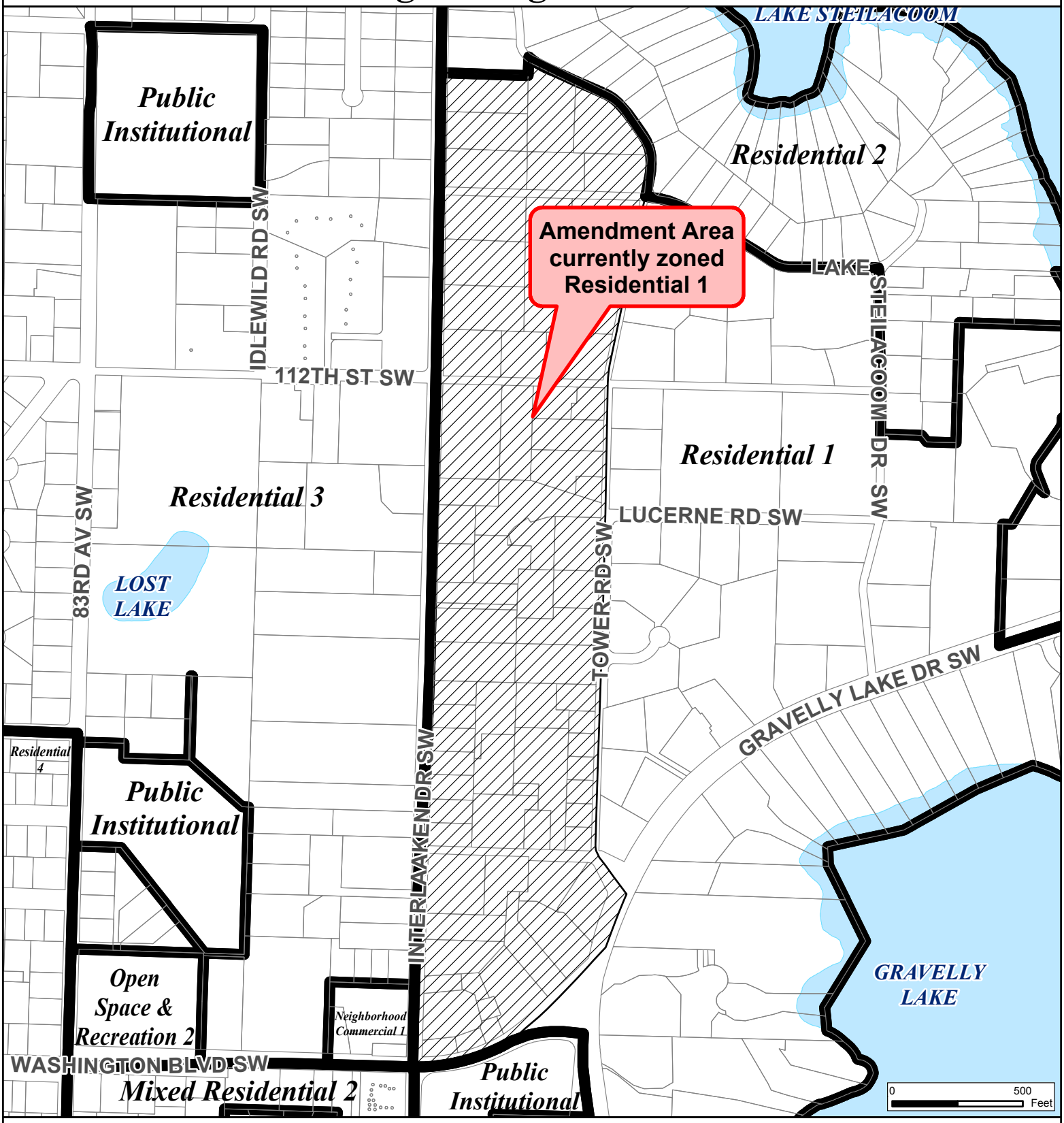
Map 4
CPA 2015-01
Existing Zoning Classification



Map Date: September 30, 2015

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Amendment Area

Tax Parcel

Zoning Classification

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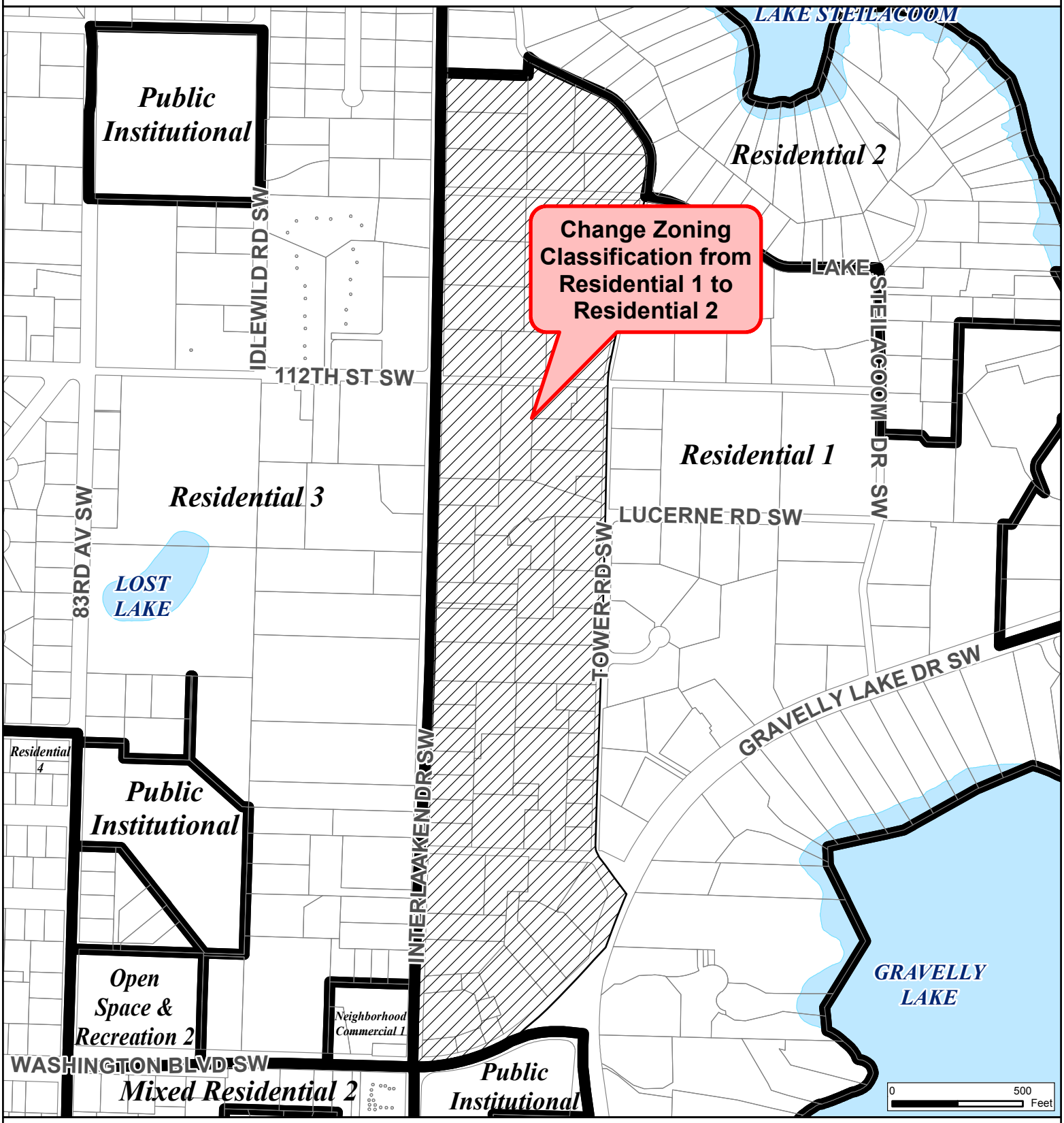
Map 5 - CPA 2015-01
Proposed Zoning Classification
Residential 2



Map Date: September 30, 2015

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Amendment Area

Tax Parcel

Zoning Classification

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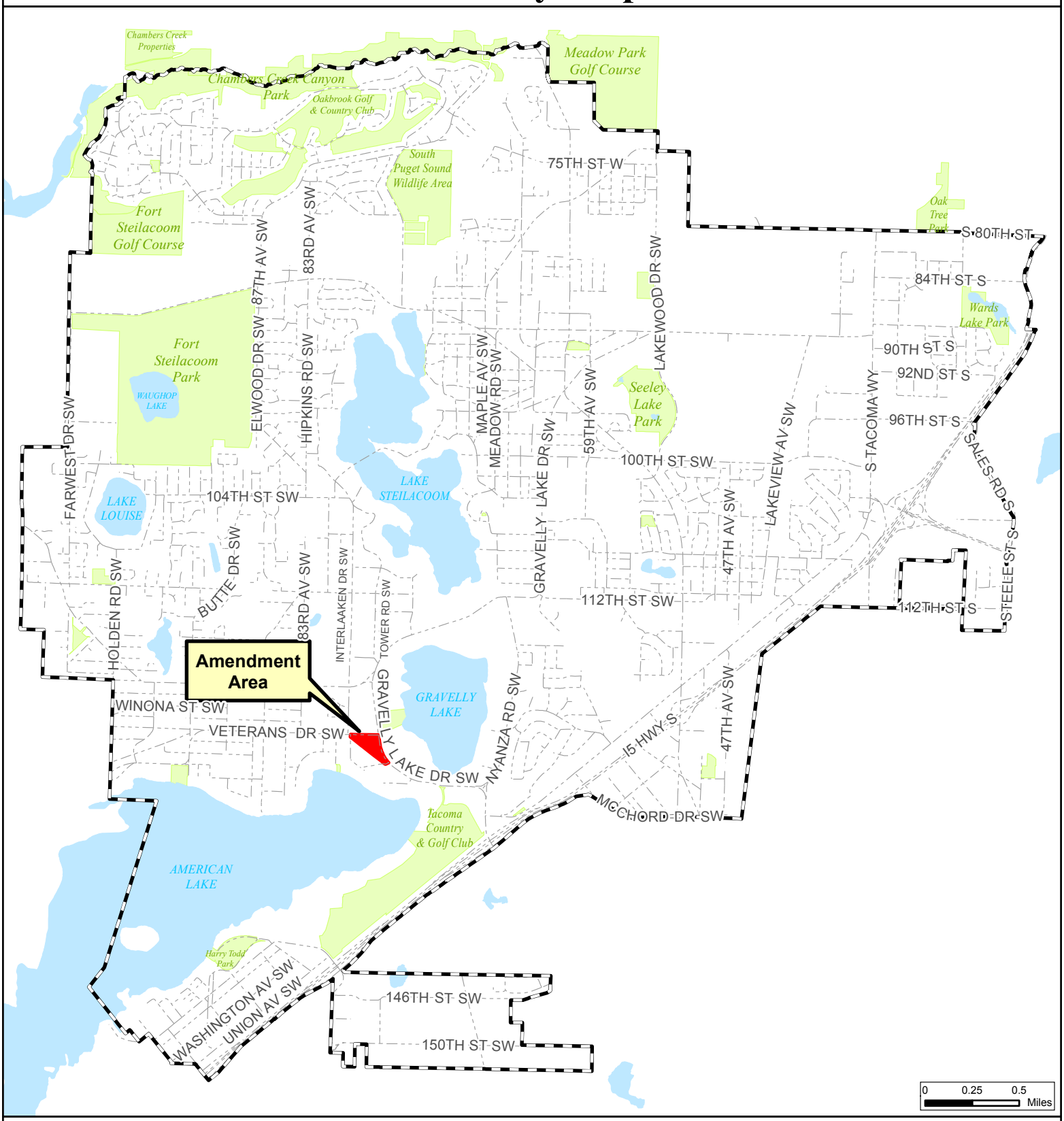
Map 1
CPA 2015-02
Vicinity Map



Map Date: September 29, 2015

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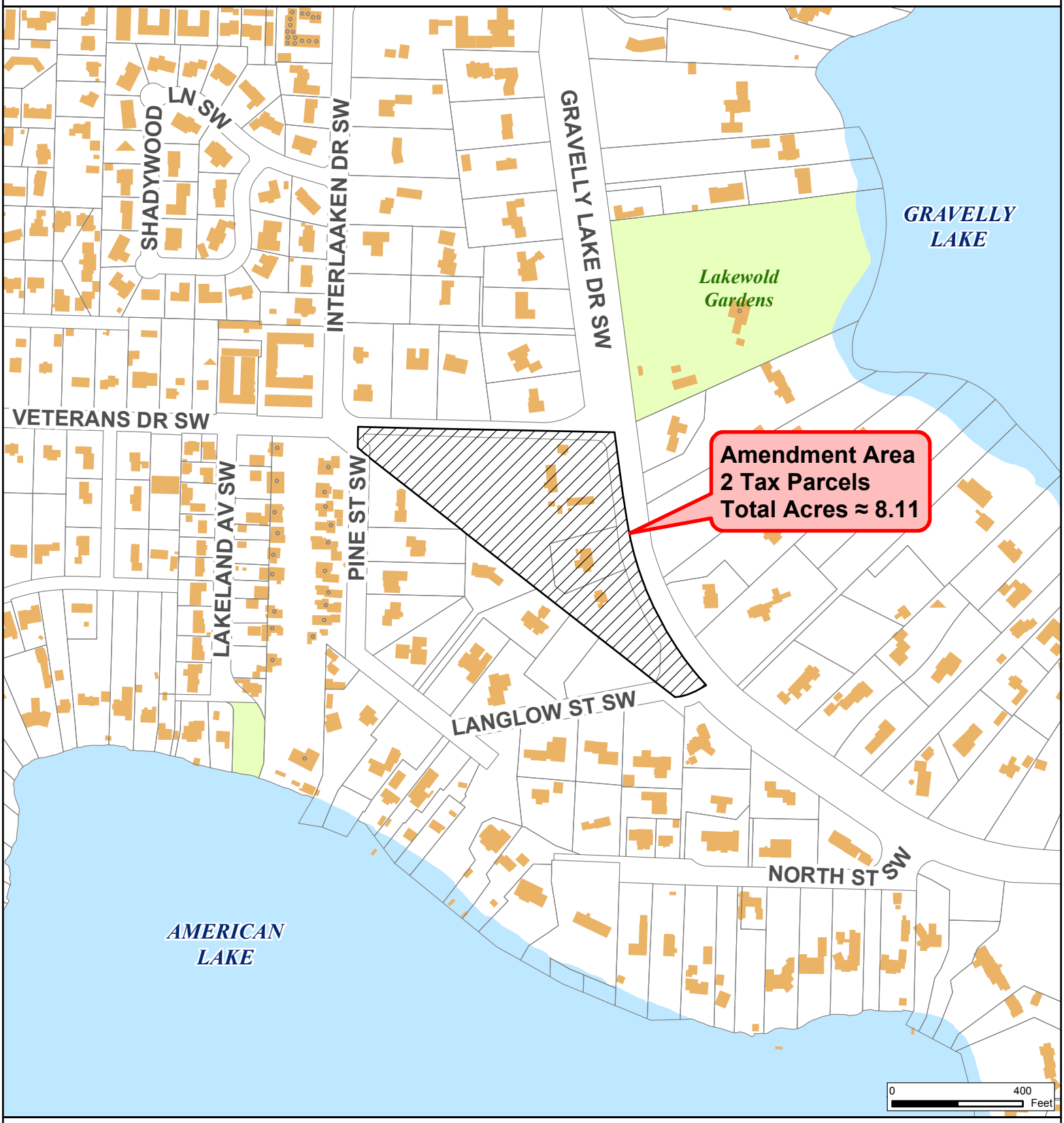
Lakewood City Limit

Map 2
CPA 2015-02
General Information



Map Date: September 30, 2015

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Amendment Area

Building

Tax Parcel

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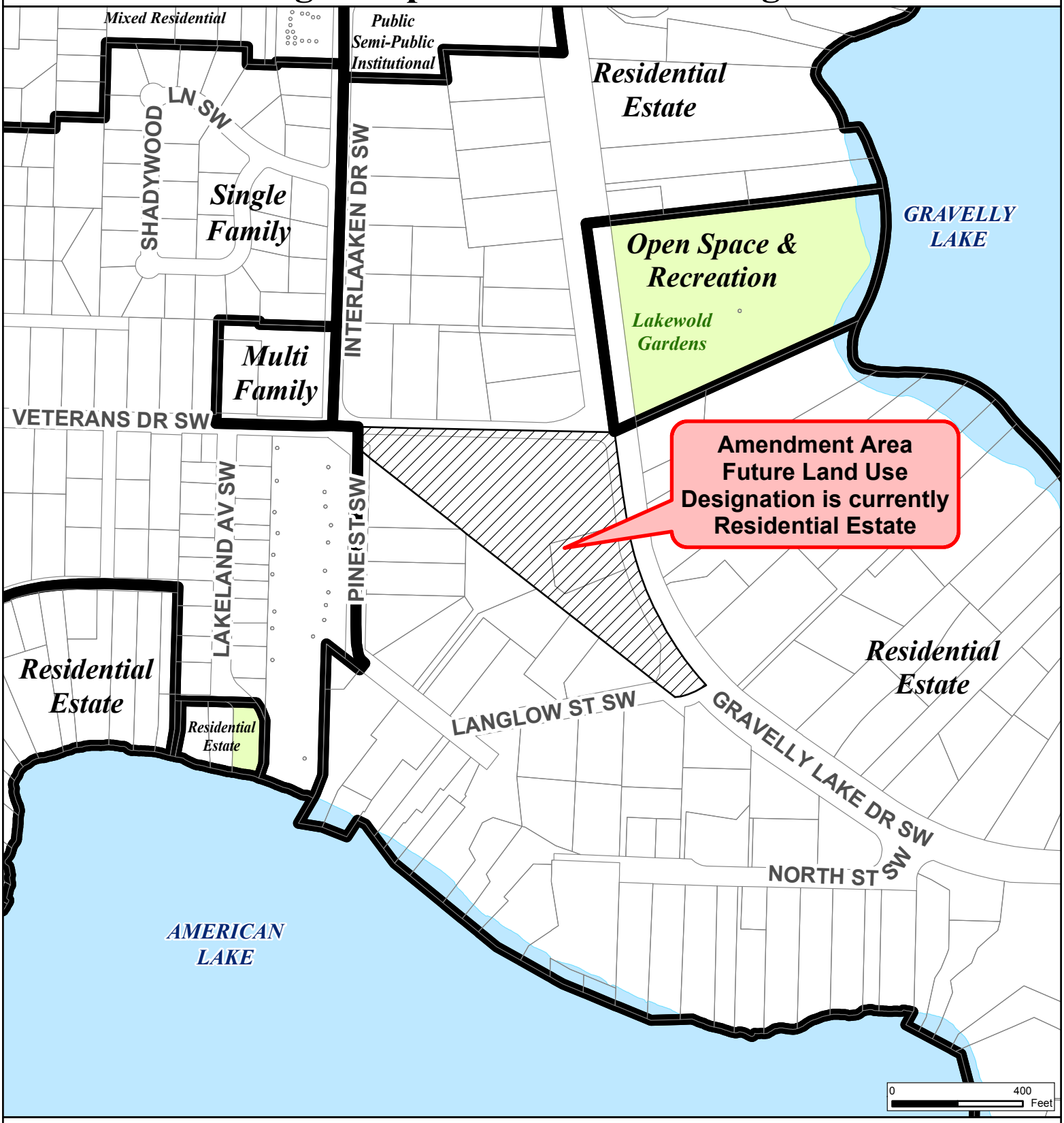
Map 3
CPA 2015-02
Existing Comprehensive Plan Designation



Map Date: September 30, 2015

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Amendment Area

Tax Parcel

Future Land Use Designation

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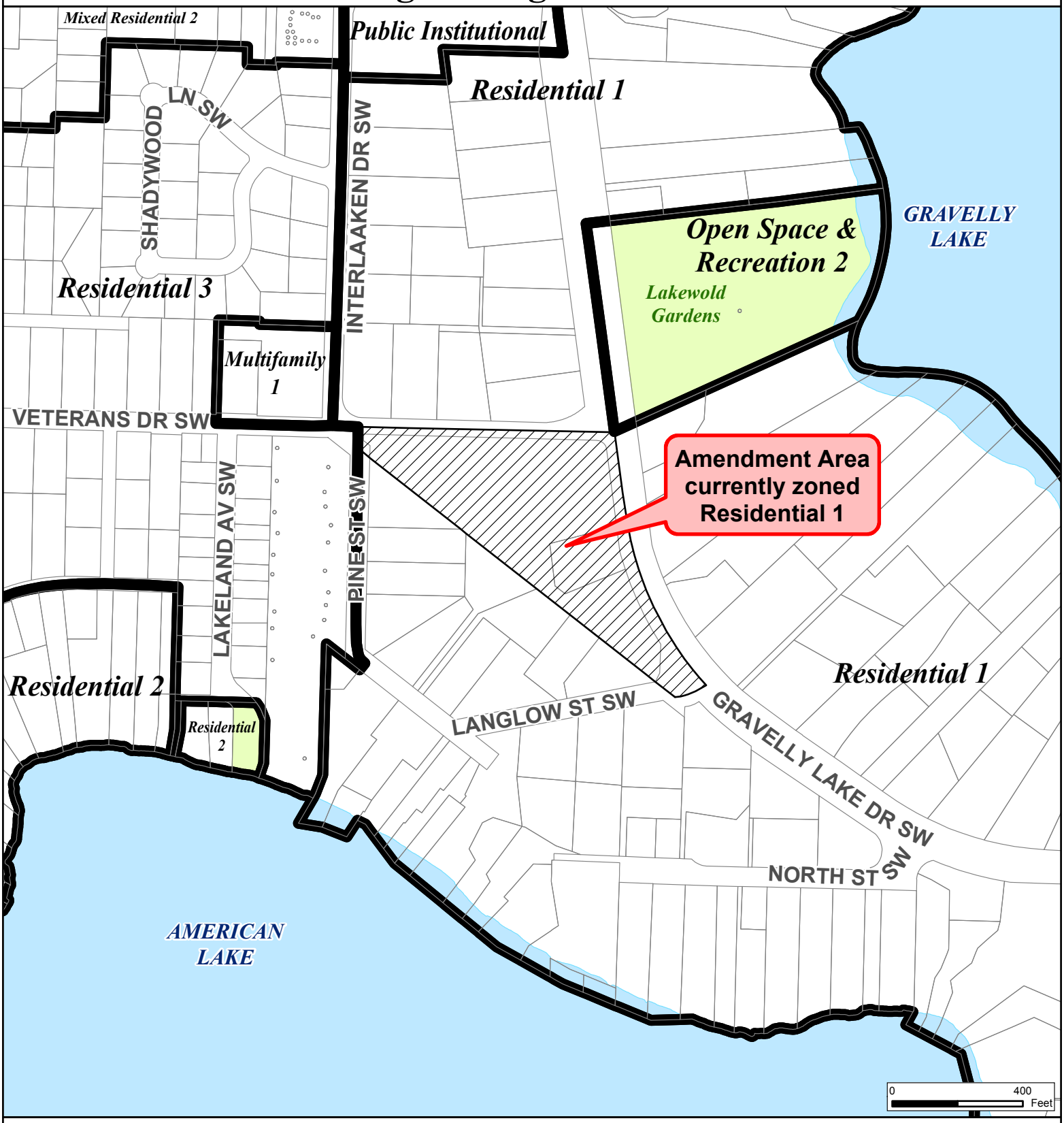
Map 4
CPA 2015-02
Existing Zoning Classification



Map Date: September 30, 2015

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Amendment Area

Tax Parcel

Zoning Classification

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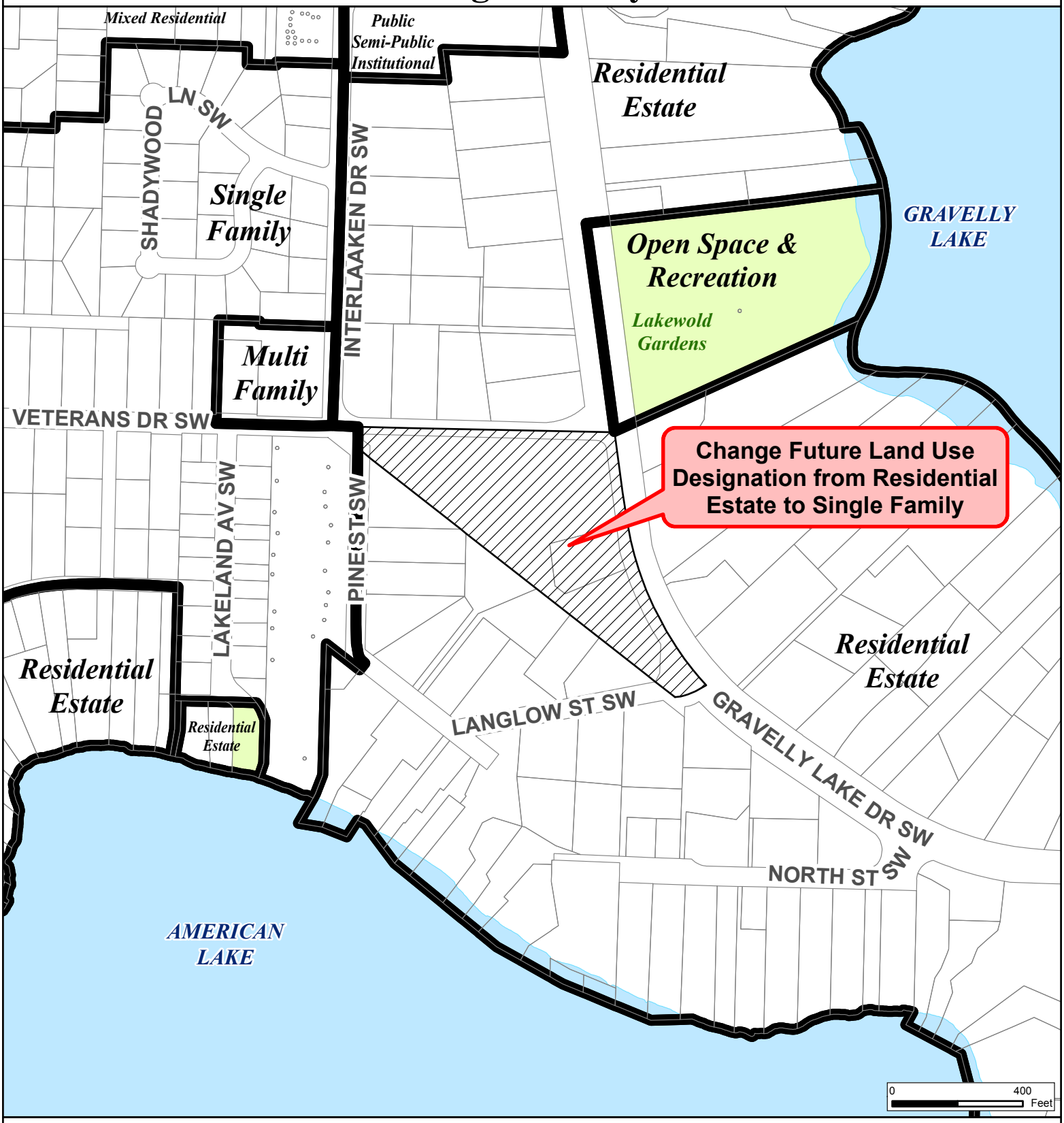
Map 5 - CPA 2015-02
Proposed Comprehensive Plan Designation
Single Family



Map Date: September 29, 2015

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Amendment Area

Tax Parcel

Future Land Use Designation

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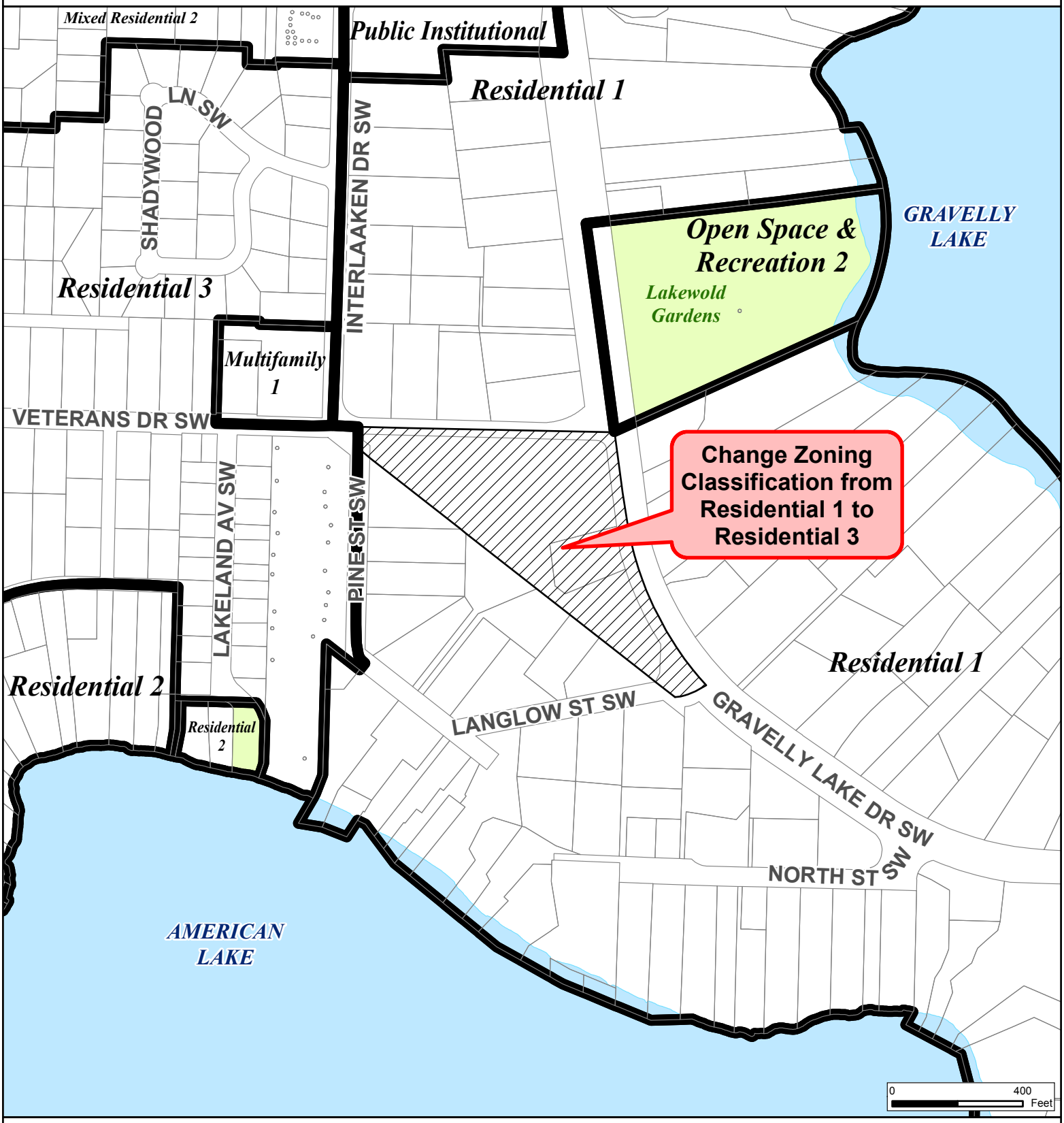
Map 6 - CPA 2015-02
Proposed Zoning Classification
Residential 3



Amendment Area

Tax Parcel

Zoning Classification

Map Date: September 29, 2015

:\projects\cd\CompPlan\Amendments\2015\CPA2-Map6.mxd

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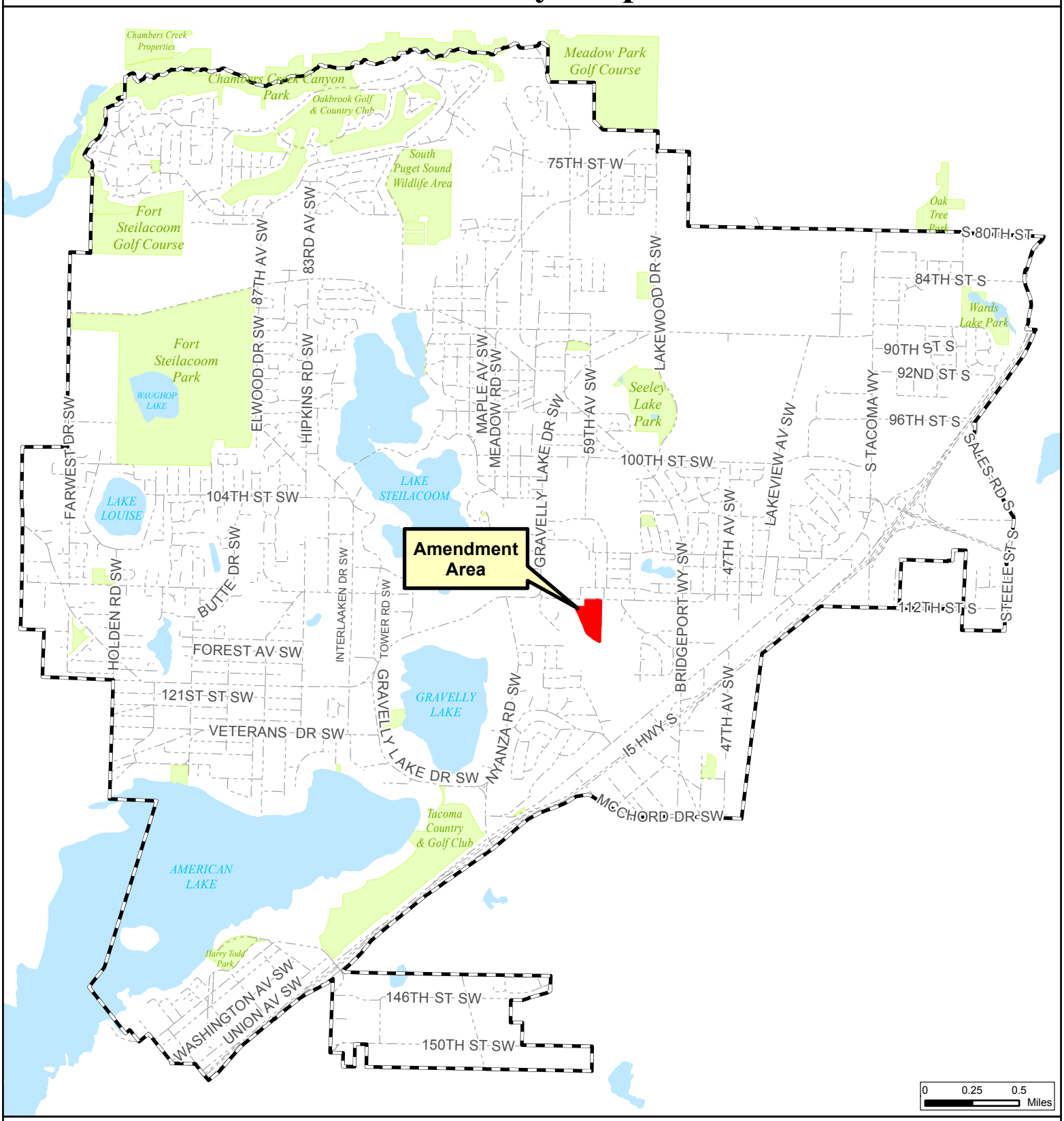
Map 1
CPA 2015-03
Vicinity Map



Map Date: September 30, 2015

:\projects\cd\CompPlan\Amendments\2015\CPA3-Map1.mxd

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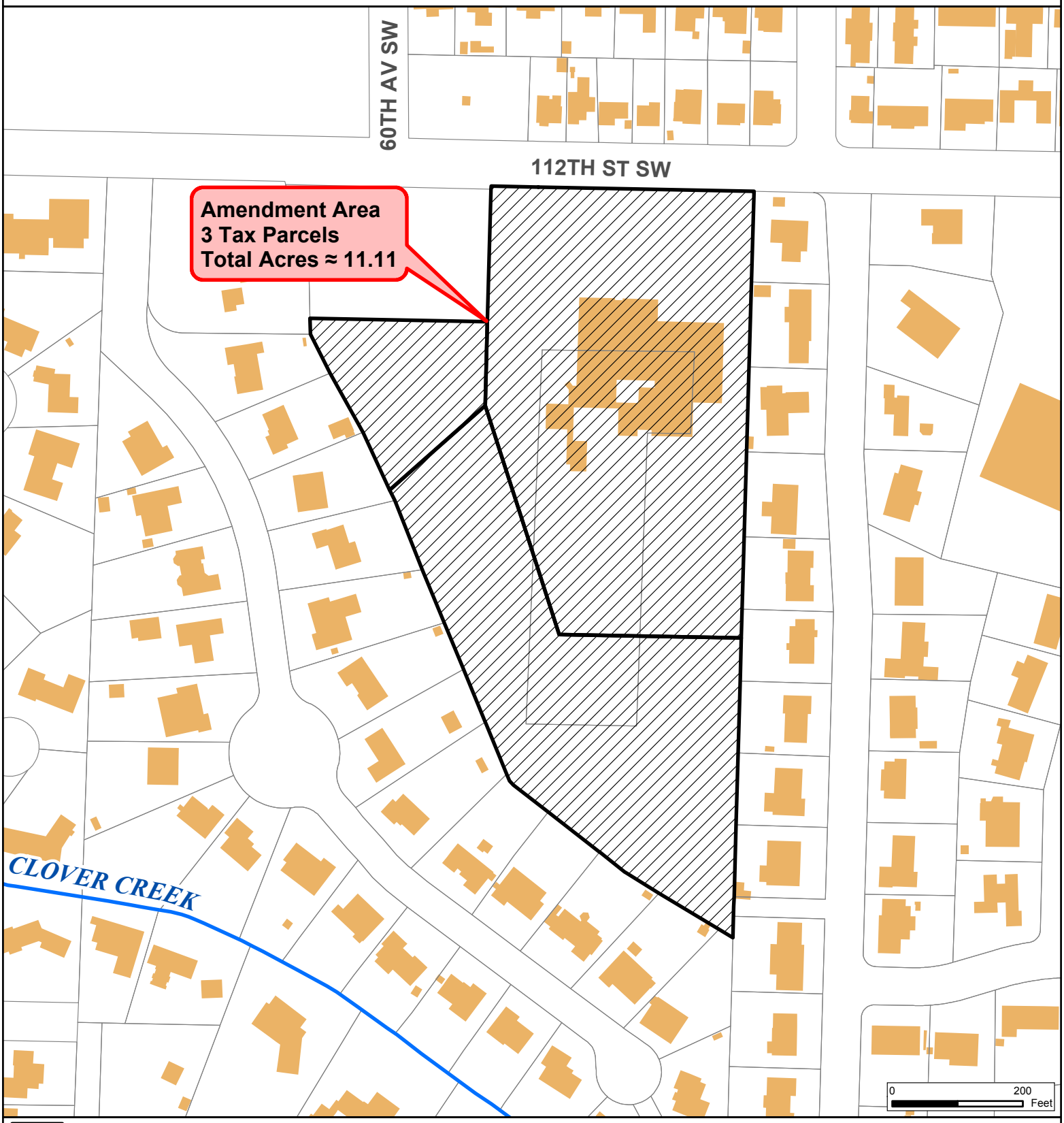
Lakewood City Limit

Map 2
CPA 2015-03
General Information



Amendment Area*

Building

Tax Parcel

*Amendment Area based partially on exhibits from AustinCina Architects.
Said exhibits conflict with record of survey and short plat dimensions for this area.

Map Date: September 30, 2015

:\projects\cd\CompPlan\Amendments\2015\CPA3-Map2.mxd

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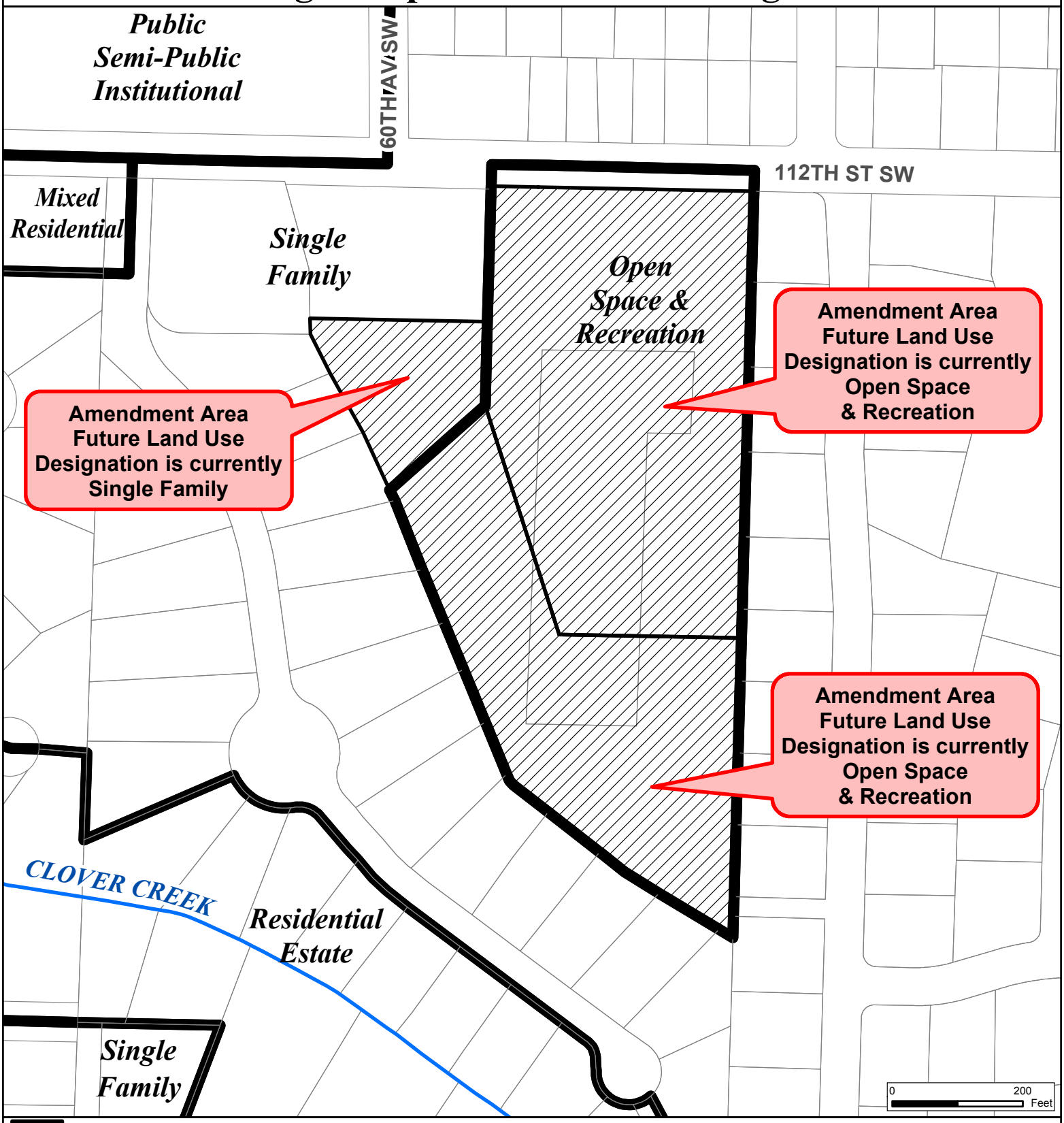
Map 3
CPA 2015-03
Existing Comprehensive Plan Designation



Amendment Area*

Tax Parcel

Future Land Use Designation

*Amendment Area based partially on exhibits from AustinCina Architects.
Said exhibits conflict with record of survey and short plat dimensions for this area.

Map Date: October 01, 2015

:\projects\cd\CompPlan\Amendments\2015\CPA3-Map3.mxd

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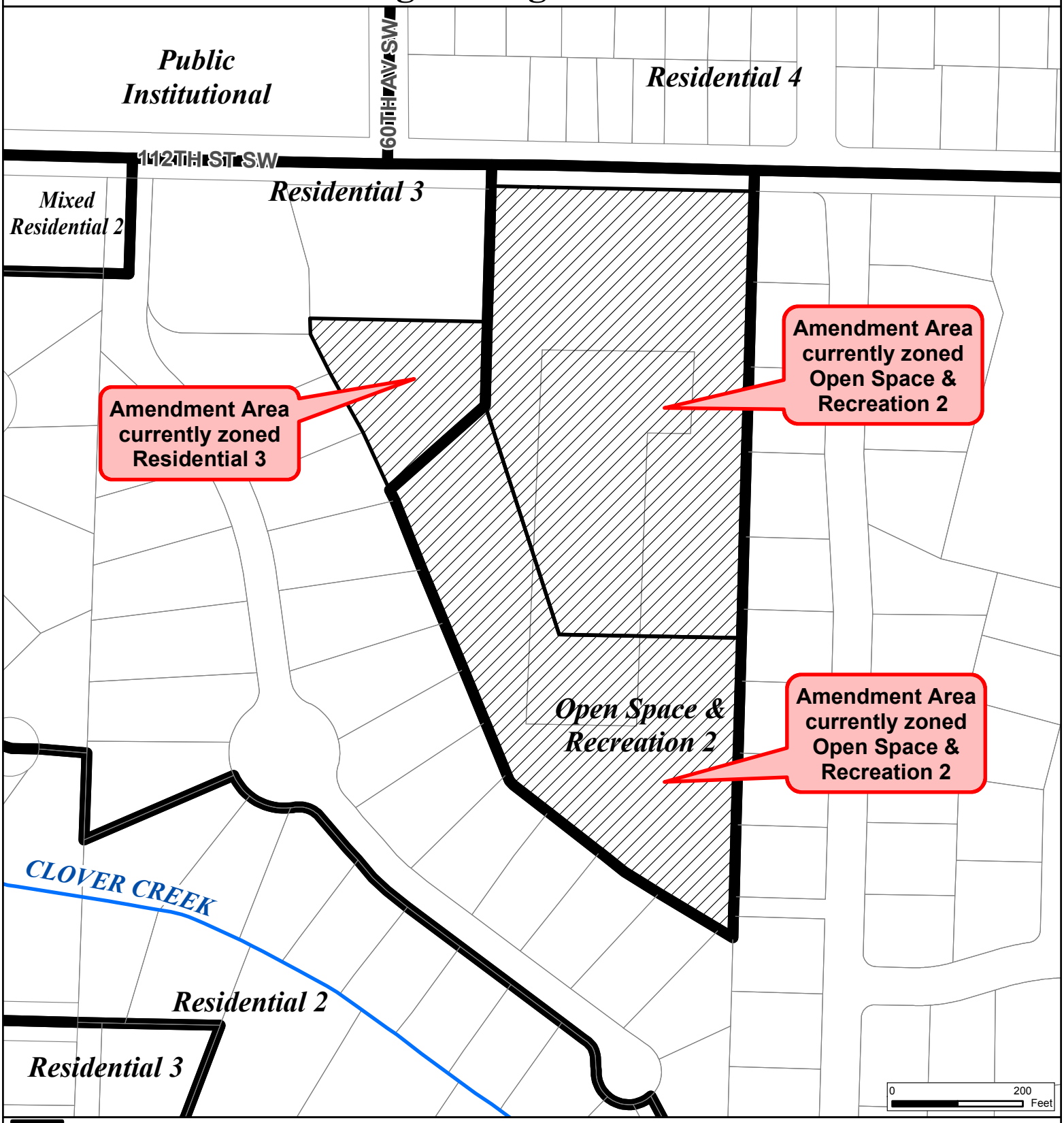
Map 4
CPA 2015-03
Existing Zoning Classification



Amendment Area*

Tax Parcel

Zoning Classification

*Amendment Area based partially on exhibits from AustinCina Architects.
Said exhibits conflict with record of survey and short plat dimensions for this area.

Map Date: October 01, 2015

:\projects\cd\CompPlan\Amendments\2015\CPA3-Map4.mxd

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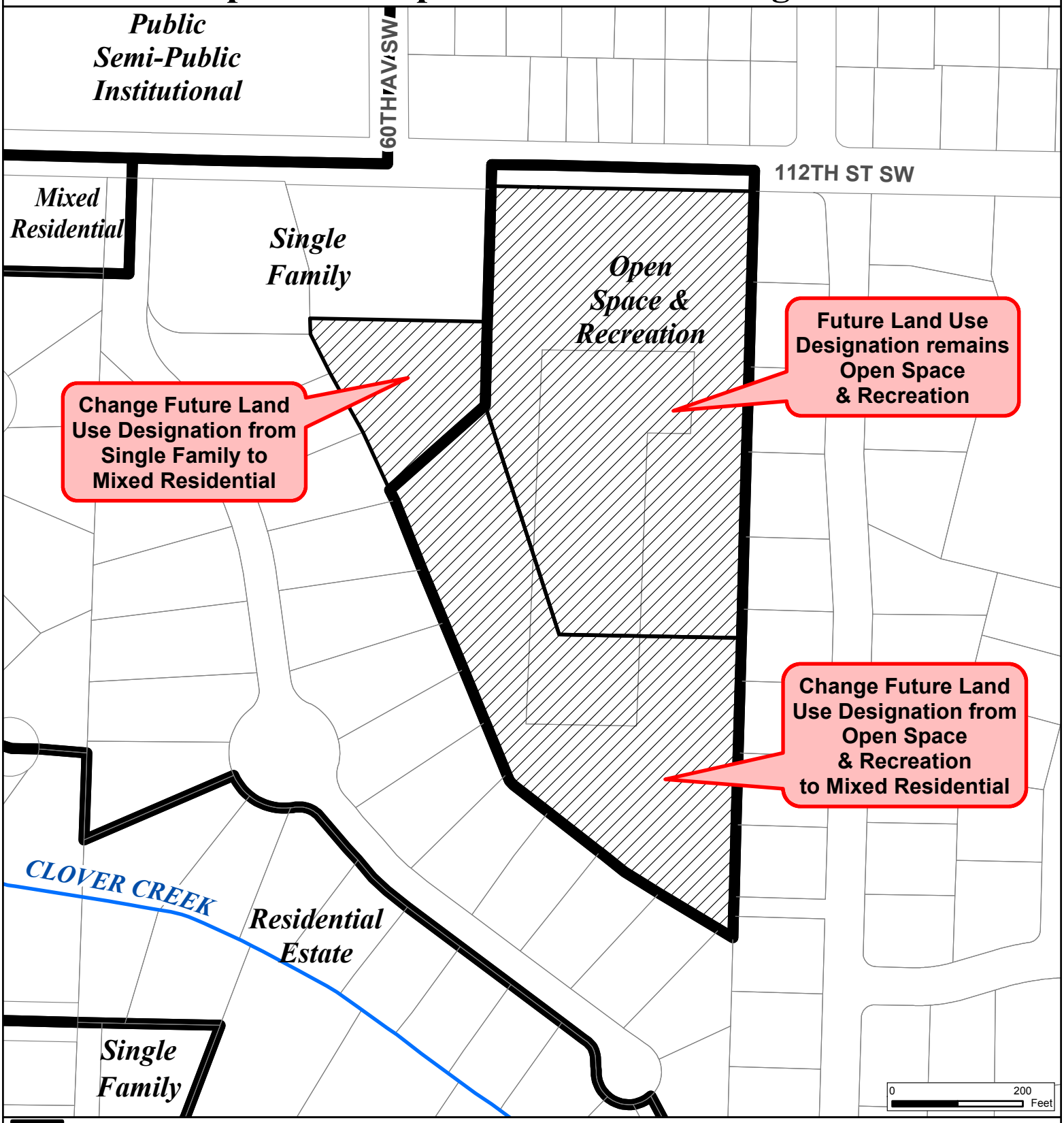
Map 5
CPA 2015-03
Proposed Comprehensive Plan Designation



Amendment Area*

Tax Parcel

Future Land Use Designation

*Amendment Area based partially on exhibits from AustinCina Architects.
Said exhibits conflict with record of survey and short plat dimensions for this area.

Map Date: September 30, 2015

:\projects\cd\CompPlan\Amendments\2015\CPA3-Map5.mxd

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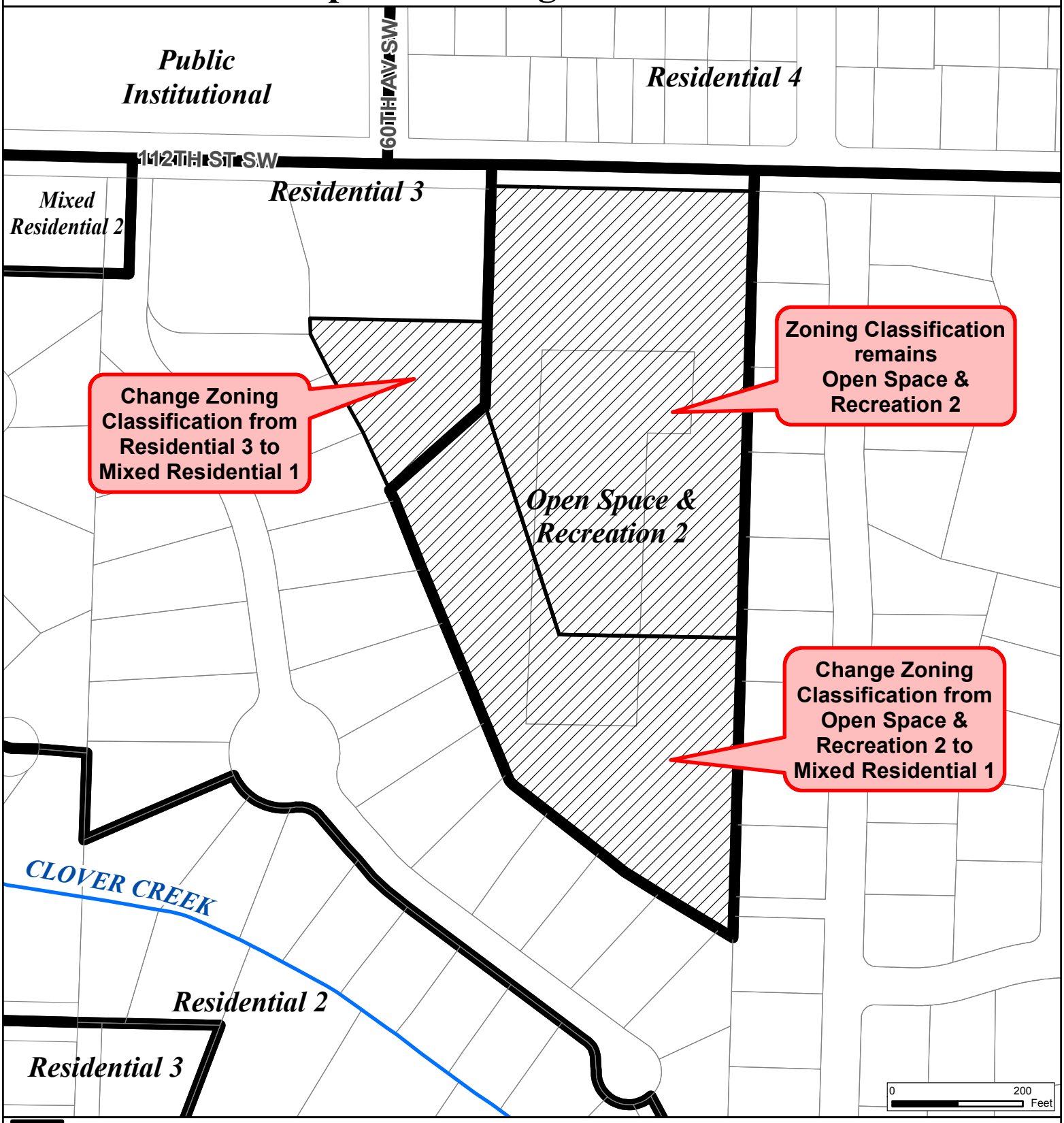
Map 6
CPA 2015-03
Proposed Zoning Classification



Amendment Area*

Tax Parcel

Zoning Classification

*Amendment Area based partially on exhibits from AustinCina Architects.
Said exhibits conflict with record of survey and short plat dimensions for this area.

Map Date: September 30, 2015

:\projects\cd\CompPlan\Amendments\2015\CPA3-Map6.mxd

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RESOLUTION OF INTENT OF THE LAKEWOOD PLANNING COMMISSION TO CONSIDER AMENDING THE LAKEWOOD COMPREHENSIVE PLAN AND THE LAKEWOOD LAND USE DEVELOPMENT REGULATIONS

WHEREAS, the Lakewood Comprehensive Plan was amended in 2014; and

WHEREAS, the 2014 amendments to the Comprehensive Plan established policies to increase single family housing development opportunities;

WHEREAS, the Lakewood City Council adopted a work plan of the Planning Commission to investigate such opportunities; and

WHEREAS, the Lakewood Community Development Department reviewed geographic areas within the community by which to promote new single family housing; and

WHEREAS, this information was presented to the Lakewood Planning Commission on January 21, 2015, March 4, 2015, and March 18, 2015; and

WHEREAS, the Lakewood Municipal Code, Chapter 18A.2, allows the Lakewood Planning Commission to initiate land use amendments by the adoption of a Resolution of Intent; and

WHEREAS, at the Community Development Director prepared a Draft Resolution of Intent to amend the Comprehensive Plan and Zoning Maps on behalf of the Lakewood Planning Commission; and

WHEREAS, the Lakewood Planning Commission considered the Resolution of Intent on the 15^{d} day of April, 2015.

NOW THEREFORE BE IT RESOLVED AS FOLLOWS:

The Lakewood Planning Commission hereby adopts a Resolution of Intent to consider:

Amending the Zoning Map for residential properties found east of Interlaaken Drive SW and west of Tower Road SW, south of Gravelly Lake Drive SW, and generally north of Lake Steilacoom Drive SW, and as depicted on Map 1 contained in the department staff report to the Lakewood Planning Commission dated April 15, 2015; and

Amending the Comprehensive Plan from "Residential Estate" to "Single Family," and the zoning classification from "R1" to "R3," for two properties located at the southwesterly corner of Gravelly Lake Drive SW and Veterans Drive SW, and as depicted on Map 4 contained in the department staff report to the Lakewood Planning Commission dated April 15, 2015

The Planning Commission shall hold a public hearing on the proposed amendments, and make its recommendations to the Lakewood City Council in 2015.

PASSED AND ADOPTED THIS 15th DAY OF APRIL, 2015.

ATTEST:

Karen Devereaux,
Administrative Assistant &
Recorder

LAKEWOOD PLANNING
COMMISSION

Don Daniels,
Planning Commission Chair

COMPREHENSIVE PLAN/ZONING MAP AMENDMENT

FEES: COMP PLAN TEXT AMENDMENT.....$600
W/ ZONING TEXT AMENDMENT.....$1440
SEPA CHECKLIST...ADD'NL. $480

APPLICATION #: LU 15-00039 (OFFICE USE ONLY) **RECEIPT #:** 001984-0005 (OFFICE USE ONLY)

ADDRESS/LOCATION: 5820 112th Street SW

ASSESSOR'S TAX PARCEL(S) NUMBER: 0219111038, 0219111040, 3097000312, 7095000820

¼ SECTION _____ **SECTION** 11 **TOWNSHIP** 19 **N RANGE** 02 **E**

APPLICANT: (mandatory)

Name: Lakewood Racquet and Sport Club Daytime Phone: 253.582.6311

Mailing Address: 5820 112th Street SW E-mail: brucelrc@gmail.com

City/State/Zip: Lakewood, WA 98499 Fax Number: _____

Signature: _____

PROPERTY OWNER 1: (mandatory if different from applicant)

Name: _____ Daytime Phone: _____

Mailing Address: _____ E-mail: _____

City/State/Zip: _____ Signature: _____

PROPERTY OWNER 2: (if more than two property owners attach additional info/signature sheets)

Name: _____ Daytime Phone: _____

Mailing Address: _____ E-mail: _____

City/State/Zip: _____ Signature: _____

We, the above signed property owners certify that the above information is true and correct to the best of our knowledge and under penalty of perjury, each state that we are all of the legal owners of the property described above and designate the following party to act as our agent with respect to this application:

AGENT / CONSULTANT / ATTORNEY: ☐ Same as applicant above; OR

Name: AustinCina Architects, ps Daytime Phone: 253.531.4300

Mailing Address: 12202 Pacific Avenue Suite C E-mail: mikecina@austincina.com

City/State/Zip: Tacoma, WA 98444 Fax Number : 253.537.6542

OFFICE USE ONLY:

DATE APPLICATION RECEIVED: _____ RECEIVED BY: _____

INSTRUCTIONS FOR
COMPREHENSIVE PLAN/ZONING MAP AMENDMENTS

Amendments to the City's Future Land-Use Map and/or zoning map will be considered by the Planning Advisory Board (PAB) after staff review/recommendations and a public hearing. The PAB will then make a recommendation to the City Council, which will approve or deny each proposed amendment. Under state law, amendments can only be considered once each calendar year, and all of the proposed amendments for the year must be considered concurrently in order to assess their cumulative impact.

This process has an application deadline established each calendar year. All requested information must be provided and fees fully paid by that deadline, or the application may be returned as incomplete and may not proceed until a subsequent amendment cycle. An environmental checklist must also be completed and submitted in conjunction with this application. If both text and map amendments are being sought, one checklist may be prepared to address both.

DESCRIPTION OF PROPOSAL:

	CURRENT DESIGNATION	REQUESTED DESIGNATION
FUTURE LAND-USE MAP:	Open Space & Recreation	Mixed Residential
ZONING MAP:	Open Space & Rec. 2 and Residential 3	MR

FOR *COMPREHENSIVE PLAN MAP* AMENDMENTS, PLEASE ADDRESS THE FOLLOWING AMENDMENT CRITERIA. Please read the criteria below (underlined and in this font) and, on one or more separate pages, answer the questions accompanying them:

1. A detailed statement of what is proposed to be changed and why. What changes are you requesting, and what is the reason or rationale for them?

2. A statement of anticipated impacts of the change, including geographic area affected and issues presented. What impact will the requested change have on the area surrounding the site(s)?

3. A demonstration of why the existing comprehensive plan guidance should not continue or is no longer relevant. What about the current comprehensive plan designation is inappropriate, incorrect, or no longer relevant that would dictate the requested amendment?

4. A statement of how the proposed amendment complies with the state Growth Management Act's goals and specific requirements. Please review the requirements of RCW 36.70A, available online at <http://apps.leg.wa.gov/RCW/default.aspx?cite=36.70A>. How will the proposed amendment comply with this law?

COMPREHENSIVE PLAN MAP AMENDMENTS

1. A detailed statement of what is proposed to be changed and why.

We are requesting that the current land owned by Lakewood Racquet and Sport Club (LRSC) be reconfigured and rezoned to allow the development of a residential community on that portion of land that LRSC has established as excess land. LRSC's property currently consists of (4) parcels of land. Two of the parcels are zoned Open Space & Recreation 2 with the other (2) zoned Residential Three. Our request is to leave the OS&R2 zone on that portion of land occupied by LRSC and rezone the remaining land to MR zone which would allow the development of a planned residential community comprised of approximately 26 single family homes set on common grounds where maintenance and repairs of site and building exteriors are the responsibility of the HOA.

In 1962, Lakewood Racquet and Sport Club began operations on what is now approximately 11.4 acres. Over the years the club has expanded to offer more indoor tennis facilities, fitness center, racquetball and squash courts and swimming pool. After closure of Fircrest Tennis Club and all of the Bally's clubs, LRSC is only one of two Pierce County facilities offering indoor tennis courts. As a private club, LRSC has always made its facilities available to local high schools and colleges.

In the early 2000's, LRSC began the process of developing a long range strategic plan to address needed maintenance and repair project, plans for expansion of facilities and programs and also provide a method for financing projects. The final master plan showed that even at its full build out, the club would only occupy a little more that half the site. Being that the site is surrounded by private homes, the most logical use for the excess land would be for housing. The sale and development of this portion of land would become the financial means for funding repairs/maintenance and future expansion projects.

Please see attached master site plan for Lakewood Racquet and Sport Club.

2. A statement of anticipated impacts of the change, including geographic area affected and issues presented.

Considering that the site is surrounded by residential developments, our proposal should have no negative impacts. The long range plan calls for enhanced landscape buffers on the perimeter.

3. A demonstration of why the existing comprehensive plan guidance should not be continued or is no longer relevant.

As it currently stands, LRSC's site does not support the guidelines outlined in the comprehensive plan. Our proposal actually supports the plan's objectives of reducing sprawl, encouraging "in-fill" projects and supporting economic development by promoting the retention and expansion of existing businesses.

Development on vacant land of a planned residential community that is comprised of smaller, quality homes will create attainable housing opportunities. Our proposal will also provide an opportunity to "in-fill" land that will never be used by LRSC.

The ability to generate funds through the development of housing is the only viable option that will allow LRSC to improve and expand its current operations. The ability to improve and expand facilities and programs will require more staff, thus creating employment opportunities in the community.

4. A statement of how the proposed amendment complies with the state Growth Management Act's goals and specific requirements.

As presented in question #3, our proposal addresses most of the goals and requirements:

- Developing vacant, undeveloped land in an area where utilities and services already exist;
- Reducing sprawl by developing undeveloped land within an area already "built out":
- Providing attainable housing opportunities to a growing population of "empty nesters" seeking to downsize into single family homes without the requirements of having to directly provide maintenance and upkeep of grounds and building exteriors;
- Providing funding through the development of vacant land, LRSC can improve and expand facilities and programs that will allow LRSC to be a viable and much needed community asset;
- Expansion at LRSC will create more outdoor recreation opportunities in the community;

5. A statement of how the proposed amendment complies with the Countywide Planning Policies.

- As outlined in our responses to questions 3 and 4, our proposal brings the site more into compliance with countywide planning policies than currently exists.

6. Identify any changes to zoning or development regulations, other plans or capital improvement programs that will be necessary to support the change, together with identification of funding sources if capital change is involved.

Our proposal will require the following changes to zoning and development regulations:

- Boundary line adjustment to separate that property designated for LRSC's lone range strategic plan and the property that is currently zoned R3 which is planned for residential;
- Change the current R3 zone to MR zone to allow development which would allow our plans to create smaller fee-simple single-family residential lots located within a large common area tract that is controlled and maintained through the home owner's association;
- Create shared access from 112th Street onto the site, used by both the LRSC and the residential community;

LRSC's ability to fund repair/maintenance and future expansion projects, both critical to its survival, will rely upon the sales and development of their undeveloped land for residential development. The development of single family residences will help pay for off-site improvements along 112th street and contribute towards city impact fees.

COMPREHENSIVE ZONING MAP AMENDMENTS

1. The proposed amendment is consistent with the comprehensive plan.

   Our request will bring the site more into compliance with the goals and objectives of the comprehensive plan by:

   - Reducing sprawl by in-filling undeveloped with attainable single family residential development;
   - Providing off-site street improvements;
   - Developing in an area where utilities and services already exist;
   - Providing a funding source that Lakewood Racquet and Sport Club will have for maintenance/repair projects and needed expansion projects;
   - Expansion of LRSC will result in more employment opportunities in the community.

2. The proposed amendment and subsequent development of the site would be compatible with development in the vicinity.

   The site is surrounded with older residential subdivisions. Our request is to allow residential development on land that is undeveloped and deemed as surplus. Our proposal makes provisions for providing landscape buffers between existing residences and both the racquet club and the new residential development.

3. The proposed amendment will not unduly burden the transportation system in the vicinity of the property with significant adverse impacts which cannot be mitigated.

   Transportation services already exist to this site. The size of our proposed project should not burden the current transportation system.

4. The proposed amendment will not unduly burden the public services and facilities serving the property with significant adverse impacts which cannot be mitigated.

   Adequate utilities and services are already available to this area and site. As an "in-fill" project, we will be utilizing existing services and utilities that already serve the site and surrounding community.

5. The proposed amendment will not adversely impact the public health, safety and general welfare of the citizens of the city.

   LRSC has been an asset to the community for over 50 years. Our ability to provide maintenance/repair projects and expand facilities and programs will only enhance our ability to continue our community support.

   The residential development proposed in our request will provide a much-needed and missing residential alternative in the single family housing market. The proposed development will provide attainable housing to those seeking to "downsize" and still live in a single-family residential community.

6. The entire range of permitted uses in the requested zoning classification is more appropriate than the entire range of permitted uses in the existing zoning classification, regardless of any representations made by the petitioner as to the intended use of the subject property.

   The site currently has multiple zoning classifications – Open Space & Recreation and Residential. Our request is to expand the residential zoning on site, taking in that land that is undeveloped and has been deemed as surplus. We also ask to change the residential zoning to one that would allow more flexibility in single family residential development.

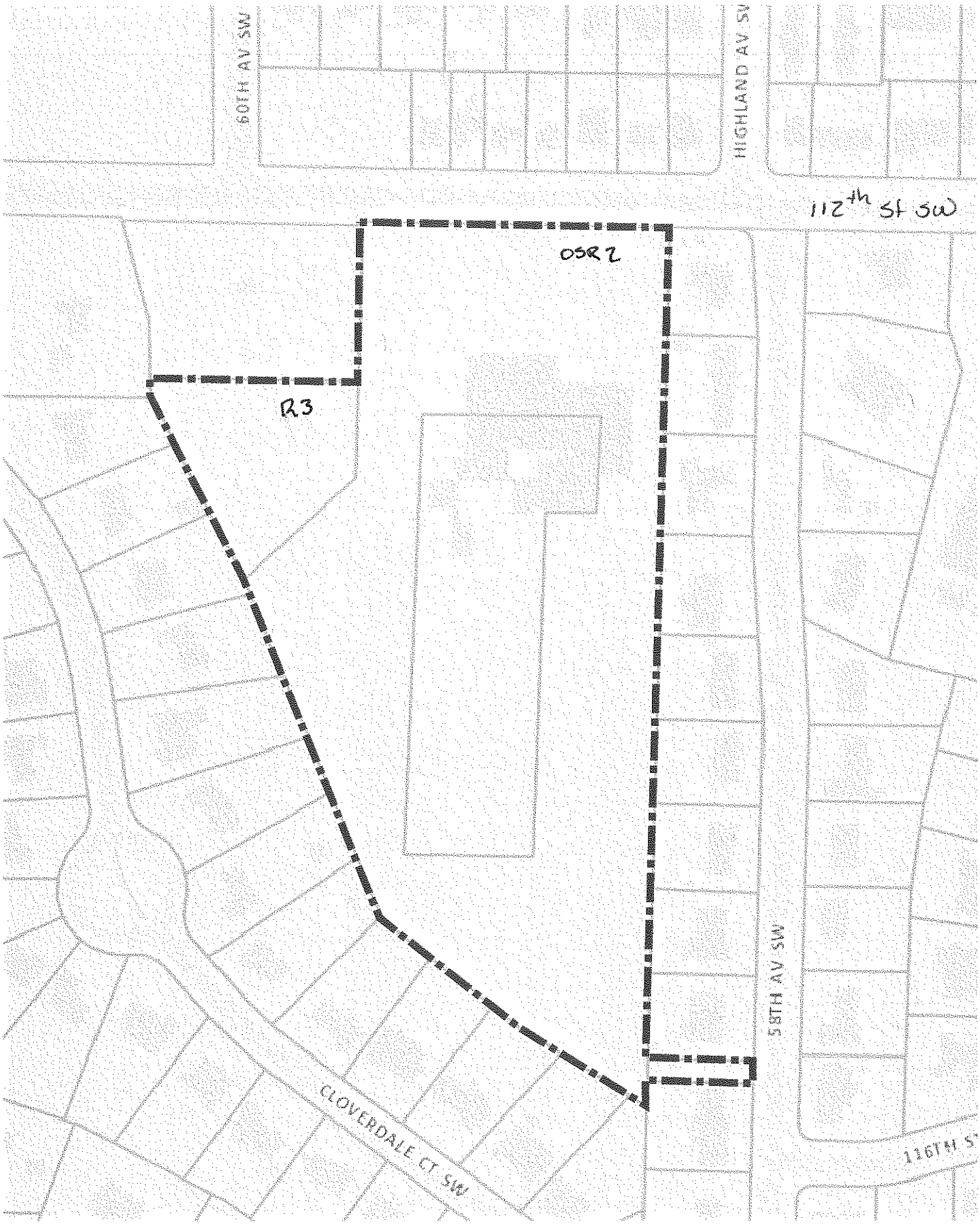
7. Circumstances have changed substantially since the establishment of the current zoning map or zoning district to warrant the proposed amendment.

   Our site is currently in compliance with zoning in the area. Our request would bring the site more into compliance with the comprehensive plan's goals and objectives.

8. The negative impacts of the proposed change on the surrounding neighborhood and area are largely outweighed by the advantages to the city and community in general other than those to the individual petitioner.

   The ability to expand LRSC's facilities and programs will be of benefit to the surrounding neighborhood and the entire community. Programs that currently do not exist due to lack of facilities will be created by future expansion projects. None of this can be accomplished without the ability to create funding through the development of residential opportunities on that portion of land that is currently undeveloped and unused.

   In regards to negative impacts, our proposal would address past complaints regarding noise from the racquet club through improvements to the facilities and the addition of enhanced landscaped screening buffers.



Lakewood Racquet and Sport Club

Department of Commerce
Innovation is in our nature.

Periodic Update Checklist for Cities – Updated June 2013

Covers laws through 2012

This checklist is intended to help cities that are fully planning under the Growth Management Act (GMA) to conduct the "periodic review and update" of comprehensive plans and development regulations required by RCW 36.70A.130(4). Cities can use the checklist to identify components of their comprehensive plan and development regulations that may need to be updated to reflect the latest local conditions or to comply with changes to the GMA since their last update.

This checklist includes components of the comprehensive plan and development regulations that are specifically required by the GMA. Statutory requirements adopted since 2003 are emphasized in highlighted text to help identify new components of the GMA that may not have been addressed in annual updates or other amendments outside of the required periodic update process. Cities within the Puget Sound Regional Council boundaries may want to use this checklist in tandem with PSRC checklists. A separate checklist is available for counties. Expanded checklists (one for Comprehensive Plans, one for Development Regulations) are also available, which include a more comprehensive list of related good ideas and things to consider.

How to fill out the checklist

With the most recent version of your comprehensive plan and development regulations in hand, fill out each item in the checklist. Select the check box or type in the fields, answering the following questions:

Is this item addressed in your current plan or regulations? If YES, fill in the form with citation(s) to where in the plan or code the item is addressed. We recommend using citations rather than page numbers because they stay the same regardless of how the document is printed. If you have questions about the requirement, follow the hyperlinks to the relevant statutory provision or rules. If you still have questions, visit the Commerce web page or contact a Commerce planner assigned to your region.

Is amendment needed to meet current statute? Check YES to indicate a change to your plan or regulations will be needed. Check NO to indicate that the GMA requirement has already been met. Local updates may not be needed if the statute hasn't changed since your previous update, if your city has kept current with required inventories, or if there haven't been many changes in local circumstances. Check "Further Review Needed" if you are unsure whether the requirement has already been met or if the city is considering a review, but hasn't yet decided.

Is your city considering optional amendments? Use this field to note areas where your city may elect to work on or amend sections of your plan or development regulations that are not required by the GMA.

How to use the completed checklist

Commerce strongly encourages you to use the completed checklist to develop a detailed work plan (see Appendix B) for your periodic update. The checklist can be used to inform the contents of a city council resolution that defines what actions will be taken as part of the GMA periodic update.

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?

I. Required Comprehensive Plan Elements and Components

1. A **Land Use Element** that is consistent with countywide planning policies (CWPPs) and RCW 36.70A.070(1).			
a. A **future land use map** showing city limits and urban growth area (UGA) boundaries. RCW 36.70A.070(1) and RCW 36.70A.110(6) WAC 365-196-400(2)(d), WAC 365-196-405(2)(i)(ii)	❑ No x Yes Location(s) Comp Plan figure 2.1	❑ Yes x No ❑ Further review needed	
b. Consideration of **urban planning approaches that increase physical activity**. RCW 36.70A.070(1), **Amended in 2005** WAC 365-196-405 (2)(j)	❑ No x Yes Location(s) • Station district and ped bridge • NMTP • Most commercial areas are mixed use • Sidewalk requirements • Legacy Parks Plan	❑ Yes x No ❑ Further review needed	
c. **A consistent population projection throughout the plan** which should be consistent with the Office of Financial Management forecast for the county or the county's sub-county allocation of that forecast. RCW 43.62.035, WAC 365-196-405(f)	❑ No X Yes Location(s) Comp Plan 3.2.5, 3.2.6 (2030= 72,000)	❑ Yes X No ❑ Further review needed	
d. **Estimates of population densities and building intensities based on future land uses.** RCW 36.70A.070(1); WAC 365-196-405(2)(i)	❑ No X Yes Location(s) Comp Plan Table 3.2	❑ Yes X No ❑ Further review needed	
e. Provisions for **protection of the quality and quantity of groundwater used for public water supplies**. RCW 36.70A.070(1)	❑ No x Yes Location(s) CP Sec. 3.11.7 LMC 14A.150-Aquifer Recharge Areas LWD Comp. Water Plan	❑ Yes x No ❑ Further review needed	

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?
f. **Identification of lands useful for public purposes** such as utility corridors, transportation corridors, landfills, sewage treatment facilities, stormwater management facilities, recreation, schools, and other public uses. RCW 36.70A.150 and WAC 365-196-340	❑ No x Yes Location(s) CP Sec 3.8, 3.9, 3.10 PI zone OS zone	❑ Yes x No ❑ Further review needed	
g. **Identification of open space corridors within and between urban growth areas**, including lands useful for recreation, wildlife habitat, trails, and connection of critical areas. RCW 36.70A.160 and WAC 365-196-335	❑ No x Yes Location(s) CP Sec 3.10 Ft Steilacoom Park Phillips Rd Game Farm Chambers Ck Cyn. Flett Wetlands	❑ Yes X No ❑ Further review needed	
h. *If* there is an airport within or adjacent to the city: **policies, land use designations** *(and zoning)* **to discourage the siting of incompatible uses adjacent to general aviation airports.** [RCW 36.70A.510, RCW 36.70.547, New in 1996)] *Note:* The plan *(and associated regulations)* must be filed with the Aviation Division of WSDOT. WAC 365-196-455	x No ❑ Yes Location(s) No g.a. airports; See CP Sec 3.7 for JBLM policies	❑ Yes x No ❑ Further review needed	
i. *If* there is a Military Base within or adjacent to the jurisdiction employing 100 or more personnel: **policies, land use designations,** *(and consistent zoning)* **to discourage the siting of incompatible uses adjacent to military bases.** RCW 36.70A.530(3), **New in 2004.** See WAC 365-196-475	❑ No x Yes Location(s) CP 3.6, 3.7 JBLM JLUS update in progress	❑ Yes ❑ No x Further review needed	
j. Where applicable, **a review of drainage, flooding, and stormwater run-off** in the area and nearby jurisdictions and provide guidance for corrective actions to mitigate or cleanse those discharges that pollute waters of the state. RCW 36.70A.70(1) and WAC 365-196-405(2)(c) *Note:* RCW 90.56.010(26) defines waters of the state.	❑ No x Yes Location(s) CP 3.12.4, 3.12.7	❑ Yes x No ❑ Further review needed	
k. **Policies to designate and protect critical areas** including wetlands, fish and wildlife habitat protection areas, frequently flooded areas, critical aquifer recharge areas, and geologically hazardous areas. In developing these policies, the city must have included the **best available science (BAS)** to protect the functions and values of critical areas, and give **"special consideration"** to conservation or protection measures necessary to preserve or enhance anadromous fisheries.	❑ No x Yes Location(s) CP 3.12.1, 3.12.2, 3.12.4, 3.12.5, 3.12.8 LMC 14A.142 et seq; BAS Report from Geo Engineers dated 8/18/2004	❑ Yes x No ❑ Further review needed	

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?
RCW 36.70A.030(5), RCW 36.70A.172, BAS added in 1995. See WAC 365-195-900 through -925, WAC 365-190-080 *Note:* A voluntary stewardship program was created in 2011 as an alternative for protecting critical areas in areas used for agricultural activities. Counties had the opportunity to opt into this voluntary program before January 22, 2012. See requirements of the voluntary stewardship program. RCW 36.70A.700 through .904.			
l. *If* forest or agricultural lands of long-term commercial significance are designated *inside* city: **a program authorizing Transfer (or Purchase) of Development Rights.** RCW 36.70A.060(4), **Amended in 2005**	x No ❑ Yes Location(s) NA	❑ Yes x No ❑ Further review needed	
2. A **Housing Element** to ensure the vitality and character of established residential neighborhoods and is consistent with relevant CWPPs, and RCW 36.70A.070(2).			
a. **Goals, policies, and objectives** for the preservation, improvement, and development of housing. RCW 36.70A.070(2)(b) and WAC 365-196-410(2)(a)	❑ No X Yes Location(s) CP Section 3.2	❑ Yes X No ❑ Further review needed	
b. **An inventory and analysis** of existing and projected housing needs over the planning period. RCW 36.70A.070(2)(a) and WAC 365-196-410(2)(b) and (c)	❑ No X Yes Location(s) CP Sec. 3.2.7; Table 3.1	❑ Yes X No ❑ Further review needed	
c. **Identification of sufficient land for housing**, including but not limited to, government-assisted housing, housing for low-income families, manufactured housing, multifamily housing, group homes, and foster care facilities. RCW 36.70A.070(2)(c)	❑ No X Yes Location(s) CP Sec. 3.2.7; Table 3.2	❑ Yes X No ❑ Further review needed	
d. **Adequate provisions for existing and projected housing needs** for all economic segments of the community. RCW 36.70A.070(2)(d) and WAC 365-196-410	❑ No X Yes Location(s) CP Sec. 3.2.8;	❑ Yes X No ❑ Further review needed	
e. *If* enacting or expanding an **affordable housing program** under RCW 36.70A.540: identification of land use	❑ No X Yes	❑ Yes X No	

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?
designations within a geographic area where increased residential development will assist in achieving local growth management and housing policies. RCW 36.70A.540, **New in 2006**. WAC 365-196-870	Location(s) CP Sec 3.2, Policies LU 2.38 thru LU 2.42	❑ Further review needed	
f. Policies so that **manufactured housing** is not regulated differently than site built housing. RCW 35.21.684, 35.63.160, 35A.21.312, and 36.01.225, **Amended in 2004**	❑ No x Yes Location(s) CP LU-7.6 LMC 18A.50.180	❑ Yes x No ❑ Further review needed	
g. *If* the city has a population of over 20,000: **provisions for accessory dwelling units (ADUs) to be allowed in single-family residential areas.** RCW 36.70A.400, RCW 43.63A.215(3)	❑ No x Yes Location(s) CP LU-6.2, 6.3 LMC 18A.70.300	❑ Yes x No ❑ Further review needed	
3. A **Capital Facilities Plan (CFP) Element** to serve as a check on the practicality of achieving other elements of the plan, covering all capital facilities planned, provided, and paid for by public entities including local government and special districts, etc.; including water systems, sanitary sewer systems, storm water facilities, schools, parks and recreational facilities, police and fire protection facilities. Capital expenditures from Park and Recreation elements, if separate, should be included in the CFP Element. The CFP Element must be consistent with CWPPs, and RCW 36.70A.070(3), and include:			
a. Policies or procedures to ensure **capital budget decisions are in conformity with the comprehensive plan**. RCW 36.70A.120	❑ No X Yes Location(s) CP Goals CF-1,2	❑ Yes X No ❑ Further review needed	
b. An **inventory** of existing capital facilities owned by public entities. RCW 36.70A.070(3)(a) and WAC 365-196-415(2)(a)	❑ No X Yes Location(s) CP Section 9.2	❑ Yes X No ❑ Further review needed	
c. **A forecast of needed capital facilities.** RCW 36.70A.070(3)(b) and WAC 365-196-415 (b) *Note:* The forecast of future need should be based on projected population and adopted levels of service (LOS) over the planning period.	❑ No X Yes Location(s) Goals CF-2 through10 Adopted LOS: D, or per	❑ Yes X No ❑ Further review needed	

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?
	Figure 6.3 for roadways. Future needs: 6-yr CIP		
d. Proposed **locations and capacities of expanded or new capital facilities.** RCW 36.70A.070(3)(c) and WAC 365-196-415 (3)(C)	❑ No X Yes Location(s) As indicated in 6-yr CIP	❑ Yes X No ❑ Further review needed	
e. A **six-year plan** (at least) identifying sources of public money to finance planned capital facilities. RCW 36.70A.070(3)(d) and RCW 36.70A.120 WAC 365-196-415	❑ No X Yes Location(s) 6-yr CIP	❑ Yes X No ❑ Further review needed	
f. A **policy or procedure to reassess the Land Use Element** if probable funding falls short of meeting existing needs. RCW 36.70A.070(3)(e) WAC 365-196-415(2)(d)	❑ No X Yes Location(s) Comp Plan section 6.7-Reassessment Strategy	❑ Yes X No ❑ Further review needed	
g. *If* impact fees are collected: **identification of public facilities on which money is to be spent.** RCW 82.02.050(4) WAC 365-196-850	x No ❑ Yes Location(s) NA. NO impact fees.	❑ Yes x No ❑ Further review needed	
4. A **Utilities Element** which is consistent with relevant CWPPs and RCW 36.70A.070(4) and includes:			
a. The **general location, proposed location and capacity** of all existing and proposed utilities. RCW 36.70A.070(4) WAC 365-196-420	❑ No x Yes Location(s) CP Ch 7.0- Utilities Element	❑ Yes x No ❑ Further review needed	
5. A **Transportation Element** which is consistent with relevant CWPPs and RCW 36.70A.070(6) and includes: TRANSPORTATION ELEMENT WILL BE INCLUDED AS PART OF 2015 UPDATE			
a. An **inventory** of air, water, and ground transportation facilities and services, including transit alignments, state-	❑ No x Yes	❑ Yes x No	

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?
owned transportation facilities, and general aviation airports. RCW 36.70A.070(6)(a)(iii)(A) and WAC 365-196-430(2)(c).	Location(s) CP Ch 6.0-Transportation Element	❑ Further review needed	
b. Adopted **levels of service (LOS) standards** for all arterials, transit routes and highways. RCW 36.70A.070(6)(a)(iii)(B), New in 1997. WAC 365-196-430	❑ No x Yes Location(s) CP Section 6.6	❑ Yes x No ❑ Further review needed	
c. Identification of specific **actions to bring locally-owned transportation facilities and services to established LOS**. RCW 36.70A.070(6)(a)(iii)(D), **Amended in 2005.** WAC 365-196-430	❑ No x Yes Location(s) CP Section 6.3 (TDM) CP Section 6.7 (Reassessment strategy)	❑ Yes x No ❑ Further review needed	
d. A **forecast of traffic for at least 10 years**, including land use assumptions used in estimating travel. RCW 36.70A.070(6)(a)(i), RCW 36.70A.070(6)(a)(iii)(E) WAC 365-196-430(2)(f).	❑ No X Yes Location(s) Transpo model. See 7/15 Transp. Background Report	❑ Yes X No ❑ Further review needed	
e. A **projection of state and local system needs** to meet current and future demand. RCW 36.70A.070(6)(a)(iii)(F) WAC 365-196-430(2)(f)	❑ No x Yes Location(s) CP Section 6.7 (Reassessment strategy)	❑ Yes x No ❑ Further review needed	
f. A **pedestrian and bicycle component.** RCW 36.70A.070(6)(a)(vii), **Amended 2005** WAC 365-196-430(2)(j)	❑ No x Yes Location(s) CP Goal T-14 and sub. policies. NMTP adopted 11/08	❑ Yes x No ❑ Further review needed	
g. A description of any existing and planned **transportation demand management (TDM) strategies**, such as HOV lanes or subsidy programs, parking policies, etc. RCW 36.70A.070(6)(a)(vi) WAC 365-196-430(2)(i)	❑ No x Yes Location(s) CP section 6.3	❑ Yes x No ❑ Further review needed	
h. An **analysis of future funding capability** to judge needs	❑ No	❑ Yes	

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?
against probable funding resources. RCW 36.70A.070(6)(a)(iv)(A) WAC 365.196-430(2)(k)(iv)	X Yes Location(s) CP Sec. 6.7; Transp. Background report; 6-year TIP	X No ❑ Further review needed	
i. A **multiyear financing plan** based on needs identified in the comprehensive plan, the appropriate parts of which serve as the basis for the 6-year street, road or transit program. RCW 36.70A.070(6)(a)(iv)(B) and RCW 35.77.010 WAC 365-196-430(2)(k)(ii)	❑ No X Yes Location(s) CP Sec. 6.7; Transp. Background report; 6-year TIP	❑ Yes X No ❑ Further review needed	
j. *If* probable funding falls short of meeting identified needs: a **discussion of how additional funds will be raised**, or **how land use assumptions will be reassessed** to ensure that LOS standards will be met. RCW 36.70A.070(6)(a)(iv)(C); WAC 365-196-430(2)(l)(ii)	❑ No x Yes Location(s) T-13.7, 13.8; Goal T-21; Section 6.7 Reassessment Strategy	❑ Yes X No □Further review needed	
k. A **description of intergovernmental coordination efforts**, including an assessment of the impacts of the transportation plan and land use assumptions on the transportation systems of adjacent jurisdictions and how it is consistent with the regional transportation plan. RCW 36.70A.070(6)(a)(v); WAC 365-196-430(2)(a)(iv)	❑ No x Yes Location(s) CP Goals T-2, T-13 and sub policies. Policy T-19.2	❑ Yes X No ❑ Further review needed	
6. Provisions for siting essential public facilities (EPFs), consistent with CWPPs and RCW 36.70A.200. This section can be included in the Capital Facilities Element, Land Use Element, or in its own element. Sometimes the identification and siting process for EPFs is part of the CWPPs.			
a. **A process or criteria for identifying and siting essential public facilities (EPFs).** [RCW 36.70A.200, Amended in 1997 and 2001] *Notes:* EPFs are defined in RCW 71.09.020(14). Cities should consider OFM's list of EPFs that are required or likely to be built within the next six years. Regional Transit Authority facilities are included in the list of essential public facilities RCW 36.70A.200**, amended 2010**. WAC 365-196-550(d)	❑ No X Yes Location(s) CP Section 3.8, and Chapter 8.0 – Public Services. LMC 18A.30.800 et. seq.; LMC 18A.20.400.D	❑ Yes X No ❑ Further review needed	
b. Policies or procedures that ensure the **comprehensive plan does not preclude the siting of EPFs.** RCW 36.70A.200(5) *Note:* If the EPF siting process is in the CWPPs, this policy may be contained in the comprehensive plan as well.	❑ No X Yes Location(s) CP Policy 9.3 CWPP EPF 1-8	❑ Yes X No ❑ Further review	

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?
WAC 365-196-550(3)		needed	
7. Consistency is required by the GMA.			
a. All plan elements must be **consistent with relevant county-wide planning policies (CWPPs) and, where applicable, Multicounty Planning Policies (MPPs), and the GMA.** RCW 36.70A.100 and 210 WAC 365-196-400(2)(c), 305 and 520	❑ No X Yes Location(s) CP Section 1.6.7	❑ Yes ❑ No X Further review needed Chapter 1 will be updated in 2015	
b. All plan elements must be **consistent with each other.** RCW 36.70A.070 (preamble). WAC 365-197-400(2)(f)	❑ No X Yes Location(s)	❑ Yes ❑ No X Further review needed Chapter 1 will be updated in 2015	
c. The plan must be **coordinated with the plans of adjacent jurisdictions.** RCW 36.70A.100 WAC 365-196-520	❑ No X Yes Location(s) Section 10.3.3; Table 10-3	❑ Yes X No ❑ Further review needed	
8. Shoreline Provisions			
Comprehensive plan acknowledges that for shorelines of the state, the goals and policies of the shoreline management act as set forth in RCW 90.58.020 are added as one of the goals of this chapter as set forth in RCW 36.70A.020 without creating an order of priority among the fourteen goals. The goals and policies of the shoreline master program approved under RCW 90.58 shall be considered an element of the comprehensive plan. RCW 36.70A.480, WAC 365-196-580	❑ No x Yes Location(s) CP Section 3.11.3; SMP Update recently approved by DOE	❑ Yes x No ❑ Further review needed	
9. Public participation, plan amendments and monitoring. ***Note*: House Bill 2834, passed in 2012, eliminates the requirement for cities planning under the GMA to report every 5 years on its progress in implementing its comprehensive plans.**			
a. **A process to ensure public participation in the comprehensive planning process.** RCW 36.70A.020(11), .035, and .140; WAC 365-196-600(3) The process should address annual amendments (if the	❑ No X Yes Location(s) CP Section 10.4, 10.6, 10.7.	❑ Yes X No ❑ Further review	

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?
jurisdiction allows for them) [RCW 36.70A.130(2), **Amended in 2006**], emergency amendments [RCW 36.70A.130(2)(b)], and may include a specialized periodic update process. Plan amendment processes may be coordinated among cities within a county [RCW 36.70A.130(2)(a)] and should be well publicized.	LMC 18A.02.400, 18A.02.565 Pub. Part. Plan for Comp Plan updates adopted May 2013.	needed	
b. A process to assure that proposed **regulatory or administrative actions do not result in an unconstitutional taking of private property**. See *Attorney General's Advisory Memorandum: Avoiding Unconstitutional Takings of Private Property* for guidance. RCW 36.70A.370	X No ❑ Yes Location(s) See 18A.50.135.I with regard to street frontage improvements.	❑ Yes ❑ No X Further review needed No explicit policy?	

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?

II. Required Components of Development Regulations WAC 365-196-810

10. **Regulations designating and protecting critical areas** are required by RCW 36.70A.170, RCW 36.70A.060(2) and RCW 36.70A.172(1). *Note*: A voluntary stewardship program was created in ESHB 1886 (2011) as an alternative for protecting critical areas in areas used for agricultural activities. Counties may choose to opt into this voluntary program before January 22, 2012. Click *here* for the requirements of the voluntary stewardship program.			
a. **Classification and designation** of each of the five types of critical areas *(wetlands, critical aquifer recharge areas, fish and wildlife habitat conservation areas, frequently flooded areas, and geologically hazardous areas),* if they are found within your city. RCW 36.70A.170; WAC 365-196-830(2) *Note*: Senate Bill 5292 adopted in 2012 clarified that certain water-based artificial features or constructs are excluded from being considered part of a fish and wildlife habitat conservation areas.	❑ No X Yes Location(s) LMC 14A.142 et seq.	❑ Yes X No ❑ Further review needed	
b. Findings that demonstrate **Best Available Science (BAS)** was included in developing policies and development regulations to protect the function and values of critical areas. In addition, findings should document special consideration given to conservation or protection measures necessary to preserve or enhance anadromous fisheries. RCW 36.70A.172(1); WAC 365-195, WAC 365-195	❑ No X Yes Location(s) BAS Review prepared by GeoEngineers Inc. dated August 18, 2004	❑ Yes X No ❑ Further review needed	
c. Regulations that protect the functions and values of **wetlands**. RCW 36.70A.060(2) and RCW 36.70A.172(1) WAC 365-190-090	❑ No X Yes Location(s) LMC 14A.162	❑ Yes X No ❑ Further review needed	
d. A **definition of wetlands** consistent with RCW 36.70A.030(21) WAC 365-190-090, WAC 173-22-035	X No ❑ Yes Location(s) LMC 14A.165.010	❑ Yes ❑ No X Further review needed	Need to update language
e. **Delineation of wetlands** using the approved federal wetlands delineation manual and applicable regional supplements [RCW 36.70A.175, RCW 90.58.380 (1995) (2011)] WAC 173-22-035	X No ❑ Yes Location(s) LMC 14A.162.020	X Yes ❑ No ❑ Further review needed	Need to reference 2014 rating system (Need to update CARL by 6/30/15)

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?
f. Regulations that protect the functions and values of **critical aquifer recharge areas ("areas with a critical recharging effect on aquifers used for potable water" RCW 36.70A.030(5)(b))**. RCW 36.70A.060(2) and RCW 36.70A.172(1) WAC 365-190-100	❑ No X Yes Location(s) LMC 14A.150	❑ Yes X No ❑ Further review needed	
g. Regulations to protect the **quality and quantity of ground water** used for public water supplies. RCW 36.70A.070(1)	❑ No X Yes Location(s) CP 3.11.7; LMC 14A.150; Lot size and lot coverage limits in zoning code.	❑ Yes X No ❑ Further review needed	
h. Regulations that protect the functions and values of **fish and wildlife habitat conservation areas.** RCW 36.70A.060(2) and RCW 36.70A.172(1) WAC 365-195-925(3), 365-190-130	❑ No X Yes Location(s) LMC 14A.154	❑ Yes ❑ No X Further review needed to analyze WAC 365-190-130 adopted 2010.	(Need to update CARL by 6/30/15)
i. Regulations that protect the functions and values of **frequently flooded areas.** RCW 36.70A.060(2) and RCW 36.70A.172(1) WAC 365-190-110, WAC 173-158-040	❑ No X Yes Location(s) LMC 14A.158; LMC 18A.40.100 et seq.	❑ Yes ❑ No X Further review needed Update references to latest FEMA maps.	(Need to update CARL by 6/30/15)
j. Definition of "fish and wildlife habitat conservation areas" does not include such artificial features or constructs as irrigation delivery systems, irrigation infrastructure, irrigation canals, or drainage ditches that lie within the boundaries of and are maintained by a port district or an irrigation district or company. **New in 2012**. RCW 36.70A.030(5)	❑ No X Yes Location(s) LMC 14A.165.010	❑ Yes ❑ No ? Further review needed NEEDS UPDATE TO ADD CLARIFICATION LANGUAGE?	(Need to update CARL by 6/30/15)
k. Provisions to ensure **water quality and stormwater drainage regulations** are consistent with applicable Land Use Element policies. RCW 36.70A.070(1)	❑ No X Yes Location(s) LMC 12A.10, 12A.11, 14A.150	❑ Yes X No ❑ Further review needed	

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?
l. Regulation of **geologically hazardous areas** consistent with public health and safety concerns. RCW 36.70A.030(9), RCW 36.70A.060(2) and RCW 36.70A.172(1) WAC 365-190-120	❑ No X Yes Location(s) LMC 14A.146	❑ Yes X No ❑ Further review needed	
m. Provisions that allow "**reasonable use**" of properties constrained by presence of critical areas. RCW 36.70A.370. See *Attorney General's Advisory Memorandum: Avoiding Unconstitutional Takings of Private Property* for guidance	❑ No X Yes Location(s) LMC 14A.142.080 and 090	❑ Yes X No ❑ Further review needed	
n. *If* your city is assuming regulation of forest practices as provided in RCW 76.09.240: **forest practices regulations** that protect public resources, require appropriate approvals for all phases of conversion of forest lands, are guided by GMA planning goals, and are consistent with adopted critical areas regulations. RCW 36.70A.570, **Amended in 2007, 2010** and RCW 76.09.240 **Amended in 2007, 2010** *Note: Applies only to counties fully planning under the GMA with a population greater than 100,000 and the cities and towns within those counties where a certain number of Class IV applications have been filed within a certain timeframe.*	❑ No ❑ Yes Location(s) NA	❑ Yes X No ❑ Further review needed	
11. Shoreline Master Program See Washington State Department of Ecology's SMP Submittal Checklist			
a. **Zoning** is consistent with Shoreline Master Program (SMP) environmental designations. RCW 36.70A.070; RCW 36.70A.480 WAC 365-196-580	❑ No X Yes Location(s) SMP Table II-development standards refer to underlying zoning.	❑ Yes X No ❑ Further review needed	
b. *If* **SMP regulations** have been updated to meet Ecology's shoreline regulations: protection for critical areas in shorelines is accomplished solely through the SMP. RCW 36.70A.480(4), **Amended in 2003 and 2010** and RCW 90.58.090(4). WAC 365-196-580	❑ No X Yes Location(s) SMP Chapter 3, Section B.3	❑ Yes X No ❑ Further review needed	
12. The Zoning Code should contain the following provisions:			
a. **Family daycare providers** are allowed in areas zoned for residential or commercial uses. Zoning conditions should be no more restrictive than those imposed on other residential	❑ No X Yes Location(s)	❑ Yes X No ❑ Further	

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?
dwellings in the same zone, but may address drop-off and pickup areas and hours of operation**.** RCW 36.70A.450, WAC 365-196-865	LMC 18A.70.100	review needed	
b. Manufactured housing is regulated the same as site-built housing. RCW 35.21.684, 35.63.160, 35A.21.312 and 36.01.225, **All Amended in 2004**	❑ No X Yes Location(s) LMC 18A.50.180; 18A.70.400 et seq.	❑ Yes X No ❑ Further review needed	
c. *If* the city has a population over 20,000 **accessory dwelling units (ADUs)** are allowed in single-family residential areas. RCW 43.63A.215(3)	❑ No X Yes Location(s) LMC 18A.70.310	❑ Yes X No ❑ Further review needed	
m. *If* there is an airport within or adjacent to the city: zoning **that discourages the siting of incompatible uses adjacent to general aviation airports.** RCW 36.70A.510, RCW 36.70.547, New in 1996) *Note:* The zoning regulations must be filed with the Aviation Division of WSDOT. WAC 365-196-455	❑ No ❑ Yes Location(s) NA	❑ Yes ❑ No ❑ Further review needed	
n. *If* there is a Military Base within or adjacent to the jurisdiction employing 100 or more personnel: **zoning that discourages the siting of incompatible uses adjacent to military bases.** RCW 36.70A.530(3), **New in 2004.** WAC 365-196-475	❑ No X Yes Location(s) LMC 18A.30.700 et. seq, JBLM JLUS update underway 2014	❑ Yes X No ❑ Further review needed	
o. Residential structures that are occupied by **persons with handicaps** must be regulated the same as a similar residential structure occupied by a family or other unrelated individuals. RCW 36.70A.410, WAC 365-196-860	❑ No X Yes Location(s) See LMC 18A.90.200 def'n of 'family'; and allowance for Type 1 Group Homes in all residential zones.	❑ Yes X No ❑ Further review needed	
p. Cities adjacent to I-5, I-90, I-405, or SR 520 and counties -- for lands within 1 mile of these highways -- must adopt regulations that allow electric vehicle infrastructure (EVI) as a use in all areas except those zoned for residential or resource use, or critical areas ***by July 1, 2011.*** RCW 36.70A.695, **New in 2009**	❑ No X Yes Location(s) See Admin policy 2010-01 dated 6/30/2010. May want to adopt model ordinance.	❑ Yes ❑ No X Further review needed	
q. Development regulations of all jurisdictions must allow electric vehicle battery charging stations in all areas except	❑ No X Yes	❑ Yes X No	

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?
those zoned for residential or resource use, or critical areas ***by July 1, 2011***. RCW 36.70A.695, **New in 2009**	Location(s) See Admin policy 2010-01 dated 6/30/2010. May want to adopt model ordinance.	❑ Further review needed	
13. Subdivision Code regulations			
a. Subdivision code is **consistent with and implements comprehensive plan policies**. RCW 36.70A.030(7)and 36.70A.040(4)(d), WAC 365-196-820	❑ No X Yes Location(s) LMC 17.10.030 as amended by Ord 591. 17.14.020.A; 17.22.050.B	❑ Yes X No ❑ Further review needed	
b. Code requires **written findings** documenting that proposed subdivisions provide appropriate provision under RCW 58.17.110(2)(a) for: Streets or roads, sidewalks, alleys, other public ways, transit stops, and other features that assure safe walking conditions for students; potable water supplies [RCW 19.27.097], sanitary wastes, and drainage ways (stormwater retention and detention); open spaces, parks and recreation, and playgrounds; and schools and school grounds. WAC 365-196-820(1)	❑ No X Yes Location(s) LMC 17.14.030.A.1 and B.1; LMC 17.22.070.B.1	❑ Yes X No ❑ Further review needed	
c. **Subdivision regulations may implement traffic demand management (TDM) policies.** RCW 36.70A.070(6)(a)(vi)	❑ No X Yes Location(s) CP Section 6.3;	❑ Yes X No ❑ Further review needed	
d. Preliminary subdivision approvals under RCW 58.17.140 are valid for a period of five, seven, or nine years. [RCW 58.17.140 and RCW 58.17.170. **Amended 2010 by SB 6544. Expires 2014**. **Amended 2012 by HB 2152** *Note*: House Bill 2152, adopted by the Legislature in 2012, modified timelines. The preliminary plat approval is valid for: seven years if the date of preliminary plat approval is on or before December 31, 2014; five years if the preliminary plat approval is issued on or after January 1, 2015; and nine years if the project is located within city limits, not subject to the shoreline management act, and the preliminary plat is approved on or after December 31, 2007.	❑ No X Yes Location(s) LMC 17.14.040 as amended by Ord 591. Note, checklist does not seem to accurately reflect RCW 58.17.140(3)(b).	❑ Yes X No ❑ Further review needed	

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?
14. Concurrency , Impact Fees, and TDM			
a. The **transportation concurrency** ordinance includes specific language that prohibits development when level of service standards for transportation facilities cannot be met. RCW 36.70A.070(6)(b)	❑ No X Yes Location(s) LMC 18A.50.195, LMC 12A.09	❑ Yes X No ❑ Further review needed	
b. *If* adopted: **impact fee methods** are consistent with RCW 82.02.050 through 100 *Note:* The timeframe for expending or encumbering impact fees has been extended to ten years. RCW 82.02.070 and RCW 82.02.080, **Amended in 2011.** WAC 365-196-850	❑ No ❑ Yes Location(s) NA	❑ Yes X No ❑ Further review needed	
If required by RCW 70.94.527: a **commute trip reduction** ordinance to reduce the proportion of single-occupant vehicle commute trips. RCW 70.94.521-551, **Amended in 2006.** WAC 468-63 *Note:* WSDOT maintains a list of affected jurisdictions	❑ No X Yes Location(s) LMC 12A.13	❑ Yes X No ❑ Further review needed	
15. Siting Essential Public Facilities (EPFs)			
Regulations are consistent with Essential Public Facility siting process in countywide planning policies or city comprehensive plan, and **do not preclude the siting of EPFs.** RCW 36.70A.200(5) WAC 365-196-550	❑ No X Yes Location(s) LMC 18A.20.400.D, 18A.30.830.A.1.b	❑ Yes X No ❑ Further review needed	
16. Project Review Procedures			
Project review processes integrate permit and environmental review for: notice of application; notice of complete application; one open-record public hearing; allowing applicants to combine public hearings and decisions for multiple permits; notice of decision; one closed-record appeal. RCW 36.70A.470, RCW 36.70B and RCW 43.21C WAC 365-196-845	❑ No X Yes Location(s) LMC 18A.02 et seq	❑ Yes X No ❑ Further review needed	
17. General Provisions: The GMA requires that development regulations be consistent with and implement the comprehensive plan. RCW 36.70A.030(7) and .040(4)(d). Regulations should also include:			
a. A process for **early and continuous public participation** in the development regulation development and amendment process. RCW 36.70A.020(11),.035, .130 and .140	❑ No X Yes Location(s) CP 10.4; LMC 18A.02.565.	❑ Yes X No ❑ Further review needed	
b. A process to assure that proposed regulatory or administrative actions **do not result in an unconstitutional**	❑ No ❑ Yes	❑ Yes ❑ No	

	Addressed in current plan or regs? If yes, where?	Changes needed to meet current statute?	Is city considering optional amend-ments?
taking of private property. RCW 36.70A.370, WAC 365-196-855 *Note:* See *Attorney General's Advisory Memorandum: Avoiding Unconstitutional Takings of Private Property*.	Location(s) See 18A.50.135.I with regard to street frontage improvements.	X Further review needed No explicit policy?	

This checklist covers the requirements of the Growth Management Act through the laws of 2012. It does not address related issues, or things that are not required but that are commonly found in comprehensive plans and the implementing regulations. It may be useful to look at the expanded checklists (one for comprehensive plans, one for development regulations) and the Growth Management Act Amendment Changes 1995-2012 (amended annually). For more information, please visit:
http://www.commerce.wa.gov/Services/localgovernment/GrowthManagement/Growth-Management-Planning-Topics/Pages/GMA-Periodic-Update.aspx

PSRC Comprehensive Plan Reporting Tool
City of Lakewood- 2015

Description of Submitted Materials

Explain the nature of the comprehensive plan materials being submitted for review, including the date adopted. For example, is this a full plan update, a revised plan element, or a set of annual amendments?

The attached materials represent a full comprehensive plan update for the City of Lakewood for 2015. Chapters 2, 3, 5, and 7 (Land-use Maps, Land Use and Housing, Economic Development and Utilities) were updated in 2014. 2015 updates include Chapters 1,4,6,8,9, and 10 (Introduction, Urban Design, Transportation, Public Services, Capital Facilities and Implementation).

Part I: Checklist

Vision 2040 Statement

- ✓ A VISION 2040 statement of how the comprehensive plan addresses the multicounty planning policies and the planning requirements in the Growth Management Act is included

The City of Lakewood interacts with the region through the Puget Sound Regional Council (PSRC). The City of Lakewood is considered a Core City with a designated Regional Growth Center. As a core city, Lakewood expects to play a significant role in accommodating forecasted growth in Pierce County and helping to reduce development pressure on rural and natural resource lands. A statement to this effect will be part of the update of Chapter 1 (Introduction).

General Multi-County Planning Policies

- ✓ Describe planning coordination with other jurisdictions and agencies (including, where appropriate tribes) *(MPP-G-1)*
- ✓ Describe efforts to identify existing and new funding for infrastructure and services *(MPP-G-4)*

MPP-G-1 Planning Coordination

The City of Lakewood participates regularly in the Pierce County Growth Management Coordinating Committee, Pierce County Transportation Coordinating Committee and the Pierce County Regional Council. The City of Lakewood also hosts the South Sound Military Communities Partnership (SSMCP) which is funded by the Department of Defense Office of Economic Adjustment to help military communities deal with the unique issues presented by the presence of military installations. The SSMCP is currently working with jurisdictions affected by Joint Base Lewis McChord (JBLM) to update that installation's Joint Land Use Study (JLUS) and Air Installation Compatible Use Zone (AICUZ) plans.

The City works closely with State agencies on specific topics such as critical areas, shorelines, and regional transit issues. The City also enjoys a productive relationship with the Nisqually Tribe.

MPP-G-4 Funding

The City of Lakewood monitors State and federal registers and clearinghouses that provide up-to-date information on new and existing grant, loan, and other funding resources for infrastructure and services. Funding sources for transportation projects typically include motor vehicle fuel tax, real estate excise tax, transfers from the Surface Water Management Fund, CDBG, vehicle license fees, property taxes, private utilities, private developers and various grant opportunities. The City has also used transportation grant funding provided through the Department of Defense, Office of Economic Adjustment. These funds have been used for relieving I-5 Corridor congestion adjacent to Lakewood and JBLM.

The Environment

Stewardship

- ✓ *Address the natural environment in all aspects of local planning, basing decision-making on the environmental best-information available; incorporate regionwide planning initiatives, such as the Department of Ecology's water resource inventory areas (WRIA) process – or actions based on guidance from the International Council for Local Environmental Initiatives (ICLEI) (MPP-En-1 through 7; En-Action-11)*

The City of Lakewood supports protection of important ecological systems through restoration activities and public ownership of lands, supporting critical environmental processes. The City's Critical Areas and Resource Lands Ordinance, adopted in 2004, incorporates Best Available Science (BAS). The City is proactively working to improve stormwater management and surface water quality through the installation of stormwater filtration devices on inlet structures and fish habitat improvements (such as the removal of fish barriers and construction of fish ladders in the City's creeks). Under the National Pollutant Discharge Elimination System (NPDES), the City maintains its current permits with the State Department of Ecology. The City is currently in the process of integrating low-impact development (LID) regulations into its municipal code. LID practices protect natural ecosystems as well as water quality. The City maintains its The City also supports the habitat preservation and management efforts of Joint Base Lewis-McChord. The City uses environmental review under SEPA to identify and mitigate potential environmental impacts of specific development projects.

Earth and Habitat

- ✓ Identify open space areas and develop programs for protecting and/or acquiring these areas *(MPP-En-8 and 9)*

- ✓ Coordinate planning for critical areas and habitat with adjacent jurisdictions *(MPP-En-9 through 11)*
- ✓ Include provisions for protecting and restoring native vegetation *(MPP-En-12)*

The City of Lakewood is fortunate to have many critical environmental resource lands under public ownership and control. The City contains approximately 1,100 acres of publicly owned passive open space and 350 acres of active recreational open space. The City has specific open space land use designations in the Comprehensive Plan and open space zoning districts. Development on properties designated and zoned for open space is extremely limited. In addition, the City's Critical Areas and Resource Lands (CARL) regulations may require restrictive covenants, placement of sensitive property in a separate tract, or permanent dedication of sensitive critical areas and their buffers.

The City engages in joint planning efforts with Pierce County and the City of University Place with regard to Chambers Creek Canyon, and with JBLM and the Washington State Department of Fish and Wildlife over American Lake and the boat launch located just south of the Lakewood city limit.

The City has also established a partnership with Pierce College to provide financial assistance from the City's tree fund in order to support the College's experimental oak prairie restoration program.

Water Quality

- ✓ *Take actions to maintain hydrological functions within ecosystems and watersheds, including restoration of shorelines and estuaries, as well as reducing pollution in water (MPP-En-13 through 16)*

The City of Lakewood is working proactively to maintain hydrological functions and water quality within the Chambers- Clover Creek Watershed (WRIA 12). The City maintains a full-time Surface Water Quality Manager, levies a surface water quality management fee on individual properties, and is actively engaged in installation of water quality improvement devices in public stormwater intake structures. The City has obtained grant funds to monitor water quality at Waughop Lake located in Fort Steilacoom Park. Lakewood maintains an active public education and outreach program designed to reduce or eliminate behaviors and practices that cause or contribute to adverse stormwater impacts, and, further, encourages the public to participate in stewardship programs.

The City adopted a comprehensive shoreline management program update in 2013, which was approved by the Department of Ecology in 2014. Other policies and regulations intended to protect water quality include the City's critical areas regulations which address aquifer recharge and wellhead protection, wetlands, and protective buffers for other water bodies including lakes, ponds, and streams.

Air Quality

- ✓ *Include policies and implementation actions to address federal and state clean air laws and the reduction of pollutants including greenhouse gases (MPP-En-17 through 19)*
- ✓ *Incorporate the Puget Sound Clean Air Agency's adopted growth management policies into the comprehensive plan (see Appendix-E-1) (MPP-En-17 through 19)*

Section 3.11.9 of the Comprehensive Plan addresses air quality. Goal LU-63 directs the City to pursue federal, state, regional and local air quality standards through coordinated, long-term strategies that address the many contributors to air pollution. Specific policies include promotion of land use and transportation practices and strategies that reduce levels of air-polluting emissions; ensuring the retention and planting of trees and other vegetation to help promote air quality, and restriction of wood-burning fireplaces in new and replacement construction.

Climate Change

- ✓ *Include specific provisions to reduce greenhouse gas emissions; include provisions addressing adaptation to the effects of climate change (MPP-En-16, 20 through 25. MPP-DP-45, MPP-T-5 through 7; MPP-PS-1, 12, 13; RCW 80.80.020)*

Transportation is the primary source of greenhouse gas emissions in Lakewood. As a focal point for action, the City targets more efficient and less polluting alternatives to driving alone as the best way to reduce emissions. Regulatory and incentive approaches are being explored, including changing zoning regulations to promote more mixed-use and higher-density development. Through these approaches, the City can create more walkable and transit-friendly neighborhoods. The City of Lakewood also encourages the use of alternative energy sources at work and at home. Development practices that retain or restore vegetation and conserve water and energy are also used to help address issues related to climate change.

Development Patterns

Urban

- ✓ Document growth targets[1] for population (expressed in housing units) and for employment *(MPP-DP-3)*
- ✓ Include provisions to develop compact urban communities and central places with densities that support transit and walking. *(MPP-DP-14)*
- ✓ Identify underused land and have provisions for redevelopment in a manner that supports the *Regional Growth Strategy(MPP-DP-15)*

[1] ***Regional Growth Strategy* and Planning Targets -** The Regional Growth Strategy in VISION 2040 provides guidance for local growth targets. Jurisdictions are asked to explain steps being taken to align with the regional guidance. It is recognized that the allocations in the Regional Growth Strategy are for 2040 and that the planning process between now and then may not be linear.

The City of Lakewood is designated as a "Core City" within Pierce County in the Vision 2040 Regional Growth Strategy. Pierce County Ordinance 2011-36s established population, housing unit, and employment targets for cities, towns and unincorporated areas for the year 2030. The targets established for Lakewood are:

	2008 Baseline	'08-'30 Change	2030 Target
Population	58,780	13,220	72,000
Housing	25, 904	8,380	34,284
Employment	29,051	9,285	38,336

The City's comprehensive plan, chapter 5, discusses the means by which to establish an urban design framework from which to develop compact urban communities. Generalized plans have been proposed for the Central Business District and the Lakewood Station District. These plans have been followed through with extensive sidewalk construction projects, "sharrow" bike lanes, and a pedestrian bridge to connect the Lakeview Neighborhood with the Sound Transit Commuter Rail Station. Of late, the City has proposed a complete streets program for Motor Avenue. This fall the Lakewood City Council will be releasing a subarea plan request for proposal for the entire Central Business District in furtherance of its goals to establish a downtown.

Lakewood has mapped all of its vacant and underutilized lands. There are about 695 acres and 1,210 acres of vacant land and underutilized properties, respectively. The data is used by the City's economic development division to market the City for redevelopment purposes. The City's current land use policies do allow for the City to plan for the project targets. However, there are two concerns. The first is the lack of infrastructure. Upon incorporation, Lakewood inherited a deficient system and has been playing catch-up ever since. Notable examples include a lack of sewers in some neighborhoods and a very poor non-motorized transportation system. The second issue is that Lakewood is not a full-service city. Fire services are provided by the West Pierce Fire District. Water is provided by a special service district. Sewer is provided by Pierce County. Power is provided by one of three utility providers. The current system requires a significant amount of policy coordination where sometimes the City's goals are not shared by other agencies.

Centers

- ✓ Identify one or more central places as locations for more compact, mixed-use development *(MPP-DP-11)*
- ✓ Demonstrate how funding has been prioritized to advance development in centers and central places *(MPP-DP-7, 10, 13; MPP-T-12; MPP-H-6)*

The central portion of Lakewood is designated as an "Urban Growth Center" under the Countywide Planning Policies (CWPP). Lands within this designated center are mostly zoned "Central Business District" or CBD, but the designated center also includes mixed residential, high-density residential, neighborhood commercial and Transit Oriented Commercial (TOC) zoning districts. The CBD zone

supports a wide variety of primarily commercial uses, but also allows for multi-family residential uses at up to 54 dwelling units per acre. The City has enacted several incentives intended to encourage new growth within identified growth centers including a Multi-family Tax Exemption program pursuant to Section 84.14. RCW, and a Senior Housing Overlay and Housing Incentives Programs which encourage affordable housing and housing for seniors through density bonuses.

Unincorporated Urban Areas

- ✓ *Include policies and programs to address annexation and the orderly transition of unincorporated areas to city governance (MPP-DP-18)*

The City of Lakewood's Urban Growth Area (UGA) includes the Partridge-Arrowhead Glen area west of the City (approx. 256 acres and a population of 2,444) and the cantonment areas of Joint Base Lewis McChord (JBLM)and Camp Murray (Washington State National Guard). The Partridge-Arrowhead Glen UGA is shared with the Town of Steilacoom. This area is mostly built-out with moderate density single-family housing, and is not expected to experience drastic changes in the existing land use pattern.

Issues related to the incorporation of these areas are discussed in detail in the recently updated Section 2.6 of the Lakewood Comprehensive Plan.

Resource Lands

- ✓ *Identify steps to limit development in resource areas. (MPP-DP-29 through 32)*

The City of Lakewood does not currently contain any commercially viable resource extraction lands. Environmentally sensitive areas are discussed in the City's critical areas regulations –LMC Section 14A.142 et seq.

Development Patterns- Orderly Development

Regional Design

- ✓ *Incorporate design provisions in local plans and regulations that apply the Transportation 2040 Physical Design Guidelines (Transportation 2040 Physical Design Guidelines)*
- ✓ *Include guidelines for environmentally friendly and energy-efficient building (MPP-DP-33 through 42)*
- ✓ *Preserve historic, visual, and cultural resources (MPP-DP-34)*
- ✓ *Ensure that the design of public buildings contributes to a sense of community (MPP-DP-38)*

(Cannot find T-2040 "Physical Design Guidelines?)

The City of Lakewood was mostly developed after World War II, and already built out at the time of its incorporation in 1996. The area is historic, however, being one of the first areas in the state to be settled by persons of European descent. In 1849, Mr. Joseph Heath established a farm on what was to eventually become Fort Steilacoom, and later, Western State Hospital. The landscape

upon the arrival of European settlers was primarily prairie and lakes. The history of Lakewood is of the conversion of the original prairie to the suburban landscape we see today. Around the turn of the century, wealthy citizens in Tacoma constructed large vacation homes around the City's lakes - homes that are generally the most expensive homes in the City today. In 1935 Mr. Norton Clapp constructed the Lakewood Colonial Center, one of the first shopping centers established west of the Mississippi River. The Colonial Center still exists today at the intersection of Gravelly Lake Drive and Bridgeport Way SW. Camp Lewis, (later to become Fort Lewis and then Joint Base Lewis-McChord, JBLM) was established with the advent of World War One. The presence of JBLM created a need for affordable housing for its soldiers and other personnel. The City's proximity to the established City of Tacoma led to a housing construction boom after World War II. The City's current form was shaped by these historic developments, together with other influences such as the construction of a Navy Supply Depot during World War II (which would later become Clover Park Technical College and the Lakewood Industrial Park), and the construction of Interstate 5 in the mid- and late- 1950's. The City supports a Landmarks and Heritage Advisory Board to help preserve, protect, and promote the unique heritage and historic resources of the City.

New construction in the City today must follow energy efficiency standards of the *International Building Code* and *International Energy Conservation Code (IECC)*. To promote a high level of design and a sense of community in the City, new multi-family residential and non-residential developments are also subject to compliance with community design guidelines.

Health and Active Living

- ✓ *Include health provisions that address (a) healthy environment, (b) physical activity and well-being, and (c) safety (MPP-DP-43 through 47; MPP-En-3, 19. MPP-T-4, 7, 11, 15, 16)*

The City promotes a healthy environment, physical activity, well-being and safety through a number of policies, programs and actions including the City's Parks and Recreation Legacy Plan, the City's Non-Motorized Transportation Plan, and codes generally intended and designed to "protect the public health, safety, and welfare."

Section 3.10 of the City's comprehensive plan addresses Green Spaces, Recreation, and Culture. One of the explicit goals of this section is to "Create a strong, active, and healthy community by providing a variety of open space and recreation opportunities." Further development of the City's parks and recreation programs is expected to be accomplished pursuant to the Parks Legacy Plan adopted in 2013.

Housing

- ✓ *Include provisions to increase housing production opportunities, including diverse types and styles for all income levels and demographic groups (MPP-H-1 through 9)*
- ✓ *Include provisions to address affordable housing needs (MPP-H-1 through 9)*

- ✓ *State how regional housing objectives in VISION 2040 are being addressed – including housing diversity and affordability, jobs-housing balance, housing in centers, and flexible standards and innovative techniques (H-Action-1 and 2)*

The City of Lakewood's 2014 Comprehensive Plan update provided a thorough review of the City's housing policies- essentially incorporating a Housing sub-element into the Land-Use element. The Housing sub-element is included as Section 3.2 of the comprehensive plan as updated in 2014. The updates specifically promote a variety of housing types for all income levels and demographic groups. Section 3.2.8 addresses housing provisions for all economic segments of the community. Section 3.2.9 addresses housing resources with a focus on affordable housing for low income households. The update also includes lengthy discussion of the City's efforts to address affordable housing needs through several on-going City programs. Among the programs offered:

- A major home repair program; a housing rehabilitation program;
- Down payment assistance;
- A neighborhood stabilization program designed to assist with the demolition and/or redevelopment of foreclosed, vacant, or abandoned properties;
- Forming a special partnership with Habitat for Humanity to build 41 owner-occupied single family homes; and
- Providing financial support for rehabilitation and improvements of properties through various non-profit organizations such as Rebuilding Together South Sound, in addition to properties owned by Network Tacoma, Living Access Support Alliance, and the Pierce County Housing Authority.

Economic Development

- ✓ *Include an economic development element that addresses: business, people, and places (Ec-Action-6; see MPP-Ec-1 through 22)*
- ✓ *Include provisions that address industry clusters (MPP-Ec-3)*
- ✓ *Focus retention and recruitment efforts on business that provide family wage jobs, industry clusters that export goods and services, and small/start up companies that are locally owned (MPP-Ec-1, 3, 4, 5)*
- ✓ *Include provisions and programs for distressed areas or areas with disadvantaged populations (MPP-Ec-11, 12)*
- ✓ *Ensure adequate housing growth in centers working collaboratively with the private sector – through the provision of infrastructure (MPP-Ec-6, 18, 20)*

The City's 2014 update includes an update of the Economic Development Element (Chapter 5). This element updates the City's vision of its economic future- evolving from a "bedroom community" for the City of Tacoma and JBLM, to a "diversified, full-service, and self-contained city". The updated element notes how the City's strong transportation networks, with immediate access to Interstate 5 and State Highway 512 and to the Ports of Tacoma and Seattle, provide a natural opportunity for

warehousing and distribution facilities. The Economic Development element also notes the natural potential for a health-care industry cluster focused around St. Clare, Madigan, and the American Lake Veterans hospitals, and an Educational Services cluster developed around Pierce College, Clover Park Technical College, and the Clover Park School District. Section 5.2.4 discusses the role of Joint Base Lewis- McChord in the region's economy and the natural linkages to off-base businesses that support the military.

Goal ED-5 and associated policies promote the revitalization/ redevelopment of (among other areas) the distressed areas of Springbrook, Woodbrook, Tillicum, Lakeview, and Lake City.

Housing is promoted in the City's urban center through the provision of robust transportation alternatives including the transit center at Lakewood Towne Center shopping area, which is within the *Central Business District* (CBD) zone, and the Lakewood Station Commuter Rail terminus in the *Transit Oriented Commercial* (TOC) zoning district. Both of these zoning districts permit high density multi-family housing at up to 54 dwelling units per acre.

Public Services

- ✓ *Include provisions to promote more efficient use of existing services, such as waste management, energy, and water supply, through conservation – including demand management programs and strategies (MPP-PS-3, 7, 8, 11, 12, 13, 19)*
- ✓ *Include provisions to promote renewable energy and alternative energy sources (MPP-PS-12, 13; MPP-En-21 through 23; MPP-T-6)*
- ✓ *Include provisions to meet long-term water needs, including conservation, reclamation and reuse (MPP-PS-17 through 20; MPP-En-25)*

Lakewood is a "contract city" and does not provide waste management, energy, water or communications infrastructure. The City does, however, promote the efficient use of existing service infrastructure (provided by contract service providers) through the encouragement of infill development (versus extension of services to currently unserved areas). The City also supports measures promoting use of renewable energy and alternative energy sources such as Electric Vehicle charging stations and infrastructure.

The City's two largest power providers are Tacoma Power and Puget Sound Energy. Tacoma gets 90% of its power from hydroelectric sources, and Puget Sound Energy gets 48% of its electricity from hydroelectric and wind sources. Puget Sound Energy also gets 25% of its electricity from natural gas sources. The City's third electrical provider, Lakeview Light and Power, is heavily invested in development of renewable energy sources; however, the cooperative buys energy on the regional market and specific sources may vary from day to day.

Water service throughout Lakewood is primarily provided by the Lakewood Water District. The Lakewood Water District has served the Lakewood Community since 1943. There is no significant

land area into which the District could expand of its service. Sewer service in the City is provided primarily through the Pierce County sewer utility.

Lakewood has limited stormwater collection infrastructure. The soils in Lakewood are very porous and stormwater is expected to be infiltrated into the ground on-site for most land development projects. Limited municipal stormwater systems are provided where infiltration is difficult because of soil conditions, or where soils have been contaminated and it is not desirable to infiltrate stormwater because of the potential to spread the contamination. There are also larger regional stormwater systems that convey water from other jurisdictions (i.e. City of Tacoma) to existing detention/infiltration facilities in Lakewood.

Transportation- VISION 2040 and Transportation 2040

(NOTE: The City will be updating its Transportation element in 2015)

The road system for the City of Lakewood is essentially built out. There are no areas available for development or redevelopment that would require any significant expansion of the roadway system. The City is strategically placed to take advantage of regional commuting resources including the Sounder commuter train and bus systems operated by Pierce Transit and Sound Transit. Several "park-and-ride" facilities are located within the city.

Transportation funding sources for the City include motor vehicle fuel tax, real estate excise tax, transfers in from the Surface Water Management Fund (for the portions of projects related to surface water), grants, private utilities, private developers, vehicle license fees, a Property Tax Excess Bond Levy, Community Development Block Grant (CDBG) funds and the City's general fund.

Maintenance, Management and Safety

- ✓ Develop clean transportation programs and facilities, including actions to reduce pollution and greenhouse gas emissions from transportation *(MPP-T-5 through 7))*
- ✓ Incorporate environmental factors into transportation decision-making, including attention to human health and safety *(MPP-DP-44; MPP-T-7)*
- ✓ Identify stable and predictable funding sources for maintaining and preserving existing transportation facilities and services *(MPP-G-4, 5: MPP-T-33)*
- ✓ Include transportation system management and demand management programs and strategies *(MPP-T-2, 3, 11, 23, 24)*
- ✓ Identify transportation programs and strategies for security and emergency responses *(MPP-T-8)*

The City of Lakewood is improving its transportation management capabilities through the implementation of active traffic management technology. Cameras have been installed at many key intersections and City personnel are able to manipulate traffic signal cycles based on real-time congestion conditions.

The City has also taken an active role with regard to the Interstate 5 corridor adjacent to Joint Base Lewis McChord (JBLM) and through Lakewood. Corridor issues include congestion and capacity, access to JBLM, and safety issues prompted by the proposed Point Defiance Bypass railroad project, which includes routing high speed passenger rail alongside Interstate 5. The train project has potential impacts on the existing I-5 interchanges.

Supporting the Growth Strategy

- ✓ Focus system improvements to support existing and planned development as allocated by the *Regional Growth Strategy (MPP-T-9 through 22)*
- ✓ Prioritize investments in centers *(MPP-T-12; MPP-DP-7, 10, 13; MPP-H-6)*
- ✓ Invest in and promote joint- and mixed-use development *(MPP-T-10)*
- ✓ Include complete street provisions and improve local street patterns for walking and biking *(MPP-T-14 through 16)*
- ✓ Design transportation facilities to fit the community in which they are located ("context-sensitive design"); use urban design principles when developing and operating transportation facilities in cities and urban areas *(MPP-T-20, 21)*

Lakewood's Comprehensive Plan supports the regional growth strategy by taking advantage of the City's location on the Sounder commuter rail network. The southerly terminus of the Sounder route is the Lakewood Station. The station provides a parking garage for 600 vehicles, and is also served by several bus routes. The area surrounding the Lakewood Station is designated as the Lakewood Station District. The District includes both Transit Oriented Commercial and High Density Multi-family Residential zoning districts. Both zoning districts allow multi-family residential development at up to 54 dwelling units per acre.

The City promotes a downtown farmer's market. The City is releasing a complete streets request for proposal for Motor Avenue which is located near the Colonial Center. The City is embarking on the promulgation of a subarea plan for the Central Business District. Work on the plan is to begin in 2016. Part of the plan will include a capital facilities plan which will assist policy makers in prioritizing major infrastructure projects where people and goods are a central focus. Of late, the City has proposed new, linear walkways throughout the Towne Center designed to promote new mixed used development.

Greater Options and Mobility

- ✓ Invest in alternatives to driving alone *(MPP-T-23, 24)*
- ✓ Ensure mobility of people with special needs *(MPP-T-25)*
- ✓ Avoid new or expanded facilities in rural areas *(MPP-T-28; MPP-DP-27)*
- ✓ Include transportation financing methods that sustain maintenance, preservation, and operations of facilities. *(MPP-T-33)*

The City of Lakewood is served by the Pierce County Public Transportation Benefit Area Corporation ("Pierce Transit"). Pierce Transit provides at least 10 bus routes through the City. The primary transit hub in Lakewood is the Lakewood Transit Center located in the Lakewood Towne Center. Lakewood is also served by the I-5/512 commuter park-and-ride facility, and the Lakewood Sounder Station ("Lakewood Station") facilities operated by Sound Transit. By contract with Sound Transit, the City of Lakewood is responsible for the maintenance of the Lakewood Station facility. The 1-5/512 Park and Ride facility provides 493 parking spaces and Lakewood Station provides approximately 600 parking spaces. Shuttle paratransit programs are provided by Pierce Transit for persons with disabilities who are unable to avail themselves of regular transit service.

The City's primary industrial facility, the Lakewood Industrial Park, and Joint Base Lewis McChord are both served by rail which reduces roadway transportation requirements for freight.

The City possesses no rural areas in which to expand. Development within Lakewood is through redevelopment.

Linking Land Use and Transportation

- ✓ Integrate the ten *Transportation 2040* physical design guidelines in planning for centers and high-capacity transit station areas *(MPP-T-21; Transportation 2040 Physical Design Guidelines)*
- ✓ Use land use development tools and practices that support alternatives to driving alone – including walking, biking and transit use *(MPP-T-33)*

The Lakewood Comprehensive Plan provides for concentrated residential densities in areas proximate to the Lakewood Transit Center and the Lakewood Sounder Station. Both areas support residential development at densities up to 54 dwelling units per acre. Access to the Lakewood Sounder Station has been further promoted by the construction of a pedestrian bridge over the railroad tracks to connect the Station to the residential neighborhoods to the north and west. The City is also pursuing non-motorized linkages between the Sounder Station and St. Clare hospital to the west.

Investments

Transportation- Growth Management Act Requirements

(NOTE: The City will be updating its Transportation element in 2015)

Land Use Assumptions and Forecast of Travel Demand

- ✓ Demonstrate that travel demand forecasts and transportation need assessments are always based on land use assumptions[2] that correspond with the most recently adopted growth targets; ensure that population and employment assumptions are consistent throughout the comprehensive plan (i.e., land use element, transportation element, and housing element) *RCW 36.70A.070(6)(a)(i)*

The City's transportation Element is being updated in 2015. The update will utilize the land use assumptions from the City's 2014 update of the Land Use element, and the 2030 population and employment targets adopted by Pierce County.

Service and Facility Needs- LOS Standards and Concurrency

- ✓ Include inventories for each transportation system, including roadways, transit, cycling, walking, freight, airports, and ferries *RCW 36.70A.070(6)(a)(iii)(A)*
- ✓ Establish level-of-service standards that promote optimal movement of people across multiple transportation modes *RCW 36.70A.070(6)(a)(iii)(B); MPP-DP-54*
- ✓ Include state facilities and reflect related level-of-service standards
- ✓ *RCW 36.70A.070(6)(a)(iii)(C)*
- ✓ Address multiple transportation modes in concurrency programs *(RCW 36.70A.070(b) and 36.70A.108; MPP-DP-54 through 56)*
- ✓ Tailor concurrency programs, especially for centers, to encourage development that can be supported by transit *(MPP-DP-56)*

The 2015 Transportation Element Update includes an evaluation of existing conditions pertaining to critical transportation systems. The update will provide special focus on corridors and intersections identified as having specific congestion issues. The City's transportation consultant will prepare a traffic model to identify levels of service at identified locations. The analysis will note existing levels of service and identify any existing or anticipated LOS deficiencies.

[2] **The Transportation Element Must Be Based on the Land Use Assumptions in the Comprehensive Plan -** A problem sometimes encountered in the certification of transportation-related provisions in local comprehensive plans is the use of different planning assumptions in the transportation element from the land use element. Comprehensive plans are to be internally consistent, which means that the same land use assumptions must be used for planning for housing, transportation, and other provisions in the plan.

Financing and Investments

- ✓ Include a multiyear financing plan, as well as an analysis of funding capability *RCW 36.70A.070(6)(a)(iv)(A) and (B)*
- ✓ Include a reassessment strategy to address the event of a funding shortfall *RCW 36.70A.070(6)(a)(iv)(C)*

The City maintains a "rolling" 6-year transportation capital improvement plan and a two-year biennial operating budget {MORE}

Intergovernmental Coordination

- ✓ *Coordinate with neighboring cities, the county, regional agencies, and the state RCW 36.70A.070(6)(a)(v); MPP-G-1; MPP-T-9*

The City coordinates with neighboring cities, the County, Joint Base Lewis-McChord and the State on a variety of transportation issues including congestion on I-5, construction of the Point Defiance Rail Bypass, access to Camp Murray, and access to JBLM.

The City is a member of the South Sound Military & Communities Partnership (SSMCP). Its purposes is to foster effective communication, understanding, and mutual benefit by serving as the most effective point of coordination for resolution of those issues which transcend the specific interests of the military and civilian communities of the South Sound region. SSMCP membership includes cities and towns in Pierce and Thurston counties, school districts, economic development boards, health systems, ports, colleges and universities, chambers of commerce, workforce development organizations, social services organizations, veterans' services and the Nisqually tribe. SSMCP also works hand-in-hand with the Washington Military Alliance.

The City coordinates with Pierce County Community Connections on a wide variety of social services programs. The City is an active member of the Tacoma-Pierce County Coalition to End Homelessness. The City is an active participant in the oversight and distribution of Section 2060 and 2163 funds. These programs provide funds for low income housing development and support homelessness programs throughout the region.

Lakewood is a member of RAMP. RAMP is a regional coalition including business, labor, public and private organizations and citizens dedicated to improved mobility in the South Sound and Washington State.

Lakewood is a member of the Pierce County Growth Coordination Committee (GMCC) and the Pierce County Regional Council (PCRC). The GMCC is the technical body which supports the PCRC. Both groups ensure that the Growth Management Act requirements are coordinated within the County and the region.

Demand Management

- ✓ *Identify demand management strategies and actions, including but not limited to programs to implement the Commute Trip Reduction Act. RCW 36.70A.070(6)(a)(vi); MPP-T-3; MPP-T-23; MPP-T-24*

The City has made investments and developed policies that are intended to foster use of the Sounder Commuter rail system and other transit options along the I-5 corridor. The City encourages transit oriented development in the Lakewood Station area through zoning that allows for high density residential development, application of multi-family residential tax incentives, and construction of sidewalks, a pedestrian bridge, and other infrastructure to facilitate access to Lakewood Station. Infrastructure improvements extend across I-5 into the Springbrook neighborhood. The City also encourages the use of public transit options through high density zoning and multi-family tax incentives around the Lakewood Towne Center.

Policies to implement the Commute Trip Reduction Act are contained in the Comprehensive Plan and Section 12A.13 of the Lakewood Municipal Code. The City of Lakewood provides commute trip reduction actions through a technical work group comprising Pierce County jurisdictions and Pierce Transit called "Pierce Trips". This group is active and is working to continually update and improve its level of employer and commuter support services. CTR services provided by Pierce trips include employer commute reduction program development, ride matching services, Emergency Ride Home program, ORCA program administration and vanpool programs.

Pedestrian and Bicycle Component

- ✓ *Include strategies, programs, and projects that address nonmotorized travel as a safe and efficient transportation option – including pedestrian and bicycle planning, project funding and capital investments, education and safety.*
  RCW 36.70A.070(6)(a)(vii); MPP-T-14 through 16

The City of Lakewood adopted a Non-Motorized Transportation Plan (NMTP) in 2008. The plan includes an inventory of the existing pedestrian and bicycle system which was then integrated into the City's geographic information system (GIS). The NMTP also includes a planning process intended to address the guidelines and regulatory requirements of the Americans with Disabilities Act (ADA), and to provide a methodology for prioritizing non-motorized transportation projects. The NMTP also includes policy and design guidelines for non-motorized transportation systems, and plans for a way-finding program.

Land Uses Adjacent to Airports

- ✓ *Identify and address any airports within or adjacent to the jurisdiction RCW 36.70.547 and 36.70A.070(6)(a)(iii)(A); MPP-T-31*

- ✓ *Describe existing and planned uses near the airport, as well as policies and regulations that discourage incompatible uses RCW 36.70.547; MPP-DP-51*

The City of Lakewood is adjacent to JBLM and the McChord Field runway. Properties to the north of McChord Field are within the identified Accident Potential Zones (APZs) and impacted areas for aircraft noise. These constraints are noted in the City's comprehensive plan and zoning ordinance. The City is currently working with JBLM and other neighboring jurisdictions on an update of the Joint Land Use Study (JLUS) for the facility. The City's current zoning within the Accident Potential Zones places limitations on types of uses and the intensity of uses (as expressed in terms of persons per acre), implements performance standards to discourage activities that are detrimental to aircraft operations, and requires noise attenuation for new structures based on the structure's location. Upon conclusion of update of the Joint Land Use Study (currently underway), appropriate adjustments will be made to the City's comprehensive plan and development regulations.

PART II: Questions

The Environment

(MPP-En-1 through 25; MPP-DP-29 through 32, 43 through 47; MPP-PS-1, 3, 7, 8, 12, 13, 19, 20, 24)

Explain how the plan addresses the environment and sustainable development. At a minimum please discuss the following:

- ✓ *Using system approaches to planning for and restoring the environment*
- ✓ *Air quality and climate change (including clean transportation and reduced greenhouse gas emissions)*
- ✓ *Water quality*
- ✓ *Wise use of services and resources (including conserving water and energy, reducing waste, protecting resource lands)*
- ✓ *Human health and well-being*

The City of Lakewood Comprehensive Plan and development regulations were developed from the outset with environmental protection considerations in mind. The most valuable of the City's environmental systems resources, open space and natural habitat areas of the City are protected through public ownership and/or open space designation and zoning. The City's critical areas and shoreline regulations are also used to regulate land use in and around sensitive areas. Development standards and capital improvement projects are implemented to protect the environment against the more direct impacts of land development. Planning decisions regarding the distribution of land uses relative to transportation networks are intended to reduce transportation impacts and greenhouse gas emissions.

Population and Employment Growth

(MPP-G-4, 5; MPP-DP-1 through 28, 33 through 42, 48 through 56; MPP-H-1 through 9, MPP-Ec-1 through 22; MPP-PS-2, 4, 5, 21 through 24)

Explain how the plan guides residential and job growth. At a minimum, please discuss the following:

- ✓ *Planning targets (housing and employment) that align with VISION*
- ✓ *Planning for and achieving housing production (to meet the needs of all income levels and demographic groups)*
- ✓ *Adequate infrastructure and financing to serve existing communities and future development (including amenities)*
- ✓ *Promoting centers and compact urban development (including density, redevelopment and infill, design)*
- ✓ *Planning for unincorporated urban growth areas (joint planning) and annexation*
- ✓ ***for counties:*** *Rural development and rural character*
- ✓ *Economic development*

As noted above, Lakewood is designated as a *regional growth center*. The comprehensive plan focuses housing and employment growth into the City's Central Business District and the Lakewood Station District. The City also has eight designated "Centers of Local Importance" which reflect second tier targets for growth. The City's "toolbox for growth" includes the multi-family tax exemption incentive programs, various housing assistance programs, and a flexible zoning code allowing for mixed use development.

Transportation Provisions

(MPP-G-4, 5; MPP-EN-7, 19, 23; MPP-DP-7, 10, 13, 17, 27, 40, 42, 43, 54 through 56; MPP-H-6, MPP-Ec-6; MPP-T-1 through 33; RCW 36.70A.070(6))

Explain how the plan addresses the following provisions from VISION 2040 and Transportation 2040 – the region's long-range transportation plan:

- ✓ *Clean transportation*
- ✓ *Maintenance and safety*
- ✓ *Demand management*
- ✓ *Serving centers and compact communities*
- ✓ *Transportation facilities that fit the community in which they are located ("Context-sensitive design")*
- ✓ *Greater options and mobility*

The City's Transportation Element is being updated as part of the 2015 update cycle. As noted above, the City is focusing on taking advantage of existing transit systems by focusing population and employment growth into the Central Business District and Lakewood Station areas. The City is also working to fill gaps in pedestrian and bicycle routes through targeted improvements selected according to the prioritization methodology established in the City's Non-Motorized Transportation Plan.

Future transportation projects intended to provide increased options for Lakewood citizens include new trolley or shuttle service from isolated areas of the City (Springbrook, Woodbrook, and Tillicum) to the City's Central Business District. (This program was recently identified as part of the City's Visioning process and has not yet been developed or implemented.)

Consistency Assessment of Capital Facilities Programming Processes

(PS-Action-8)

- ✓ *Describe how capital improvement programs and other service and facility plans are consistent with and implement VISION 2040 and the growth management objectives in the comprehensive plan.*

Regional and state-wide public facilities located in Lakewood include Western State Hospital, Pierce College and Clover Park Technical College, St. Clare Hospital, Pierce Transit headquarters, DSNS Work-Source offices, and the South Tacoma Game Farm. Transportation facilities include the Lakewood Sounder Station, Sounder Layover facility, and rail line owned by Sound transit, as well as Interstate 5 and the WSDOT maintenance facility of Pacific Highway SW.

The City evaluates the siting of public facilities through zoning permits. A wide variety of public uses are allowed in the Public-Institutional zoning district with the issuance of a discretionary land-use permit (administrative use permit or conditional use permit). Most of the existing institutional uses in Lakewood operate pursuant to an approved discretionary land use permit. "Master Plans" are required for facilities exceeding 20 acres. Other public uses may be sited in other zoning districts depending on the nature of the use and the district. New structures and significant programmatic changes are usually authorized through an amendment or update of an existing land-use permit or master plan.

VISION 2040 Actions

Describe work underway or proposed to address the following VISION 2040 implementation actions:

- ✓ *Expanded efforts to conduct environmental planning (En-Action-11)*
- ✓ *Identification of underutilized lands (DP-Action-16)*
- ✓ *Collaboration with special districts on facilities siting and design (PS-Action-6)*
- ✓ *Collaboration with special districts on facilities location (PS-Action-7 and 8)*

Several actions are currently under consideration or in development which are intended to further land use planning goals expressed in the city's comprehensive plan and related programs. These include:

- Closure of Oakwood Elementary School. This school is located in the Accident Potential Zone and Noise Impact Area for McChord Airfield. The school is proposed to be closed and its students distributed to other schools in the vicinity.
- Closure of Woodbrook Junior High School. This school is proposed to be closed to help facilitate conversion of the Woodbrook area to industrial uses. The student population of this school is intended to be redistributed to schools both on-base at JBLM and off-base in Lakewood.
- The City is currently in the process of making adjustments to the comprehensive plan Future Land Use map and zoning district maps to re-designate/re-zone select properties in the Residential Estate areas to accommodate increased density. This reassessment is focusing on lands fronting on arterial streets or with other characteristics that may warrant increased densities.
- The City is currently in the process of developing a "cottage housing" ordinance that would provide for increased densities in single –family zoning districts in exchange for development

of cottage housing units meeting specific design requirements and providing for specific types and amounts of open space.

- The City is planning to develop a specific planning document- a "Planned Action" or other framework- to encourage further development of the Lakewood Towne Center. This is likely to take the form of a subarea plan for the City's Regional Growth Center.
- The City has recently taken steps to accommodate a new large multi-family development in the Springbrook neighborhood. The project site was a decrepit mobile-home park that has been vacated over the last few years. A multi-family tax exemption has tentatively been approved for the property. The project may include over 200 dwelling units.
- The City and the Clover Park School District will initiate a capital facilities planning process this late summer and early fall. This proposal will review aging school and facility infrastructure, and consolidation and closure issues.
- Through the SSMCP and the JLUS planning process which is currently underway, the City is pursuing the acquisition of privately held Clear Zone properties located at the northerly end of McChord Field.
- Within the past year, the City embarked on a community visioning process. Sustainable and responsible practices have become a topic of interest. The city council is currently considering a number of actions items including a community sustainability plan, a green building intuitive, a waste diversion plan for large institutional uses (school facilities, colleges, an existing hospital, and a psychiatric hospital), and reducing municipal electrical costs by installing LED traffic signals & street lights throughout the community.

Monitoring

(MPP-G-3) Describe monitoring programs for

1) *plan implementation and performance*
2) *tracking where residential and employment growth is occurring*
3) *achieving housing production*
4) *assessing the health and function of natural environmental systems – including protection and restoration*
5) *reducing pollution and greenhouse gas emissions*

The City's comprehensive plan includes an implementation chapter. Section 10.3.5 lists specific implementation strategies for land use, urban & community character, economic development, transportation, and capital facilities planning. Additionally, the community & economic development department provides an annual work plan to the city council which outlines emerging land use issues, and where appropriate, makes recommendations for amendments to policy documents. Specific performance measurements are adopted as part of the City's biennium budget process.

The City monitors existing economic conditions and trends and produces reports to this effect. Case in point is the semi-annual Lakewood Index which provides statistical information on school enrollment, new businesses, unemployment rates at the local and regional level, real estate data, and retail sales

tax collections. Residential growth is tracked through the issuance of building permits. Employment growth is also tracked through building permits, in addition to business licensing. The City maintains a list of top employers. The City performs business retention/expansion interviews. Over 100 interviews are conducted annually. The City is a member of the Tacoma Pierce County Economic Development Board (EDB). The EDB assists with site selection and relocation of major businesses to Pierce County. EDB board members include Lakewood elected officials and the city manager.

Each year, the community & economic development department produces an annual housing report. The report provides information on new housing starts, in addition to data on the type of housing, and level of affordability. The City's comprehensive plan has specific policies encouraging housing of all types (See Section 3.2.10). In 2014 and 2015, the City expanded its multifamily tax exemption program to Springbrook and the Lakewood station district to encourage redevelopment and expand housing production.

The City requires tree removal permits as a means of monitoring the City's forested lands. Natural open and forested lands account for 31 percent of Lakewood's land cover.

Development projects are required to set aside the City's remaining open space areas or provide mitigation. For one project, over 30 percent of the land was set aside as private open space to protect Oregon white oaks, and, further, to preserve portions of the Flett Creek Wetlands Complex from further development.

The City has used its land use regulations to set aside private lands for open space. The City has acquired private lands classified as wetlands. The City has expanded its park areas.

The City maintains contracts for services for a tree arborist and with Pierce College. The tree arborist monitors the health of City street trees. Pierce College works with the City to develop systems which would increase the population of Oregon white oaks. This program is funded using the City's tree mitigation fund.

The City has pursued Department of Ecology grants to study the health of local lakes. The Public Works Surface Water Management Division (SWM) promotes the preservation of natural drainage systems, protection of fishery resources, and wildlife habitat. Most recently, the SWM partnered with the Nisqually Tribe to construct a fish ladder on Clover Creek.

Lakewood is pursuing the reduction of greenhouse gas emissions primarily through its transportation policies by: reducing the consumption of energy through an efficient and convenient transportation system; keeping travel times for people and goods as low as possible; and emphasizing the movement of people and goods, rather than vehicles, in order to obtain the most efficient use of transportation facilities.

Other Topics

Explain any other provisions in the comprehensive plan of regional interest or significance, as well as any unique topics or issues.

CITY OF LAKEWOOD

DEPARTMENT OF COMMUNITY DEVELOPMENT

ENVIRONMENTAL CHECKLIST APPLICATION FORM

A. BACKGROUND INFORMATION

Name of Project:	2015 Lakewood Comprehensive Plan Update and Amendments
Name of Applicant:	City of Lakewood
Contact Person:	Dan Catron, Principal Planner (253) 983-7730
Mailing Address:	6000 Main Street SW Lakewood, WA 98499

DESCRIPTION OF PROPOSED AMENDMENTS:

The 2015 update involves Chapters 1 (Introduction), 4 (Urban Design), 6 (Transportation), 8 (Public Services), 9 (Capital Facilities), and 10 (Implementation) of the Lakewood Comprehensive Plan. The 2015 comprehensive plan updates will apply city-wide.

Three separate comprehensive plan amendments are also proposed:

- The Lakewood Racquet Club is proposing to re-designate and rezone their 11.4 acre facility from *Open Space and Recreation* to *Residential* to accommodate development of the site with residential uses. The Lakewood Racquet Club is located at 5820 112th Street SW (Pierce County Assessor's Parcels 0219111038, 0219111040, and 3097000312).

- The City is proposing to "up-zone" approximately 56 acres of developed large-lot residential land comprising approximately 75 parcels located between Interlaaken Drive SW and Tower Road SW, north of Washington Blvd. SW. The amendment would rezone the land from R1 to R2 in order to reflect the existing mix of lot sizes and provide for increased in-fill housing options; and

- The City is proposing to re-designate and rezone approximately 7 acres of mostly vacant land located on the southwest corner of Gravelly Lake Drive SW and Veterans Drive SW (Pierce County Assessor's Parcels 4585000042 and 4725003074). The property would be re-designated from *Residential Estate* to *Single-Family*, and rezoned from *R1* to *R3*. (Corrected description of proposed land-use and zoning designation from Multifamily/MF1 to Single Family/ R3, 8/14/15).

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Name of signee: Dan Catron

Position and Agency/Organization: Planning Manager, City of Lakewood

Date Submitted: July 13, 2015

D. SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. *How would the proposal be likely to increase discharge to water; emission to air; production, storage, or release of toxic or hazardous substances; or production of noise?*

The proposed comprehensive plan updates are primarily administrative in nature and are intended to achieve consistency with the Puget Sound Regional Council's Vision 2040 document, the Washington State Growth Management Act, other applicable State laws, and the Pierce County Countywide Planning Policies. The proposed city-initiated comprehensive plan amendments are intended to increase residential densities in specific areas with existing roadways, utilities and infrastructure as directed by the Growth Management Act. The proposal by the Lakewood Racquet Club is intended to allow the development of vacant property with medium density residential uses. None of these amendments are expected to result in increased discharges to air or water, involve the production, storage or release of toxic substances, or to produce significant amounts of noise.

Proposed measures to avoid or reduce such increases are:

(Not applicable)

2. *How would the proposal be likely to affect plants, animals, fish, or marine life?*

The proposed comprehensive plan updates are not expected to affect plants animals, fish, or marine life.

The City –initiated amendments may result in the elimination of on-site trees and vegetation when the properties in question are developed, but significant impacts to critical habitat resources are not expected. All new development will be required to comply with City regulations related to habitat protection, stormwater discharge, and tree removal.

The privately initiated amendment for the Lakewood Racquet Club involves lands within a recently delineated "Area of Special Flood Concern" (as shown on draft FEMA Flood Insurance Rate Maps issued 9/28/2007) which is the potential pathway for floodwaters overflowing the Clover Creek channel in the vicinity of 58th Avenue SW. Overflow from Clover Creek may result in impacts to sensitive salmon species. This change to the Flood Insurance Rate map has not yet been adopted.

Proposed measures to protect or conserve plants, animals, fish, or marine life?

A site specific engineering and /or biological impact analysis of the Clover Creek flood issue for the Lakewood Racquet Club property will be required prior to any development. The concern is that Clover Creek could overtop its banks in a major flood event and result in the impound of flood waters along 58th Avenue and onto the Racquet Club property. An engineering analysis could result in identifying actions that could be taken to reduce the flood risk. If the risk cannot be substantially reduced or eliminated, a biological assessment may be necessary to identify the impacts of a flood event on the salmon in Clover Creek, and specify mitigation measures to eliminate any such impacts.

3. *How would the proposal be likely to deplete energy or natural resources?*

The proposed updates and amendments are not expected to have any significant impact on energy or natural resources.

Proposed measures to protect or conserve energy and natural resources are:

New development facilitated by the proposed comprehensive plan amendments will be subject to the International Energy Conservation Code (IECC). Any new development will be located within an urban area with existing utilities and infrastructure which will also help minimize energy use over the life of the development.

4. *How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?*

Under draft updated FEMA Flood Insurance Rate Maps (FIRM) issued in September 2007, the Lakewood Racquet Club property is re-designated from Zone C (Areas of Minimal Flood Concern) to Zone AE- Area of Special Flood Hazard, Elevations Determined, based on more

detailed mapping of the topography of the area. The new map identifies the LRC property as being within the pathway of the "Clover Creek Lakewood Overflow". The re-designation of the property from *Open Space* to *Residential* could result in increased exposure of structures and development to flood hazard risks.

Proposed measures to protect such resources or to avoid or reduce impacts are:

Further detailed engineering analysis of the Clover Creek Lakewood Overflow is necessary to determine the extent of the flood risk and potential measures to reduce or eliminate that threat. It is not known at this time if engineering actions are available to eliminate or reduce the flood risk.

5. *How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?*

The proposed comprehensive plan updates and amendments would have only minimal impacts on land and shoreline use- the proposed updates are mostly administrative in nature. The proposed city-initiated amendments and the Lakewood Racquet Club amendments will affect land use. The proposed land use changes would not, however, be clearly incompatible with existing plans. In both instances, the proposed amendments would provide for residential development in an existing residential area.

Proposed measures to avoid or reduce shoreline and land use impacts are:

Future development would be subject to the development standards of the City's Land Use and Development Code which includes provisions intended to foster compatibility between adjacent land uses.

6. *How would the proposal be likely to increase demands on transportation or public services and utilities?*

The proposed comprehensive plan updates re-emphasize the strategy of focusing new growth in areas with good transit access such as the *Central Business District* and the *Lakewood Station District.*

While the proposed up-zone of residential property between Interlaaken Drive and Tower Road could potentially result in the construction of up to 40 additional dwelling units if all of the properties were cleared and redeveloped at the highest level of density, Staff believes that additional development over the next 10-20 years is more likely to be in the 6- 12 unit range. This equates to additional traffic of 60-120 vehicle trips per day over existing levels, with the increase spread out over a period of 10-20 years. The City Engineer does not consider this to be a significant impact on the City's transportation systems.

Proposed measures to reduce or respond to such demand(s) are:

The City hopes to *increase* demands on public transit systems. All of the proposed comprehensive plan map amendments propose to increase residential densities in areas with existing excess roadway capacity.

7. *Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.*

The most significant environmental issue identified for the 2015 Comprehensive Plan Amendments/Update is the Flood/Endangered Species issue at the Lakewood Racquet Club. This issue was the subject of a Biological Opinion (BiOp) issued by the National Marine Fisheries Service (NMFS) on September 22, 2008. Federal law requires that effects on floodplain features and functions must be identified and avoided or mitigated to prevent harm to ESA listed fish species and killer whales that feed on those fish. All potential impacts must be avoided or fully mitigated.

City of Lakewood

2015 Comprehensive Plan Amendments and Update

Determination of Non-Significance

Project: **2015 Lakewood Comprehensive Plan Amendments and Update**

Description: The Washington State Growth Management Act requires that Pierce County jurisdictions review and, as necessary, update their comprehensive plans every eight years. The City of Lakewood 2015 update involves Chapters 1 (Introduction), 4 (Urban Design), 6 (Transportation), 8 (Public Services), 9 (Capital Facilities), and 10 (Implementation) of the Lakewood Comprehensive Plan. The 2015 updates also include a request by the Lakewood Racquet Club to re-designate and rezone their 11.4 acre facility from *Open Space and Recreation* to *Residential* to accommodate development of the site with residential uses; and two city-sponsored proposals to "up-zone" approximately 63 acres of residentially zoned land in order to increase residential densities and provide for increased housing options in specific areas.

The City adopted updates to Chapters 2, 3, 5, and 7 of the Comprehensive Plan in 2014. The 2015 update is a continuation of the 2014 update effort.

Specific elements of the 2015 update are described below:

Comprehensive Plan Update

Amendments to Chapter 1- Introduction. Chapter 1 is amended to acknowledge actions that have been completed since the comprehensive plan was first adopted in 2000. The Chapter is also amended to include findings from a Visioning program initiated by the City in 2014. Many of the conclusions and results of the Visioning effort are discussed in the updated chapter.

Amendments to Chapter 4- Urban Design. Chapter 4 is updated to reflect actions that have been completed since the Chapter was originally written in 2000, such as construction of the Lakewood Sounder Station and extension of sewer service to Tillicum and Woodbrook, as well as projects that have emerged since that time, including the Point Defiance Rail Bypass project. This chapter also directs the City to prepare sub-area plans for the Lakewood Station District and the Central Business District.

Amendments to Chapter 6- Transportation. The City's Transportation Element has been updated to reflect changes and improvements in the City's transportation systems and traffic demands,

and to reflect the growth forecasts of the City's Land Use element that was updated in 2014. The City's transportation Element consists of two parts. First, Chapter 6 of the comprehensive plan document discusses the circumstances and issues affecting the City's transportation networks, and contains goals and policies relative to transportation systems. The comprehensive plan document also includes the Transportation Background Report. Second, the City's Six-year Transportation Improvement Program (6-year TIP) contains prioritized lists of specific transportation system projects together with budget and funding information. Together, Chapter 6 of the comprehensive plan (including the Transportation Background Report) and the 6-year TIP comprise the City's Transportation Element.

Amendments to Chapter 8- Public Services. Chapter 8 is updated to reflect program changes and the evolution of several agencies providing public services. A policy is added to prohibit the development of school facilities on sites that present potential hazards that may affect school functions and/or negatively impact students and others. At the present time, the Clover Park School District is proposing to close several schools that are impacted by their environments. A new policy (PS 10-10) directs the City to work with the school district to redevelop surplus sites with appropriate uses consistent with the comprehensive plan. Updates also include more specific policies with regard to the improvement of public library services in Lakewood, establishment of goals and policies with regard to health and human services, and expansion of goals and policies regarding efforts to provide affordable housing in the community.

Amendments to Chapter 9- Capital Facilities. This chapter is updated to acknowledge changes in the City since 2000 including formation of a police force and construction of a police station facility. A new policy CF 9.3 is also added noting that the siting of essential public facilities is not categorically precluded.

Amendments to Chapter 10- Implementation. This chapter is updated to acknowledge the development of the City's regulatory framework through the adoption of implementing regulations and programs since initial adoption of the Comprehensive Plan in 2000.

Lakewood Racquet Club- Comprehensive Plan and Zoning Map Amendments

The Lakewood Racquet Club is proposing to re-designate and rezone their 11.4 acre facility from *Open Space and Recreation* to *Residential* to accommodate development of the site with residential uses. The property is located at 5820 112th Street SW. The proposal involves lands within a recently delineated "Area of Special Flood Concern" (as shown on draft FEMA Flood Insurance Rate Maps) which is the potential pathway for floodwaters overflowing the Clover Creek channel in the vicinity of 58th Avenue SW. This change to the Flood Insurance Rate map has not yet been adopted.

Site specific engineering and /or biological impact analysis of the Clover Creek flood issue will be required prior to any development of the Lakewood Racquet Club property. An engineering analysis could result in identifying actions to further reduce or eliminate the flood risk. If the risk cannot be substantially reduced or eliminated, a biological assessment may be necessary to identify the impacts of a flood event on the salmon in Clover Creek, and specify mitigation measures to eliminate any such impacts.

Interlaaken/Tower Road Zoning Map Amendments

The City is proposing two comprehensive plan amendments intended to increase residential densities in specific areas with existing roadways, utilities and infrastructure as directed by the Growth Management Act. The study area includes residential properties between Interlaaken Drive and Tower Road, north of Washington Boulevard. While the proposed up-zone could potentially result in the construction of up to 40 additional dwelling units if all of the properties were cleared and redeveloped at the highest level of density, staff believes that additional development over the next 10-20 years is more likely to be in the 6- 12 unit range. This equates to additional traffic of 60-120 vehicle trips per day over existing levels, with the increase spread out over a period of 10-20 years. The City Engineer does not consider this to be a significant impact on the City's transportation systems in this area.

Veterans Drive Comprehensive Plan and Zoning Map Amendments

- The City is also proposing to change the comprehensive plan designation on a seven (7) acre site from *Residential Estate* to *Single--Family*, and to change the zoning from *R1* to *R3*. The property is located in the southwest quadrant of the intersection of Gravelly Lake Drive and Veterans Drive SW (Pierce County Assessor's Parcels 4585000042 and 4725003074). The property is currently developed with two older homes, but is mostly vacant. (Corrected description of proposed land-use and zoning designation from Multifamily/MF1 to Single Family/ R3, 8/14/15).

FINDINGS OF FACT:

1. On July 10, 2000, the Lakewood City Council adopted a new Comprehensive Plan as required by the Washington State Growth Management Act of 1995. An Environmental Impact Statement was prepared pursuant to the State Environmental Policy Act (SEPA) which addresses the environmental impacts caused by changes in land use proposed by the new Plan.

2. On August 20, 2001 the City adopted a Land Use and Development Code (Chapter 18A of the Lakewood Municipal Code). The broad intent of the Code is to implement the Comprehensive Plan. The adopted Code is intended to foster harmony among land uses, preserve the qualities of desirable residential neighborhoods, improve neighborhoods whose character undermines good-quality living conditions, diminish reliance on automobile use, and promote the well-being of the city through integration of aesthetic, environmental, and economic values.

3. 2004 Update. In 2004 the City completed its first update of the comprehensive plan. Changes were minimal, however, since the plan was adopted only four years before, and few of the

implementing regulations adopted in response to the initial comprehensive plan had an opportunity to be applied.

4. 2014 Update. In 2014, the Lakewood City Council adopted updates to Chapters 2 (land Use), 3 (Land Use Maps), 5 (Economic Development); and 7 (Utilities). The environmental impacts of these amendments were analyzed at that time and a Determination of Non-significance was issued on July 28, 2014. The 2015 slate of updates will reference the plans, policies and determinations made in the 2014 amendments.

5. SMP adoption. On September 8, 2014, the Washington State Department of Ecology granted final approval to the City's update of its Shoreline Master Program. By statute (RCW 36.70A.480) the goals and policies of the shoreline master program are considered to be an element of the comprehensive plan.

6. Visioning program. In conjunction with the 2015 Comprehensive Plan Update, the Community Development Department has been conducting a community visioning program to solicit input from citizens regarding the policy direction of the city. Efforts have included preparation of a community profile document, interviews of select stakeholders, preparation, dissemination, and collection of results from a web-based community survey, meetings with existing community groups, and conducting a plenary Community Visioning Workshop. The principal findings of this effort are reflected in the *City of Lakewood Community Vision Plan* prepared by Tindale Oliver Associates dated June 2015.

7. Critical Areas Update. In 2015, the City has been working to update its critical areas regulations (Title 14A of the Lakewood Municipal Code). Updates include reference to the National Marine Fisheries Service (NMFS) biological opinion regarding implementation of the National Flood Insurance Program in the Puget Sound region. NMFS found that development in flood hazard areas could have detrimental effects on endangered salmon species. The City is updating its code to ensure that potential impacts to special status species are identified and avoided. Measures necessary to avoid impacts to special status species will be identified and implemented as part of the project specific environmental review of any proposed development.

8. Transportation element. As part of the 2015 update, the City Engineer, in conjunction with the City's transportation consultant, completed an inventory of existing transportation facilities and conditions, including a compilation of existing traffic volumes on City roadways, and an evaluation of traffic operations (i.e. level-of-service) at major intersections. The Background Report then provides a travel demand forecast and needs evaluation, a description of the City's transportation systems planning, and finally discussion of an implementation program including potential funding sources, regional coordination, concurrency management and development review, and a reassessment strategy if funding conditions change. The analysis identifies several specific locations where transportation LOS may fall below established levels. In most cases planned infrastructure improvements will improve LOS to acceptable levels. Five specific locations are identified where arterial

segments will operate at LOS D or worse, even with planned transportation system improvements.

9. Conclusions regarding 2015 Update. The Environmental Official has concluded that the proposed comprehensive plan and zoning code updates, for the most part, simply update information and recognize the attainment of many of the goals of the original comprehensive plan. With regard to the three proposed map amendments, prospective impacts are speculative at this time and cannot be properly evaluated until specific development projects are proposed. No significant adverse environmental impacts are expected as a result of the proposed comprehensive plan updates, or the three proposed amendments.

CONCLUSIONS OF RESPONSIBLE OFFICIAL:

The Responsible Official concludes that the proposed amendments and update to the City's comprehensive plan will not have a probable significant adverse impact to the environment. Pursuant to WAC 197-11-340(2)(a)(v), a DNS may be issued. This conclusion is based on staff review of the proposed comprehensive plan update and the environmental checklist. The environmental effects of specific projects allowed under the plan will be analyzed on a case-by-case basis, as required by the State Environmental Policy Act.

Agency: City of Lakewood
Community Development Department
6000 Main Street SW
Lakewood, WA 98499

Date of Issue: July 30, 2015

Comment Deadline: August 14, 2015

Date of Final Determination: _____

_____
David Bugher, Responsible Official

NOTE: Pursuant to Lakewood Municipal Code Section 14.02.200, decisions of the Responsible Official regarding Process V Legislative Actions are final and are not subject to administrative appeal.

EXCERPTS FROM PLANNING COMMISSION MINUTES
2015 COMPREHENSIVE PLAN AMENDMENTS AND UPDATE

From February 4, 2015

Comprehensive Plan Update

Mr. Dan Catron, Planning Manager, provided a draft copy of the Washington State Department of Commerce Checklist addressing the Comprehensive Plan Update adopted by Council in December 2014.

It was explained the checklist is intended to help cities that are fully planning under the Growth Management Act (GMA) to conduct the "periodic review and update" of comprehensive plans and development regulations required by RCW36.70A.130 (4). Cities can use the checklist to identify components that may need to be updated to reflect the latest local conditions or to comply with changes to the GMA since their last update.

From March 4, 2015

Comprehensive Plan Update

Mr. Dan Catron noted staff continues to work on getting the checklist together for the Puget Sound Regional Council (PSRC) and the State Department of Commerce (DOC). The 2014 Comprehensive Plan Amendments (CPA) was submitted to DOC, of which they verified receipt and have not responded with any comments.

Mr. Dave Bugher commented that staff is working on additional critical areas of gathering information for the update to the Capital Facilities element of the CPA. The Transportation element will be available for the commission to view in May. PSRC Questionnaire is tied to the Transportation funding dollars and must be completed in the same timeframe.

From March 18, 2015

R1 and R2 Land Use Zoning Analysis

Mr. Dave Bugher explained this is a continuation of the previous discussion of the R1 and R2 zones in relation to cottage housing development to comply with the Growth Management Act projected population increase. Staff presented large-scale maps for the areas in the vicinity of Interlaaken Drive SW and Gravelly Lake Drive SW. No formal actions are being taken this evening. An open discussion between staff and commissioners allowed for a SWOT analysis which evaluated the strengths, weaknesses, opportunities and possible threats to any proposed comprehensive plan and zoning map amendments. The primary objective is to develop a full awareness of all factors, positive and negative, that may affect decision-making. This analysis will be used to develop a resolution of intent to amend land use documents.

From April 15, 2015

R1 and R2 Map Amendments

Based on commissioner's comments to-date regarding possible comprehensive plan and zoning map changes, Mr. Dave Bugher submitted five proposals (Map 1 through Map 5) for further review and study. The group considered possible changes in and around Interlaaken Dr SW, and in the vicinity of Veterans Dr SW and Gravelly Lk Dr SW. A Resolution was examined that outlined a proposed City-initiated amendment for 2015. The Resolution proposes to change the zoning for the properties designated on Map 1 from R1 to R2, and to amend the Comprehensive Plan designation from "Residential Estate" to "Single Family"; and change the zoning classification for two properties located at the southwesterly corner of Gravelly Lk Dr SW and Veterans Dr SW from R1 to R3, as depicted on Map 4 contained in the department staff report to the Lakewood Planning Commission dated April 15, 2015.

From June 3, 2015

New Business

2015 Comprehensive Plan Update - Introduction (no recommendations)

In 2014 staff updated and adopted the land use maps (Chapter 2) and element (Chapter 3), economic development chapter (Chapter 5) and the utilities chapter (Chapter 7) of the City's comprehensive plan. Planning Manager Dan Catron introduced the commissioners to the rough-draft comprehensive plan updates and brief description of changes to four chapters to include:

a) Chapter 1 – Introduction
   A section will be added describing the highlights of the recent efforts of the Community Visioning Plan which will be incorporated into this chapter. A series of pictures will be updated showing benchmark improvements from 2000 through 2015.

b) Chapter 4 – Urban Design
   Substantive changes to this chapter include extending the civic boulevard designation to the full length of Bridgeport Way SW through Springbrook and north of Steilacoom Blvd. Expect significant realignment of roadways in Tillicum with changes from WSDOT congestion relief projects along JBLM frontage. This chapter is also reaffirming policies to prepare sub-areas plans for the Central Business District, Tillicum and Lakewood Station District.

c) Chapter 9 – Public Facilities
   The proposed update clarifies that the City will use a two-part approach to this chapter. The chapter itself contains the general goals and policies regarding public facilities, but the implementation of plans and programs will be contained

in the City's 6-Year Capital Improvement Program. That program is very detailed. The 6-Year Transportation Improvement Program has been incorporated into the City's adopted bi-annual budget. An explicit policy is added that directs the City to update the CIP with the budget every two years.

d) Chapter 10 – Implementation
This section will incorporate the action plan elements of the Community Visioning Plan.

In the future staff will be discussing the Transportation and Public Services elements, as well as a privately initiated comprehensive plan and zoning code amendment from Lakewood Racquet Club. The Club property is located on 112th St across from Clover Park High School. The Club wants to change the designation of their property from *Open Space and Recreation* to some kind of a residential zoning to accommodate development on the vacant lot of townhomes and condos. This location is also in a newly mapped flood zone (historic creek channel for Clover Creek) that has not yet been formally adopted. Staff is not sure how this will get resolved. There are endangered species act implications from this new flood plain designation.

Mr. Robert Estrada queried if this was just an introduction. Mr. Dan Catron noted questions can be asked at any time while explaining the next steps would be an environmental review, then a public hearing, after which the commissioners would give a recommendation to the City Council. Mr. Dave Bugher explained the PSRC Checklist is a working document and will continue to be updated until staff finalizes the environmental review and starts the public hearing process, at which time the public and the commission will still have ample time to review it and suggest changes.

Mr. Dan Catron explained sub-area plans in response to Mr. Robert Estrada's query. Mr. Dave Bugher noted the plans include more detailed specific types of uses; which may include mixed-use residential/retail in the Towne Center. These sub-area plans could address new road systems, perhaps expanding the level of open space in the Towne Center and taking into account the new markets coming about as a result of the internet. Changes in the sub-area plans may include creating more of a sense of place and a higher level of walkability in the Towne Center itself.

Mr. Dave Bugher noted the sub-area plans are not just talking about the Towne Center but include everything in the designated CBD (Central Business District), such as the Colonial Center. It will likely address additional road improvements on Gravelly Lk Dr, how the City uses signals to manage traffic control to move people faster on Gravelly Lk Dr, 100th Street, and Bridgeport Way. Mr. Dave Bugher stated that the biggest change will be additional criteria for building construction to include what the buildings will look like and how they will be used. This will be a very large undertaking and a significant investment on the part of the City.The City will hire a consultant to do the work and will take approximately 18-24 months with an expected cost of around half a million dollars.

The sub-area plan will also require the Lakewood Water District, Tacoma Power and Pierce County Sewer Department to take a look at existing capital infrastructure and determine if it's sufficient to meet the demands for the kinds of development we are talking about. Mr. Dave Bugher commented that this may start a conversation about parking garages along Pacific Hwy.

Mr. Robert Estrada asked about future plans for high-density multi-family housing in and around the Lakewood Station, and wondered if it required zoning changes. Mr. Dan Catron stated that zoning allowing 54 units per acre was established in the existing Comprehensive Plan, with plans for development becoming more realistic since the Lakewood Station was built in the Lakeview neighborhood.

2015 CPA Site Tour

The five commissioners present, along with Mr. Dave Bugher and Mr. Dan Catron, toured two prospective areas of Lakewood that are subject to comprehensive plan amendments and land use zoning changes. The tour began at 6:55 p.m. and ended at 7:35 p.m. with all participants returning to the Council Chambers to conclude the regular meeting.

From July 15, 2015

New Business

2015 Comprehensive Plan Update Review

The commissioners were provided updates on the following chapters of the Comprehensive Plan:

Chapter 6 –Transportation

Ms. Desiree Winkler shared with commissioners staff has been working with their consultant, Transpo Group, in updating the transportation element of the Comprehensive Plan. Two major efforts included: 1) evaluating the current transportation system operations and determining if the current and planned transportation improvements are adequate to serve future land use to an adopted level of service standard; and 2) updating the goals and policies to be consistent with current state, regional, and local regulations and the City of Lakewood vision.

Ms. Winkler provided an overview of the transportation background report findings and proposed edits to the transportation element. The background report is an outline of the existing conditions of our transportation system via the travel demand model which was developed with the I-5 studies. The model allows staff to look at land uses and employment data and see how that correlates with the functioning of heavily used intersections. It was explained these measurements are based on a level of service standard (LOS) which is graded from A to F levels. A grade of "A" meaning there is free flowing traffic and you never have to stop, an "F" grade meaning some delays in roadway traffic at intersections. The City is required to adopt a level of service standard. The current standard on many roadways is "D" during peak hour traffic, which is acceptable. If a roadway is already built out and unable to improve facilities any wider or

any larger, the City then accepts the lower standard. Typically these are in shorter stretches of roadway. In some instances turn lanes have been added or extended and configurations changed which actually improves the LOS from a future “E” back down to a “D”. These types of improvements are easily implemented when cost effective.

Ms. Winkler clarified that actual physical counts are done every four years. The travel demand model looked at various intersections and roadways through 2030 and has identified a couple areas that need to be looked at. An example was the “F” grade to Washington Blvd SW & Interlaaken in 2030. Staff is looking at ways to improve the intersection with signalization.

Mr. Bugher reminded commissioners this information will be brought to them again for further review in study sessions and public hearings in September.

The comprehensive plan is the goals and policies and a summary of levels of service standards including a list of projects they propose to follow through on. The biggest change in goals and policies has to do with sustainability and greenhouse gas emissions. The City must note for the state and regional requirements how they are going to be sustainable and address those two items.

Chapter 8 – Public Services

Mr. Bugher provided a draft of the chapter that was last amended in 2004. The chapter outlines City policy in the following areas: fire protection; emergency medical services; police; emergency management; schools and higher education; library services; health and human services; and housing and community development programs.

Mr. Bugher explained at this time the chapter is being provided to the Commission for informational purposes. Staff has initiated review of these draft policies to various City boards/committees and outside agencies. Mr. Bugher commented that he expects a lot of feedback and discussion over how the City uses its human services funds. It was noted the City doesn’t actually get involved in providing human services *per se*, but it allocates money, determines what the City’s needs are, and it works with partners to move it forward.

Comments and recommendations from these groups will be submitted to the Commission throughout August and September. The Commission will be asked to provide recommendations to Council after a public hearing is held. The hearing has been tentatively scheduled for September 16.

From September 2, 2015

2015 CPAs and Update – Study Session

Mr. Dan Catron outlined the 2015 updates noting a few of the highlights to the following chapters:

- *Chapter 1 Introduction*

Consists primarily of simple updates to language and references. Incorporation of conclusions from the City's 2015 Community Visioning Plan. A "Guiding Principles" statement proposed to be replaced by "Community Values" identified in the 2015 Vision Plan.

- *Chapter 4 Community Design*

Consists primarily of simple updates to language and references. Adjusting the list of "Green Streets" and "Principal Arterials" noting the significant modifications to the freeway interchanges in Tillicum. Affirming the City's desire to see a commuter rail station in Tillicum.

- *Chapter 6 Transportation*

Rework language of General Transportation Goals and Policies. Modifications to classifications. Cross Base Highway. Development of energy efficiency goals.
Non-Motorized Transportation Plan to consider adopting a "Complete Streets" ordinance. Recalibration of Level of Service for roadways.

- *Chapter 8 Public Services*

2015 updates recognize the creation of West Pierce Fire and Rescue. Acknowledges the discontinuance of the crime free housing program. Enhance policies regarding schools and redevelopment of surplus school sites. Promotion of construction of a new main library facility within the City's downtown core. Updates to goals and policies regarding health and human services together with policies regarding housing and community development programs.

- *Chapter 9 Public Facilities and Improvements*

Capital facilities related goals and policies of the Capital Improvement Plan, Parks Plan, and Utility Master Plan providing specific short term operational planning. Addition of a policy directing the City to update the CIP every two years in conjunction with approval of the City budget. Reflecting the fact that the Lakewood Police Station has been constructed.

- *Chapter 10 Implementation*

Reaffirming the City's desire to support the construction of a Sounder commuter rail station in Tillicum.

- *City Initiated Amendments*

In April 2015 the Planning Commission adopted a resolution of intent directing the Community and Economic Development Department to consider two amendments to the Land-Use and Zoning Maps:

1. Rezone 75 parcels located between Interlaaken Dr SW and Tower Rd SW, north of Washington Blvd from R1 to R2 to reflect the existing mix of lot sizes and provide for increased in-fill housing options; and

2. Re-designate and rezone 7 acres of mostly vacant land located on the southwest corner of Gravelly Lk Dr SW and Veterans Drive from *Residential Estate* to *Single Family*, and rezoned from *R1* to *R3*.

- *Privately Initiated Amendment (Lakewood Racquet Club)*

The Lakewood Racquet Club is proposing to re-designate and rezone a portion of their 11.4 acre facility from *Open Space and Recreation*/*OSR2* and *Single Family*/*R3* to *Mixed Residential/MR1* in order to accommodate redevelopment of a portion of the site with residential uses.

Mr. Catron provided three maps of the City-initiated and privately-initiated proposed amendments and described the changes again to Commissioners. A copy of each of the Department of Commerce Comprehensive Plan Update Checklist, PSRC Checklist, and SEPA Checklist were also provided and discussed, as well as the 2015 CPA Determination of Non Significance.

The comment period deadline was August 13, 2015. Commissioners were provided copies of the 9 letters received from respondents during that period.

From September 23, 2015 (Draft)

Public Hearing
2015 Comprehensive Plan Updates and Amendments
(Continued from September 16, 2015)

- *City Initiated Amendments*

In April 2015 the Planning Commission adopted a resolution of intent directing the Community and Economic Development Department to consider two amendments to the Land-Use and Zoning Maps:

Interlaaken Dr and Tower Rd SW Amendment
Mr. Dan Catron noted that he had provided copies of several letters the department had received over the last week from citizens on this proposal. It was noted these letters would be compiled into their next agenda packet for deliberations at their next meeting. The names were stated as follows: Baxter Shaffer, Arthur Peavey, Burton and Doris Johnson, Lakewood Water District, Merrit Lawson Jr., Mickey Porto, Preston and Elizabeth Carter, State Department of Transportation and Mr. Bruce Dayton of the Lakewood Racquet Club.

Mr. Dan Catron explained that in response to last week's unfortunate incidence with the recording equipment staff sent letters to everyone who had signed in with a full address mailed a letter announcing the continuation of the public hearing to Wednesday, September 23, 2015, as well as reposting the public notice signs at the parcel locations

of the map amendments, reposting the information on the City website and revised notices on entrance doors of the City Hall.

Mr. Catron suggested the commissions allow testimony on the map amendments first, and then after all public comments have been heard on one amendment then moving to the next.

Mr. Catron described the City proposal to rezone 75 parcels located between Interlaaken Dr SW and Tower Rd SW, north of Washington Blvd from R1 (25,000 sq. ft. minimum lot size) to R2 (17,000 sq. ft. minimum lot size) to reflect the existing mix of lot sizes and provide for increased in-fill housing options. It was explained these areas were chosen because of the variety of existing lot sizes. However, a more detailed analysis of land and structure values in the area indicates that the proposed rezone is not likely to have much of a practical effect in terms of new development, and further up-zone to R3 is not appropriate. For this reason, staff is recommending that this amendment not be pursued at this time. Mr. Catron did urge the commission to hear the public comment on this issue at this time.
Mr. Don Daniels, Chair, opened the floor for testimony explaining to citizens they would be called forward in small groups by the Vice-Chair, Mr. Paul Wagemann, and requested citizens limit their speaking to 3 minutes, or 10 minutes if they represent a group.

Bob Lenigan, Lakewood resident opposed to the amendment, noted the Lake City area is a jewel and should not be disturbed from its present zoning. He wholeheartedly agrees with staff recommendation not to pursue rezoning.

Katie Howard, Lakewood resident opposed to the amendment, is strongly opposed to the rezoning, commenting that contractors do not care about the integrity of the area and feels Lakewood is robbing residents of equity in their private property.

Lorrie O'Brien, Lakewood resident opposed to the amendment, grateful staff is not recommending rezoning in this area. She read her letter describing the historic area known as Interlaaken Township in the early 1800's with beautiful, stately homes urging commissioners to never sub-divide these properties. She spoke about the natural beauty and that people come to her neighborhood to enjoy the natural rural settings, wildlife and beauty of the area.

Lissa Tommervik, Lakewood resident opposed to the amendment, related the history of beautiful expansive estates built in the 1920's around the lakes and in the wooded areas. It was noted how the 1950's brought many young families to the Lakewood area and the sub-dividing began. It was emphasized that rezoning would increase the loss of wildlife and a habitat of trees. Noting that the neighborhood encompasses the historical character of the City, Ms. Tommervik urged that the City leave it alone.

Marsha Evans, Lakewood resident opposed to the amendment, objected to developing in this neighborhood when there are areas of business that could be redeveloped.

Roberto Quintana-Leon, Lakewood resident opposed to the amendment, commented that most of Lakewood is very industrial and does not have an aesthetic feel. Mr. Quintana called the neighborhood a beautiful oasis in the middle of doom; noting many other areas in the City could consider the addition of small residences as a beautification, but the neighborhood would be downgraded if re-zoning were allowed to increase traffic in a pristine area.

Bill Clark, Lakewood resident opposed to the amendment, pointed out the infrastructure through the neighborhood is insufficient now and feels the neighborhood is not prepared for an increase in traffic volumes.

Veterans Dr and Gravelly Lk Dr SW Amendment
Mr. Catron noted that, as part of the City's effort to locate properties where additional single-family housing could be developed, the City proposes to re-designate and rezone 7 acres of mostly vacant land located on the southwest corner of Gravelly Lk Dr SW and Veterans Drive from *Residential Estate* to *Single Family*, and rezoned from *R1 (25,000 sq. ft. minimum lot size* to *R3 (7,500 sq. ft. minimum lot size)*.

Staff is recommending that the density be increased on this site partly in consideration of extensive street frontage improvements that would be required for the development of the site. That seems to be a limiting factor in enticing anyone to look at redeveloping the site. Staff is recommending these amendments.

Mark Pfeiffer, Lakewood resident opposed to the amendment, advocated that the re-zoning of the Barker estate lot goes against everything the Comprehensive Plan states it wants to uphold in the historic neighborhood such as preserving significant tree stands, providing visible open space in the urban environment, and lowering density around the lakes.

Don Russell, Lakewood resident opposed to the amendment, shared that his property has been in his family for 106 years, stated that a discontinuity would be caused in the neighborhood if smaller homes were allowed and urged commissioners to consider an R2 zoning allowing larger lots instead of an R3 zone.

John Kohler, Lakewood resident opposed to the amendment, expressed how he felt fortunate to live in a rural setting along Gravelly Lk Dr and Veterans area that is worth preserving.

Tom Coates, representing Garrett Homes, a Fircrest based custom homes builder, is in support of the amendment to make land available to build retirement sized homes on the smaller lots, but not build them out to the maximum density.

Preston Carter, Lakewood resident opposed to the amendment, noted the Barker property is unique and expressed concerns over increased traffic volumes and issues of noise if R3 zoning permitted 33 new homes to be built.

Kathryn Van Wagemen, Lakewood resident opposed to the amendment, stressed that no changes should be allowed to the current R1 zoning to preserve the heritage, beauty and health of the trees and forested land and all they provide the community.

Janet Spingap, Lakewood resident opposed to the amendment, stated she was born and grew up on an estate in the neighborhood playing in the woods of the property which has impacted her life proven by the fact she has taken a career in forestry and works for a lobbyist in Olympia, urged Lakewood to continue the continuity of the neighborhood.

Connie Wright, Lakewood resident, opposed the amendment because, as an architectural designer, she admires the current beauty and architecture on Gravelly Lake Dr. It was noted that sometimes when properties are redeveloped the new homes don't match an area very well and other properties are negatively impacted and wants to appeal to the City to keep Gravelly Lake beautiful just as it is.

Lakewood Racquet Club

This is a privately initiated amendment where the LRC is proposing to re-designate and rezone 5.5 acres of their 11.5 acre property from Open Space and Recreation and OSR2 zoning to Mixed-Residential and MR1 zoning to accommodate residential development on the site. The surrounding development is zoned R3.

The proposed Mixed-Residential 1 zone would allow for a variety of medium density housing types including single family detached, two-family and single-family attached residential development. Apartments or a multi-family development is not a permitted use type in the MR1 zone.

There has been a change in circumstances since the property was originally designated Open Space and Recreation in 2001, in that the Club was successful in removing a deed restriction affecting the property. The proposal is consistent with Comprehensive Plan policies that encourage infill development in urban areas with existing services and infrastructure. Staff believes that providing the Club with the possibility of developing a portion of the site in order to stabilize the Club financially and help retain the facility within the Lakewood community would be a net advantage to the City. Staff is recommending that the proposed re-designation and re-zoning of a portion of the Lakewood Racquet Club be approved.

Mike Cina, with Austin Cina Architects and representing Lakewood Racquet Club, in full support of the amendment, explained an approval of the request will help the LRC to create funds that will help to expand the facility and maintain it. Their proposal would support a number of the guidelines outlined in the Comprehensive Plan by reducing sprawl, encouraging infill projects and supporting economic development by promoting the retention and expansion of existing businesses. Their proposal offers to use infill land that will never be used by the club. Development on vacant land of a planned

residential community comprised of smaller quality homes will create a much needed housing opportunity. It was urged that if granted the change their intent is to control the type of development on the property to ensure that it is compatible and complementary to the surrounding neighbors and to their club and its members. The upkeep and maintenance of these exteriors would be handled by the HOA ensuring the community will maintain its appearance for years to come.

Doug Cooke**,** Lakewood resident representing the Cloverdale Court HOA, who is also a long-time member of the LRC, noted they do not oppose the amendment but suggests it be rezoned to R3 zoning to make it similar to the surrounding area.

Robert Daly, Lakewood resident representing the Racquet Club Estates HOA, voiced concerns over privacy of the homeowners bordering the LRC property. The main concern stated was the stormwater drainage and instances of current flooding. They urged the development of retainage ponds to handle all the current and proposed run-off citing the problems with the amount of impermeable surface of an additional development.

An unidentified woman stated that she signed wrong sheet but sent a letter August 14 to the City. Stated that she was a Lakewood resident opposed to the Interlaaken amendment and agreed with everything already said about the beauty of the neighborhood . She is very happy to hear that staff has decided not to rezone the area.

Andrea Gernon, Lakewood resident and LRC member in full support of the amendment, pointed out the primary purpose of the proposal is to enable the LRC to generate resources to upgrade their facility. The 50-year-old structure must be brought up to current standards of the code. By selling the property and providing a middle market of housing to the community they will continue to be a viable asset to the City. She described prominent citizens with moderate income who have difficulty finding an appropriate home to downsize to within the City have moved to University Place as a result. LRC wishes to continue to be good neighbors, provide opportunities to new families with housing that is compatible to the neighborhood but not identical, and turn grass and blackberry bushes into homeownership. Ms. Gernon urged commissioners to approve the amendment.

William Kikillus, Lakewood resident in support of the amendment, explained the new development should blend in with the adjacent existing estates by increasing the proposed lot sizes. Additional comments were made regarding providing enough parking spaces to accommodate the additional tennis courts and tournament events to avoid causing traffic problems with all the visitors to the neighborhood.

Mr. Don Daniels, Chair, provided one more opportunity for citizens to comment on the proposed map amendments.

Mark Pfeiffer, suggested the developer with an interest in the Barker estate property on Interlaaken could get together with the trustee and request a zoning change along with at least a conceptual plan of how they would develop it.

Preston Carter, encouraged the staff to be mindful of the possible effect on the Gravelly Lake - American Lake aquifer with regard to the Barker property, although it is not lake front property, it is situated on the narrowest point between the spring fed lakes and the development would directly affect the health of the lakes.

John Kohler commented that the state pressures communities with their Growth Management Act to infill areas.

Bob Lenigan requested an explanation of the process of the amendments.

Mr. David Bugher explained once all comments have been received during this public hearing the commissioners have a few options of either closing the public hearing and begin debating the amendments, continue the public comments until next meeting on October 7th, or as has been the past practice of the planning commission is to close hearing for public comments but leave open for written comments until the next meeting then close the acceptance of written comments and immediately begin the deliberation process at that meeting on October 7, 2015.

Mike Cina, representing Lakewood Racquet Club, reiterated that it is not his goal to put in large houses stacked up against each other and he stipulated that provision for appropriate stormwater systems will be addressed.

Roberto Quintana restated his concern with the aesthetics of the proposed new developments and poor planning.

Text updates to the 2015 Comprehensive Plan covering the six chapters listed below were reiterated and described by Mr. Dan Catron again:

- *Chapter 1 Introduction*
- *Chapter 4 Community Design*
- *Chapter 6 Transportation*
- *Chapter 8 Public Services*
- *Chapter 9 Public Facilities and Improvements*
- *Chapter 10 Implementation*

The commissioners have been in the process of reviewing these changes over the last several months, tonight's public hearing was held to hear the community's residents comments regarding the proposed amendments.

There were no comments on the proposed comprehensive plan updates.

Mr. Don Daniels, Chair, closed the floor for public comments on the proposed amendments. **Ms. Connie Coleman-Lacadie made the motion close the public comments section of the hearing but to hold the record open for written comments only until their next planning commission meeting on 10/7/15. Mr. Christopher Webber seconded the motion. A roll call vote was called and the motion carried unanimously.**

Tacoma-Pierce County
Health Department
Healthy People in Healthy Communities

September 1, 2015

City of Lakewood Planning Commission
6000 Main St SW, Lakewood, WA

Re: Proposed 2015 Updates to Lakewood Comprehensive Plan

Dear Planning Commission Members:

Thank you for the opportunity to review your Proposed 2015 Updates to Comprehensive Plan.

Health starts where we live, learn, work and play. Comprehensive plans give a community the opportunity to put this principle into action.

Last year, Tacoma-Pierce County Board of Health passed a resolution (No. 2014-4416) declaring that the health of our neighborhoods impacts people's health and well-being. The Board also resolved that integrating health into local comprehensive plan policies can create healthy built environments to promote health and well-being, economic vitality and health equity.

We stand ready to partner with you in your efforts to improve health outcomes through planning. During the draft plan review stage, we encourage your jurisdiction to use our self assessment tool (www.tpchd.org/files/library/87189ac3d23467ab.pdf) to assess how your draft plan integrates health and the "Health and Well-being" element of the Countywide Planning Policies. This assessment can help your jurisdiction document successes and identify opportunities for future action. If you need help on applying the tool, please contact Amy Pow at apow@tpchd.org.

We are also available to help you develop implementation strategies and identify performance measures to make your jurisdiction healthier. Please let us know if we can assist in this regard.

We look forward to partnering with you to improve the health and quality of life of all who live, learn, work and play in your community.

Yours sincerely,

Anthony L-T Chen, MD, MPH
Director of Health

cc: Dave Bugher, Assistant City Manager/Community Development Director
Dan Catron, Principal Planner

STATE OF WASHINGTON
DEPARTMENT OF COMMERCE
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www.commerce.wa.gov

RECEIVED
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COMMUNITY DEVELOPMENT

September 2, 2015

Mr. David Bugher
Community Development Director
6000 Main Street Southwest
Lakewood, Washington 98499-5027

RE: 2015 Periodic Update Deadline

Greetings:

As you know, the deadline for the required Growth Management Act (GMA) periodic review and update for counties and cities in the central Puget Sound (King, Pierce, and Snohomish counties) was June 30, 2015. For many jurisdictions, the update is still underway for a variety of reasons. Here are the critical statutory deadlines for you.

- June 30, 2015 — Statutory deadline to complete the review and update.[97]
- June 30, 2016 — Deadline for completion of the review and update of development regulations that protect critical areas, also known as the critical areas ordinance (CAO), under the *reasonable progress exception.*[98]

Commerce is responsible for tracking compliance with the requirements of the GMA in order to advise granting agencies of whether jurisdictions are eligible to receive funds for certain grant and loan programs.[99] This includes completion of the periodic review and update.

Currently, our assigned planners are contacting with every jurisdiction in central Puget Sound to make sure that we have an accurate and up-to-date understanding of your compliance status. Attached is a list of critical steps you can take to help your jurisdiction successfully finalize the review and update process.

[97] RCW 36.70A.130(5)(a)
[98] RCW 36.70A.130(7)(b)
[99] RCW 43.155, RCW 70.146

We are reviewing submitted draft amendments at this time. Jurisdictions with a June 2015 deadline are wrapping up their update process. Jurisdictions with a June 2016 deadline are in the middle of the review and update process. Many 2017 jurisdictions are already underway.

We are prioritizing review of amendments that are part of the update process, or are part of an outstanding Growth Management Hearings Board decisions. When we see an item submitted for review, we are using the check box on the cover sheet to identify periodic review items and reviewing them accordingly. We use the checklist to review them for completeness and are contacting you to go over the items before we send a comment letter.

The GMA requires jurisdictions to review, and if needed, revise the comprehensive plan and development regulations. Therefore, we are tracking the Comprehensive Plan, Development Regulations, and the CAO as the three separate steps or milestones. When we receive adopted amendments that are part of your periodic review and update, we review them to determine, with your assistance, whether you have completed one or more of these milestones. Commerce will issue a letter, congratulating you on the submittal of update adopted amendments, depending on the update milestones completed. We will also provide advice on how to finalize any remaining milestones in your update process.

Your final step to complete the periodic review process is to **notify us in writing that your update is complete.** When you have taken final action, we are sending you a congratulatory letter completing the process. We will call you first to make sure we correctly interpreted what you sent us. However, **a cover letter telling us that your process is complete will help avoid confusion on our end.**

We maintain a list on our web site showing who, according to our records. You can see it here:

http://bit.ly/GMACompliance

Please review the list. If it does not reflect your current status, please contact us and let us know. We will update this list in the next few weeks to reflect the latest GMA deadline.

Your assigned planner is available to help you if you have any questions. Please call:

Anne Fritzel at (360) 725-3064

Thank you for all your hard work on this important process.

Best regards,

Jeffrey S. Wilson, AICP
Senior Managing Director
Growth Management Services

Critical Steps to Finalize the Periodic Review and Update Process

1. **Legislative Action:** After reviewing and, if needed, revising your local plans and regulations, you must take legislative action to formally conclude the periodic review process. Every ordinance or resolution that is a component of your periodic update process should outline the periodic review and update action completed, and it should **include a finding in the ordinance or resolution recitals that explain this action is part of the periodic review and update.** Our Commerce periodic update web site includes several examples of legislative language to assist. We can also help you find an example that is right for you.

2. **Final Action:** When you have completed the entire process of reviewing the plan and all development regulations, the last legislative action should again **include a finding in the recitals that summarizes all necessary action and declares your periodic review and update process is complete.** This final declaration may be incorporated into the ordinance adopting your final amendments, or it may be summarized within a separate, final resolution. Whichever method you choose, a clear statement in the record that you have completed the update is critical. This step starts the 60-day appeal clock and will help defend your process if a failure to act claim is made after the end of the 60-day appeal period. Again, we have sample language available to help guide you through this final step

3. **Notify Department of Commerce:** Your final step to complete the periodic review process is to **notify us in writing that your update is complete.** You are required to send every comprehensive plan or development regulation amendment that you adopt to Commerce within ten days of adoption (RCW 36.70A.106). When submitting any adopted amendment, please indicate whether the legislative action was part of the periodic review process. The easiest way to do this is to check the box on the **cover sheet** that you include with your agency notice. Additionally, when submitting your final legislative action to complete your update, **please include a letter formally notifying Commerce that your update process is complete**. We recognize that many jurisdictions have been drafting and adopting updates in stages, often requiring additional time and experiencing unforeseen delays. Formal notice that the process is complete is critical to keeping us in the loop. We want to work with you as much as possible to make sure our records reflect that you have successfully completed your review and update process.

Where to go for more Help and Information?

- *http://www.commerce.wa.gov/growth* (select "**GMA Periodic Update**" from the left index)
- *Keeping your Comprehensive Plan and Development Regulations Current*: **A Guide to the Periodic Update Process under the Growth Management Act.**
- WAC 365-196-610 Periodic review and update of comprehensive plans and development regulations
- RCW 36.70A.130

Puget Sound Regional Council
PSRC

September 9, 2015

Dan Catron, Long Range Planning Manager
City of Lakewood Department of Community Development
6000 Main Street SW
Lakewood, WA 98499-5027

Subject: PSRC comments on draft Lakewood Comprehensive Plan update

Dear Dan,

Thank you for providing an opportunity for the Puget Sound Regional Council to review a draft of the urban design, transportation, public services, capital facilities and implementation elements of the City of Lakewood 2015 Comprehensive Plan update. We recognize the substantial amount of time and effort invested in the plan and appreciate the chance to review elements while in draft form. This timely collaboration helps to ensure certification requirements are adequately addressed and certification action can be taken by PSRC boards upon adoption.

We would like to note some notable aspects of the draft plan, including:

- Comprehensive goals and policies in the urban design element to create attractive and livable urban spaces.
- The plan's commitment to developing a multimodal transportation system, including a robust set of transportation demand management strategies.
- Goals and policies that promote economic development activities for livable wage jobs for low and moderate income persons.
- Housing and community development programs supporting a holistic approach to human services and reducing barriers to affordable housing.

The draft Lakewood plan elements advance regional policy in many important ways. There are a few items, however, that the city should consider before the plan is finalized:

- VISION 2040 contains policies that encourage local jurisdictions to prioritize infrastructure funding within regional growth centers. Policies that prioritize funding in centers for transportation and capital facilities investments can further support development of Lakewood's urban center (MPP-DP-7, MPP-T-12). The city is encouraged to include compatible policy language and supportive infrastructure investments where appropriate.
- MPP-DP-54 and 55 call for addressing transportation concurrency on the movement of people and goods instead of only on the movement of vehicles, both in assessment and mitigation. The plan includes a policy to work toward developing multimodal LOS and concurrency standards. This could be strengthened by including an expected timeline or approach for implementation.
- As called for in VISION 2040 (DP-Action-18), the city should include mode split goals for the regional growth center. The plan introduction notes that mode split goals have been developed for the regional growth center but they not appear in either the transportation element or transportation background report. PSRC recently produced additional guidance about setting mode split goals that the city may find helpful in this work.
- The city is commended for including in the plan a list of transportation projects, along with general discussion of a multi-year financing strategy. However, the plan should include, in either the transportation or capital facilities element, a more detailed analysis of its funding capability relative to probable funding sources for transportation improvements, including estimated cost of the transportation plan improvements compared with estimated revenues. Further guidance on how to

address the financial analysis in your plan can be found in RCW 36.70A.070, WAC 365-196-430, and the Department of Commerce's Transportation Element Guidebook.

- The draft transportation element references the 2009 Non-Motorized Transportation Plan, which includes detailed maps depicting sidewalk, trails, and bicycle facilities. To more clearly address inventory requirements in the element, the city should include maps within the adopted comprehensive plan that depict inventories of nonmotorized facilities, updated where appropriate.
- The capital facilities and public services element of the plan should address more fully the promotion of efficient use of existing services, such as waste management, energy, and water supply, through conservation – including demand management programs and strategies (see MPP-PS-3, 7, 8, 12, and 13).

PSRC has resources available to assist the city in addressing these comments. Additional resources related to the plan review process can also be found at http://www.psrc.org/growth/planreview/resources/.

Thank you again for working with us through the plan review process. There is a lot of strong work in the draft elements and we are available to continue to provide assistance and additional reviews as the plan moves through the development process. If you have questions or need additional information regarding the review of local plans or the certification process, please contact me at 206-464-6174 or LUnderwood-Bultmann@psrc.org.

Sincerely,

Liz Underwood-Bultmann

Liz Underwood-Bultmann
Associate Planner
Growth Management Planning

cc: Review Team, Growth Management Services, Department of Commerce

Washington State Department of Transportation

Lynn Peterson
Secretary of Transportation

Olympic Region
5720 Capitol Boulevard, Tumwater
P.O. Box 47440
Olympia WA 98504-7440
360-357-2600 / FAX: 360-357-2601
TTY: 1-800-833-6388
www.wsdot.wa.gov

September 15, 2015

RECEIVED
SEP 21 2015
COMMUNITY DEVELOPMENT

Mr. Dan Catron
Principal Planner
City of Lakewood
6000 Main Street SW
Lakewood, WA 98499

RE: Proposed Amendments to the City of Lakewood Comprehensive Plan - 21449

Dear Mr. Catron:

Thank you for allowing the Olympic Region of the Washington State Department of Transportation (WSDOT) the opportunity to review and comment on the proposed amendments to the City of Lakewood's Comprehensive Plan. We recognize the investment of time and energy that this document represents, and we appreciate the opportunity to comment. The following comments are provided for your consideration as the City completes its update.

Our review included a review of the City's *Transportation Background Report* since the Comprehensive Plan Transportation Element was referenced as being based in part on this report.

The Growth Management Act (GMA) requires local governments, at a minimum, to adopt Level of Service (LOS) standards for arterials and transit routes (RCW 36.70A.070(6)(a)(iii)(B))[1]. Currently, both the comprehensive plan and background report address LOS for city arterials and identifies the transit routes that service the local jurisdiction; however, neither document addresses transit route LOS. Because transit busses use the arterial street network, transit LOS decisions should be coordinated with your transit service provider and should reflect realistic service expectations.

The Transportation Element should include an existing and future year Level of Service (LOS) forecast for the freeway portions of I-5 which pass through the City of Lakewood. The background report covered LOS for the City of Lakewood street system, both roadway and intersections, but appears to have overlooked this state highway. It does identify LOS or impacts at highway ramp terminals, but neglects what is occurring on the mainline. Per RCW 36.70A.070(6)(a)(ii) *"Estimated traffic*

[1] "Level of service standards for all locally owned arterials and transit routes to serve a gauge to judge performance of the system."

impacts to state-owned transportation facilities resulting from land use assumptions to assist the department of transportation in monitoring the performance of state facilities, to plan improvements for the facilities, and to assess the impact of land use decisions on state-owned transportation facilities."

Page 2, Alternative Modes; this paragraph mentions missing bike and pedestrian connections within the city. It would be helpful if a map depicting the bike or pedestrian gaps was provided.

WSDOT encourages you to give consideration to fostering livable communities either in these or future amendments — providing people access to affordable and environmentally sustainable transportation rather than just completing the connections. Consideration should be given to the six principles of livability as laid out by the USDOT, Housing Urban Development (HUD) And the Environmental Protection Agency (EPA).

WSDOT would also encourage giving consideration to adopting the federal and state goal of doubling biking and walking over the planning horizon, while at the same time reducing collisions involving cyclists and pedestrians (5% per year). In addition, we would suggest that you consider adopting or endorsing the National Association of City Transportation Officials (NACTO) *Urban Street Design Guide* and *Urban Bikeway Design Guide*.

Again we applaud your effort in developing this update and thank you for the opportunity to review and comment on the proposed comprehensive plan update. If you have any questions related to this letter please contact George Kovich of my office at (360) 704-3207.

Sincerely,

Dennis L. Engel, P.E.
Transportation Planning Manager

DE:yl
GK

cc: Ike Nwankwo, Commerce
Anne Aurelia Fritzel, Commerce
Yorik Stevens-Wajda, PSRC

Dan Catron

From: Jack Tillen <tillenjr@gmail.com>
Sent: Friday, July 31, 2015 6:09 AM
To: Dan Catron
Subject: Rezoning between Interlakken and Tower Rd.

Dear Mr. Catron,

I saw the Public Notice on Tower Rd. yesterday. My property could be potentially impacted. Would appreciate it if you could send me a copy of the Public Notice and any other pertinent information at this time.

Sincerely,

Jack Tillen
11312 Tower Rd. SW

Disclaimer: Public documents and records are available to the public as required under the Washington State Public Records Act (RCW 42.56). The information contained in all correspondence with a government entity may be disclosable to third party requesters under the Public Records Act.

August 6, 2015

City of Lakewood Planning Commission
City of Lakewood Community Development Department
Dave Bugher, Community Development Director
Dan Catron, Long Range Planning Manager

Dear Sirs:

We are writing in response to your letter of notice on the re-zone of my neighborhood, an area of towering trees and stately homes, from R-1 estate 30,000-25,000 sq. ft to R-2 17,000 sq. ft. The additional homes would certainly create more traffic along Tower Road which is already heavily used. More importantly, the character of the neighborhood would be adversely impacted with the subsequent and necessary clear cutting of trees for these new homes.

There are currently smaller homes and lots in this neighborhood. A majority of these existing homes on Tower Road are rentals and poorly maintained. More of this type of housing would potentially reduce the property value of the entire area and would surely affect parcels to the east of Tower Road and west of Interlaaken Drive. What would prevent someone from purchasing a home on a large lot, demolishing it, and building 3 homes instead of the original one? This would dramatically alter the neighborhood.

This is a beautiful and picturesque neighborhood, one that should be protected and promoted by the city as a jewel, a wonderful example of a rural place to live, protected from random re-zoning which is exactly what you are wanting to do. We supported the city formation to prevent this very scenario.

We implore you to cancel this rezone effort.

Sincerely,

Marvin and Melissa Tommervik

RECEIVED
AUG 12 2015
COMMUNITY DEVELOPMENT

August 8, 2015

City of Lakewood Planning Commission
City of Lakewood Community Development Department
Dave Bugher, Community Development Director
Dan Cantron, Long Range Planning Manager

Dear Sirs:

We bought our property in Lakewood over 55 years ago when the zoning was one house per acre. Our intent was to have a home in a low density area with other high quality homes. Later you downgraded the zoning to one house per ¾ acre. You are now proposing another downgrade to one house per 25,000 square feet which is just over one half acre. We feel very strongly that we should have the right to expect maintenance of the property standards at the levels they were when we acquired them. Anything short of this will result in reduced property values and unjust treatment to the existing land holders.

We ask that you do not downgrade the property in the immediate vicinity of our property.

Thank you for your attention.

Sincerely,

John C Dimmer
Marilyn J. Dimmer

John and Marilyn Dimmer
7505 112th Street Southwest
Lakewood, Washington 98498

Dan Catron

From: Bonnie C Boyle <bonniecboyle@comcast.net>
Sent: Monday, August 10, 2015 9:32 AM
To: Dan Catron
Subject: Zoning amendments question

Were the parcels on the west side of Interlaaken between Washington Blvd and 112th St. considered for rezoning? If so, why was there no recommendation to provide for more dense housing there? It appears to have more potential for growth than many of the parcels included in the changes. Thanks you.

Bonnie C Boyle
11012 80th Ave Ct SW
Lakewood WA 98498
(253) 468-8540
bonniecboyle@comcast.net

Disclaimer: Public documents and records are available to the public as required under the Washington State Public Records Act (RCW 42.56). The information contained in all correspondence with a government entity may be disclosable to third party requesters under the Public Records Act.

Calvin & Katie Howard
11408 Tower RD SW
Lakewood, WA 98498

RECEIVED
AUG 18 2015
COMMUNITY DEVELOPMENT

August 13, 2015

David Bugher
Community Development Director, City of Lakewood
6000 Main Street
Lakewood, WA 98499-5027

Re: 2015 Comprehensive Plan Amendments & Update

Mr. Bugher, Mr. Catron, and all other parties affiliated:

I am in receipt of the public notice for proposal to change zoning in my area of residence from R1 to R2, and I adamantly object to this change.

I purchased my property at 11408 Tower Rd SW, Lakewood, WA 98498 in May of 2013 in large part due to the large lots, surrounding undeveloped areas and seemingly less-populated neighborhood. RE-zoning this area will change the entire fabric of the community and completely undermine my, and I'm sure most of the property owner's in the area, intentions to purchase property and make my home in the Lake Steilacoom/ Gravelly Lake area of Lakewood.

Not only will this re-zoning have an adverse impact on our property values, but this area of the city is not equipped to function with smaller, thus more populated, lots.

While it is my understanding this proposal will allow lots to be subdivided into smaller parcels at the owner's discretion, surrounding properties will lose value in the event that construction occurs on the newly-determined parcels- construction that may not conform with the current landscape of the community and will rid the area of its most prominent and natural characteristic; trees.

Safety is also a concern. Our streets in this area are not meant for high-traffic. These are residential roads that are barely wide enough for one vehicle, traveling in one direction. We do not have sidewalks, we have very few streetlights, very few stop signs, and most of our driveways are hidden and undefined. The impact that re-zoning would inevitably have on this area would wreak havoc on our roads and the safety of pedestrians, motorists, bicyclists, alike.

This area of Lakewood is an area in which homes and properties are cared for. As a resident of this area, I am passionate about the fabric of my neighborhood. As a real estate professional, I am also very aware of the impact that surrounding areas have on my property value. Re-zoning these areas to allow for more subdivision will be detrimental to property values, safety and the desirability of this neighborhood.

I appreciate the opportunity to voice my opinion about this proposal, and it is my hope that you will consider each of the points that I have made and discontinue your plans for re-zoning.

Sincerely,

Katie Howard
253·273·5835

Dan Catron

From:	laobrien77@aol.com
Sent:	Friday, August 14, 2015 12:58 PM
To:	John Caulfield; Adam Lincoln; Dan Catron
Cc:	Don Anderson; Jason Whalen; Marie Barth; Paul Bocchi; mbrandsetter@cityoflakewood.us; Mary Moss; John Simpson; mffjmob@aol.com
Subject:	RE: City-initiated amendments to "up-zone" location between Interlaaken Drive SW and Tower Road SW, north of Washington Blvd. SW

To:
John Caulfield - City Manager
Adam Lincoln - Assistant to City Manager/Management Analyst
Dan Catron - Long-Range Planning Manager

August 13, 2015

Dear Sirs,

I'm writing to you in response to the city's proposal to "up-zone" land in my neighborhood from R1 to R2. I have been a resident of the Interlaaken Neighborhood for 16 years, living on Tower Road SW. This area of Lakewood has a beautiful rural setting, stately homes, active wildlife which includes nesting eagles, and historical value. Even though the city is only proposing at this time to rezoning two of the streets from R1 to R2 in the neighborhood, it effects the ENTIRE neighborhood. My husband and I are concerned about the effects rezoning will have on its natural beauty, infrastructure, and ecosystems the neighborhood supports. We feel this area needs to be preserved as is for our children and future generations.

I would like to outline our concerns about rezoning in this area:

- <u>Destroying the rural setting and natural beauty of the neighborhood:</u>
    - The area from Interlaaken east and north to Lake Steilacoom has a beautiful rural setting. There are stately homes and historical homes in the neighborhood dating back to 1905. The towering Douglas firs and Garry oaks/Oregon white oak trees (the only oaks native to Washington State and characteristic features of the valley woodlands in the Pacific Northwest) line the streets within this neighborhood. We have many people walk our streets because they love the rural setting.
- <u>The ecosystems and wildlife the neighborhood support</u>:
    - In our neighborhood, it is common to see deer, owls, bunnies, hawks, and a variety of birds including eagles nesting in towering trees. I am blessed and privileged to have bunnies living in my yard, bats fly overhead at dusk, birds making their homes in our trees and eagles soaring overhead and nesting in trees just north of my property. I also have mature Douglas firs, Garry Oaks, wild Rhododendrons, ferns, and other plants native to this area living on my property. The plants and trees you would see at Lakewold Gardens are growing wild in this neighborhood. The ecosystems and

wildlife would diminish or radically change with clear cutting and the removal of plants and trees to accommodate urban sprawl.

- Will the neighborhood's infrastructure handle the additional homes and congestion?

    - Again, this is a rural area. Our roads are narrow and we do not have sidewalks nor street lights. I don't think our neighborhood could handle the influx of new homes created from r-zoning. Parts of Tower Rd and 112th are already heavy used. I don't know if the city officials realize how bad the traffic is in the morning and evenings on Gravelly Lake out to I5. Many times I don't use the Gravelly Lake exit in the mornings because it is backed up. I have to use alternative routes to get to I5. What would an influx of housing do to the Gravelly Lake exit during rush hour?

- Re-Zoning? Haven't we been there before with the county? Haven't we learned from the past?

    - In my opinion, the zoning in Lakewood is a mess due to the county's governance. Before moving to Tower Road, I lived on John Dower Road SW for fourteen years. The road has businesses, apartment complexes, duplexes and single family homes. It is a mess and that is why I had voted for cityhood twice. I wanted the people of Lakewood to be in control of Lakewood. I wanted our taxes to be used for the good of Lakewood. And, I want the citizens of Lakewood to be in control of urban growth and economic development.

- Effecting the value of our homes:

    - I believe rezoning will effect and lower the values of homes in this area. My husband and I feel extremely blessed to live in this neighborhood. We love the rural setting and quietness of the neighborhood. It has the feel of living out in the country but I am only a few minutes to shopping, entertainment and the I5 corridor. I have lakes close by, woods, parks and spectacular views of Mt. Rainier. Living in this rural neighborhood is a way of life for my husband and I, and I'm sure many of my neighbors feel the same way. Frankly, what is to stop the city from rezoning this area from R1 to R2 and then in a few years rezone from R2 to R3, etc.

- The historical value and future value this neighborhood has for Lakewood and its citizens and keeping the 'Woods' in Lakewood!

    - This neighborhood and other areas near Lake Steilacoom in the 1920's was the playground and recreational area for the greater Tacoma area. In 1908 the township of Interlaaken had property lots of 5 to 10 acres. Those property lines no longer exist today and the township of Interlaaken is now part of Lakewood but some of those historical homes, mansions and carriage houses still exist. Let's preserve what we have left of the Interlaaken neighborhood's past and keep the few R1 areas that still remain for future generations. They should be preserved not rezoned. I believe this neighborhood has more value to Lakewood as a whole then being divided into mini sub-divisions.

I did have a meeting with Dan Catron to go over the proposed 'up-zoning' of this area. He did explain to me that the state is asking Lakewood to find areas for future growth. If Lakewood doesn't comply, the city could lose state transportation funding. I understand this is a perplexing situation. I

believe the city can find the extra space without rezoning the few R1 areas left in Lakewood. According to the zoning maps Dan showed me the only R1 areas left is my neighborhood and around Gravelly Lake. The city should promote these areas in their marketing materials instead of ripping them apart. It demonstrates that Lakewood can support different living styles from apartment/condo living, multi-family, single family, to R1 estate living.

Please reconsider the proposal to 'up-zoning' this neighborhood. Come and tour our neighborhood and see what a picturesque and beautiful area it truly is. I asking you to be good stewards to the rural areas left in Lakewood and keeping the 'Woods' in Lakewood.

If you have any questions or would like a personal tour of our neighborhood, please give us a call.

Best Regards,

Lorrie and Danny O'Brien
Tower Road SW, Lakewood
(253) 232-2568

CC:
Don Anderson - Mayor
Jason Whalen - Deputy Mayor
Marie Barth - City Council Member
Paul Bocchi - City Council Member
Michael Brandsetter - City Council Member
Mary Moss - City Council Member
John Simpson - City Council Member

Disclaimer: Public documents and records are available to the public as required under the Washington State Public Records Act (RCW 42.56). The information contained in all correspondence with a government entity may be disclosable to third party requesters under the Public Records Act.

RECEIVED
AUG 25 2015
COMMUNITY DEVELOPMENT

August 24, 2015

Don Catron

City of Lakewood

600 Main Street SW

Lakewood, WA 98499-5027

Dear Mr. Catron,

We will not be in the state when the City Planning Commission meets on September 16th. We are writing to oppose the change of zoning for Interlaaken. We are 46 year residents of Lakewood at our current address 11405 Interlaaken. We chose this area for the larger lots and many trees. Now a rezoning is being considered because someone privately requested an amendment to the City's Comprehensive plan.

We contest this decision because of the lack of an environmental impact statement. Has anyone from the city looked at the number of large trees on the parcels included in this decision. We love the many birds that live in our neighborhood because we have large trees and dense undergrowth. A spotted owl lives here as well as a pileated woodpecker. There are not very many of these around in a city. Our extra lot includes mature native rhodendrons. Smaller lots mean more houses which mean fewer trees which mean less wildlife.

There is also a problem with traffic. Interlaaken is a heavily traveled through street. The intersection of Interlaaken and Washington Blvd. is unsafe because of a lack of sight distance. When Bernese was closed some years ago we were promised a light at the Washington and Interlaaken intersection. It hasn't happened. Before Bernese was closed one could turn onto Bernese to get to Tower and then right to Gravelly Lake Drive for a safe intersection. Now many vehicles traveling South on Interlaaken turn right at 112 Street then right on the narrow Tower Road to get to Gravelly. There also is a plan for over 30 homes in a platted area on the West side of Interlaaken just North of Washington Blvd. which will add many more vehicles.

There are plenty of places in Lakewood where urban renewal could provide denser population in quality homes or apartments. Concentrate on making Lakewood attractive to new residents. There are many homes for sale and apartments that are for rent as well without destroying our neighborhood. We, as well as our neighbors, urge you not to go through with this change of minimum parcel size in our neighborhood.

Dr. Burton L Johnson and Doris E. Johnson

Burton L Johnson

Doris E Johnson

TO: LAKEWOOD CITY COUNCIL
FROM: 10832 INTERLAAKEN FAMILY

RECEIVED
SEP 15 2015
COMMUNITY DEVELOPMENT

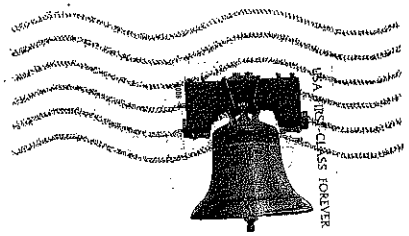
I WISH TO VERBALIZE MY OBJECTION TO CHANGING LANDS BETWEEN TOWER RD AND INTERLAAKEN DRIVE TO R2, AS IT WOULD INCREASE TRAFFIC FLOW ON INTERLAAKEN INTERFERRING WITH CHILDREN AND SCHOOL TRAFFIC. ALSO SINGLE FAMILY DWELLINGS ARE LESS ABT TO HAVE MISCHEVIOUS ACTIVITIES SUCH AS MULTIPLE FAMILY DWELLING. PLEASE THINK ABOUT THE SAFETY OF YOUR CITIZENS THAT CURRENTLY LIVE IN THIS AREA AND DON'T CHANGE TO A R2. OUR FAMILY OBJECTS TO THIS PLAN.

THANKS

Natasha Stock
Lily Anderson JR
Benin Stockman
Keira Stockman
J L Stockman

Stockman/Anderson Family
10832 Interlaaken Dr SW
LAKewood WA 98499

SEATTLE WA 980
12 SEP 2015 PM 5 L



LAKewood community Development
DAN Catron Planning manager
6000 Main st SW
LAKewood WA 98499-5027

RECEIVED
SEP 15 2015
COMMUNITY DEVELOPMENT

98499501399

DEAR MR. CATRON, 9-15-15

DR. & MRS BURTON JOHNSON HAVE EXPRESSED MY SENTIMENTS EXACTLY ABOUT YOUR IDEA TO REZONE INTERLAAKEN DR & TOWER AD SW.

THIS DOES NOTHING FOR MY QUALITY OF LIFE OR MY PROPERTY. IT IS STRICKTLY TO BENEFIT SOME ONE WHO IS A CONTRACTOR OR DEVELOPER AND INCREASE TAXES FOR THE CITY OF LAKEWOOD. I STRONGLY OPPOSE SUCH A CHANGE FOR FINANCAL GAIN.

SINCERELY,

Arthur A. Pavey

Mr. Arthur A. Pavey
11315 Interlaaken Dr SW
Lakewood, WA 98498-5519

Just a note...

RECEIVED
SEP 21 2015
COMMUNITY DEVELOPMENT

September 21st, 2015

Mr David Bugher
Assistant City Manager, Economic Development, City of Lakewood
6000 Main Street
Lakewood, Washington 98499

Dear Sir,

It was nice meeting you last Wednesday before the Planning Commission meeting before the unfortunate turn of having to cancel the hearing due to technical issues. As I have commitments in Oregon, I am unable to attend the postponed hearing for September 24th. I am aware that the comment period for the proposal has passed and had hoped to address the commission at the meeting, but my inability to travel for the hearing warrants this letter.

I am the son of Nancy and Wilbur Barker and trustee for their Barker Living Trust, and Power of Attorney for Virginia Barker, owners of the property proposed for rezoning at Gravelly Lake Drive and Veterans Drive. For approximately 90 years, a member of my family has resided at this location, has been involved in many different interests in the Lakewood community and we have always called Lakewood "home". As the representative for my family, I would like to offer our support for rezoning from the current R1 to R3 as proposed by the city for the following different reasons:

Economic Impracticalities of large lots:

There have been a couple of proposals over the past fifteen years to subdivide the land, but none came to fruition mostly due to economic variables. The cost of desired city infrastructure (curbs, sidewalks, easement setbacks) and other needed improvements helped push the price of any R-1 subdivided land to far exceed market price and put the exorbitant development costs onto the property owners. Some current estimations for a R-1 development with the cost of current required infrastructure could be equal or exceed the value of the land; which the resultant would be no development. R-3 zoning would help distribute more of the infrastructure cost over a larger number of lots and would assist in an efficient in layout / design of new homes on the triangle-shaped parcels.

Changes in Social Economic metrics:

The days of the "McMansions" seemed to have faded with the severe economic downturn the country experienced around 2008. The parcels are not endowed with any desirable attributes such as waterfront or scenic views that homeowners would desire building 3,500+ sqft. homes on R-1 lots. Families are looking for a more reasonable approach to their housing needs for many reasons. One apparent under served segment of the population in Lakewood appears to be the middle / upper middle class which would be well served by appropriate designed spaces on the parcels while still retaining the "feel" of the current neighborhood.

Less than desirable location created by arterial streets:

The parcels are situated between two designated main arterials by the city. While it may be beneficial to support more homes than currently exist on the property, this traffic generates a great amount of noise at almost all hours of the day. There is some concern that some of the property closest to the corner of Veterans and Gravelly Lake would be the hardest to sell for housing because of the traffic and noise coming from the intersection. Even though the parcels are surrounded to the east and south / southwest by high valuation residences, most of these have the characteristic of being waterfront properties, which command a high desirability under any economic situation and were built in a much different economic environment than currently exists in Lakewood.

Vision moving forward:

I believe that, through a productive and cooperative partnership with all entities involved, new houses could be built on Gravelly Lake Drive aimed at the $400,000 - $600,000 market. I do not support the vision of houses "smashed" together to yield the greatest number of units, but that rezoning to an R-3 status would allow for development flexibility to accommodate different sizes that are appropriate for the market and for the financial viability of any project. I also believe that it is essential to keep the "feel" of the current neighborhood as much as practical not only for the current neighbors, but that it would aid in the marketing of the new residences. This would all take time as there are no proposals, but a successful one would require all parties working together. Rezoning to R-3 would aid in the possibility to develop the land for future residential use.

Sincerely,

Baxter (Nathan) Shaffer III
Representative/Trustee/POA - Barker Living Trust, Wilbur Barker, Virginia Barker

RECEIVED
SEP 22 2015
COMMUNITY DEVELOPMENT

Dear Commissioners:

Firstly, I would like to share that I reside on Gravelly Lake, in Lakewood, Washington and am the current President of the Gravelly Lake Improvement Club. We respectfully write to voice our opposition on behalf of our board and members to the proposed rezoning and redesignation of the property located at 12404 Gravelly lake Dr SW, Lakewood, WA 98499, owned by Wilbur Barker, et al.

The proposal to rezone the Barker property presents the possibility of significant changes to a very well-established neighborhood. The proposal to rezone and develop the property from R-1 to R-3 would result in cluster homes on small lots incompatible with contiguous neighborhood that are all zoned R-1, estate lots of 25000 square feet minimum. More specifically, the R-3 zoning would allow for a residential dwelling unit on a lot size of 7500 Square feet; setbacks of 10 feet for front yard and back yard from the street; and 5 feet setback between houses. To honor the faith placed in you as our representative, we urge you to vote to reject the proposal to rezone this property.

This proposal in principle is a misapplication of transitioning from high densities at the center of the Lakewood Towne Center toward lower densities on the periphery. The subject proposed is not in or adjacent to an Activity Center, so cluster development is not needed and would appear out of place given the architectural context and landscape of the surrounding neighborhood. Moreover, the proposal to rezone will further exacerbate the traffic congestion for drivers, bikers, and walkers along that street and intersection. Many residents, who live near the subject property, already face considerable challenges everyday to merge onto traffic from their respective driveways. To honor the context and the history of the character of our neighborhood and homes, we urge you to vote to reject the proposal to rezone the property to R-3.

Sincerely,

Mickey B. Portnoy

Mickey B. Portnoy, President

Gravelly Lake Association

Mickey Portnoy 11415 Gravelly Lake Dr. SW, Lakewood 98499 mickey.portnoy@ubs.com

253-222-8138

RECEIVED
AUG 21 2015
COMMUNITY DEVELOPMENT

20 August, 2015

David Bugher
Assistant City Manager for Community Development
City Hall
Lakewood, WA 98498

RE: Consideration of re-zoning, parcel bounded by Gravelly Lake Drive, Veteran's Drive, and Langlow Street SW, commonly known as the Barker property.

Dear Mr Bugher:

This is in response to the recently posted public notices on the above-referenced Lakewood property. An original erroneous notice was posted proposing re-zoning from R-1 to Multifamily. Several days later, this notice was replaced by the current notice which proposes re-zoning the land in question from R-1 to R-3. We are abutting property owners on Walnut Street SW. This property has long been in the Barker family, and about a year ago was listed for sale in its R-1 status. Under the ownership of Wilbur and Nancy Barker, a large fraction of this approximately 8 acre parcel had been undeveloped except for a large private seasonal vegetable garden maintained by Mr Barker. As such, the property has substantial areas of habitat suitable for birds and other urban wildlife, and contains numerous large and historic trees, including mature old-growth Douglas fir and endangered Garry Oaks.

We understand the desire of the city to make this zoning change as an incentive to potential buyers to re-develop the site with modern housing on lots smaller than currently allowed under R-1 status. The proposed change to R-3 would cut the minimum lot size from the current approximately 0.6 acres to a new minimum lot size of approximately 0.2 acres, about a three-fold reduction. We understand that the proposed change may be more in keeping with housing trends which favor less yard maintenance as a tradeoff for more closely packed housing units. We believe that when properly done, such a change could be accomplished in a manner that maintains the current overall "feel" and quality of the existing neighborhood, and would cite as an example the existing Madera development at the corner of Gravelly Lake Drive and Nyanza Drive.

Despite the opinion just expressed, we wish to document our strong concerns (in the event that the proposed zoning change takes place) that any potential re-development plan

for this parcel be carefully vetted for attention to the previously mentioned historic trees and related habitat, with preservation of sufficient greenspace and common areas to maintain the compatibility of the parcel with the existing surrounding estate-level homes. If a developer were to be permitted to merely pack in as many houses as possible under the new zoning minimums without attention to maintaining the overall ambience of this important area of Lakewood, it would have severe negative impact on property values of the surrounding homes, not only for those which abut the property directly, but also for the entire surrounding neighborhood in this part of the Gravelly Lake / American Lake region. We urge that city planners strictly stipulate appropriate greenspace and common space covenants as a condition of redevelopment of this important parcel in the city of Lakewood. We further encourage the city to consider recognizing the Barker family's longstanding excellent stewardship of this land by encouraging any developer to either include the Barker family name in the name of the new subdivision, or by the placement of a suitable monument on the redeveloped property which recognized its important heritage in Lakewood history

Sincerely,

Preston & Elizabeth Carter

Preston Carter, MD
Elizabeth Carter, MD

7817 Walnut Street SW
Lakewood, WA 98498
plandejcarter@hotmail.com

RECEIVED
SEP 22 2015
COMMUNITY DEVELOPMENT

21 September, 2015

Lakewood Community Development Department
Mr. Dan Catron, Planning Manager
600 Main Street SW
Lakewood, WA 98499-5027

RE: Rezoning proposal for the property bounded by Veteran's Drive, Gravelly Lake Drive, and Langlow St SW, also commonly known as the Barker property

Dear Mr. Catron:

As you know, the city of Lakewood has proposed a major zoning change to the large triangular parcel of land referenced above. The proposal is to re-zone the parcel from its present Residential Estate (R-1) status to small-lot, single family R-3 status. **We write to make you aware of our increasingly serious reservations.** The opinions which we relate in this letter supersede those in our earlier letter to Mr. David Burger on this matter. That letter was composed before we were fully aware of the city's parallel proposal for rezoning lots in the Tower Road / Interlaaken area, and before we were mindful of the alternative possibility of an R-2 re-zone for the Barker property, as is proposed for multiple lots in Interlaaken area.

Under the original City of Lakewood master plan, Residential R-1 zoning was selected for this property, which is the same zoning for all single-family abuting properties on Gravelly Lake Drive and Langlow Street SW. In addition, R-1 is the zoning for all nearby properties along Gravelly Lake Drive and North Street The Lakewood Municipal Code 18A.30.110 defines these R-1 zones as being designated for "**areas where a pattern of large lots and extensive tree coverage exists. These zones seek to preserve the identity of these residential areas, preserve significant tree stands,... and reduce traffic volumes in the arterial corridors".**

The historic 8 acre parcel in question completely fits this definition. It is heavily forested, with important specimens of both old-growth Douglas Fir and endangered Garry Oaks on its acreage. Even at a time when the present owner tilled and maintained his large and active private garden on the property, its character of excellent forestation and habitat made it a refuge for a wide variety of birds and wildlife, including foxes, raccoons, great horned owls, red-tailed hawks, and California quail. Bald eagles also often perch on the property's tallest firs.

Under the existing R-1 designation, this property could be redeveloped to accommodate about 10 new single-family homes, with a minimum lot size of 25,000 square feet As you are aware, the proposed change to an R-3 zone would reduce this current minimum

to a much smaller 7,500 square feet. **Under R-3, up to 33 new homes could be built on the parcel. This is more than triple the number permitted under the existing zoning.**

We have carefully considered the proposed change. As we fully think through the implications, we now strongly feel that R-3 designation for this property would adversely impact the local neighborhood by greatly reducing existing tree cover, and packing large numbers of homes on this relatively small parcel along a major Lakewood arterial street. This change would inevitably lead to greatly increased local traffic and noise. **We feel these combined effects would seriously degrade the future appearance and neighborhood "feel" of this area of Lakewood. This is directly against the stated intent of the Municipal Code referenced above**. Further, it is difficult for us to see how this proposed "island" of high-density R-3 housing could fit in to the surrounding already-built R-1 properties without major adverse impacts on their salability and value.

We believe that a far better compromise plan would be to re-zone this parcel from R-1 to R-2, instead of R-1 to R-3. An R-2 designation still permits smaller lots (17,000 square feet versus 25,000), and would allow re-development with moderate (but much more acceptable) increased local housing density. Under R-2 zoning, about 15 new homes could be built, 50% more than the 10 currently allowed under R-1, but far fewer than the drastic increase of 33 which would be permitted under R-3. **We feel that a R-2 designation would still achieve the goal of making the property attractive for responsible re-development, but would have far less negative impact on the overall feel - and property values - of existing local properties.**

It also seems to us that city planners are being inconsistent, since the parallel re-zoning proposal for properties in the Tower Road / Interlaaken neighborhoods calls only for the more modest R-1 to R-2 downsizing of lot sizes, rather than the much greater reductions allowed by R-3. It makes little sense to us that the Interlaaken / Tower Road parcels should be re-zoned by one standard, and the Gravelly Lake Drive parcel by another. The existing lot mixes and woodland ambiance for each of these areas are extremely similar.

We have been nearby homeowners to the Gravelly Lake property in question for over 35 years. The peace and tranquility of this pleasant corner of Lakewood has been of great value to all who live near the parcel in question. We feel that the re-zoning proposal as it now stands will seriously degrade the quality of life for **all** in this neighborhood. We urge the planning council to re-consider the matter, and - if a change to the existing Master Plan is deemed necessary for this important property - to go forward with a R-2 zoning change rather than the current R-3 proposal.

Sincerely,

Preston & Beth Carter

Preston and Elizabeth Carter
7817 Walnut Street SW
Lakewood, Washington 98498-5224

(253) 581-0450

Brett and Patti Jacobsen
12610 Gravelly Lake Dr SW
Lakewood, WA 98499

September 15, 2015

Dan Catron
Long Range Planning Manager
City of Lakewood
6000 Main Street SW
Lakewood, WA 98499-5027

RE: Comp Plan and Rezone Amendments

Dear Mr. Catron (and Members of the Planning Commission):

For the record, I live at 12601 Gravelly Lake Drive S.W. across from the proposed rezone designation located east of Gravelly Lake Drive between Veterans Dr. SW and Langlow St. S.W. As you may be aware, I do not oppose development in general terms, however, I feel that development should be done in a fashion that promotes and accentuates the feel and integrity of the existing neighborhood.
One of the reasons that I purchased my home and property on Gravelly Lake Dr. was that it was set within and surrounded by residences within the R1 Zoning designation, having like densities, scale and proportion.

The proposed rezone from R1 to R3, where density is potentially tripled from the current zoning designation, is not only unwarranted, but not consistent with sound zoning theory and will undermine the value and quality of the neighborhood. The subject property is one of the last vacant parcels (if not the last) which borders Gravelly Lake Drive along Gravelly Lake and American Lake. All other properties have already been developed extensively in keeping with R1 designation. Please keep the Gravelly Lake Drive neighborhood as originally envisioned in your code, as Residential Estate. Do not let this last piece of development forever detract from our neighborhood a century in the making. Please hold the line and keep this portion of Gravelly Lake Drive and its neighborhood consistent throughout as R1.

Ironically, this property sits at the entrance to Lakewold Gardens, one of the iconic estate settings in our City. To allow this proposed rezone at the entrance of this estate would be a disservice to not only the donating family, members/donors of this estate, but the Lakewood Community as well. **Keep the R1 Zoning; please do not down grade or spot zone our neighborhood.**

Sincerely,

Brett Jacobsen

September 19, 2015

Merritt E. Lawson, Jr.
12415 Pine St. S.W.
Lakewood, WA. 98498

RECEIVED
SEP 21 2015
COMMUNITY DEVELOPMENT

Lakewood Community Development Dept.
Mr. Dan Catron, Planning Manager
6000 Main St. S.W.
Lakewood, WA. 98499

Dear Mr. Catron:

I received your "NOTICE OF PUBLIC HEARING" regarding the City's initiated amendment to re-designate and rezone the land on the corner of Gravelly Lake Dr. and Veterans Drive S.W., from the current Residential Estate zone of R1, to a re-designated Single–Family zone of R3.

My property line for 12415 Pine St. S.W., which has been our home for the past 19 years, borders the area that you would like to change from R1 to a R3 zone, which would then permit an additional 30–35 homes in our immediate R1 neighborhood.

When I bought our home, mentioned above, we were told that by buying a home in a Residential Estate-1 area, we were assured of having mature trees, reduced traffic and very nice homes, like our home. Now, I understand the City wants to take the property, right next to our property line and change that zoning from its immediate R1 zoning to a R3 zoning, where much less expensive homes may be built that will allow at least three (3) times the number of homes that could be built, if the R1 zone is changed to a R3 zone.

This is not acceptable to us and our neighbors in this immediate area. This zone change would create a gross devaluation of property in our R1 zone; kill trees in this neighborhood, such as Oaks and Fir trees; create a very serious traffic problem, especially on Pine St., Walnut St. and Langlow St. as residents may drive their cars from Pine St. to Gravelly Lake Dr., as a short cut from Veterans Dr. to Gravelly Lake Dr., at high speeds to avoid the traffic lights. Some people are doing this now, as they seek to avoid the traffic lights and it will become a traffic hazard, if the R1 zone is changed to a R3 zone due to the additional homes that would be built in this neighborhood.

When this area was zoned R1, it was with the good intent to keep this area the way it is today, where 8-10 very nice homes, with large lots with mature trees could be built on the area you want to change from a R1 zone to a R3 zone. We believe we need to keep this area as a R1 zone only and not desecrate it with many less expensive small houses in a congested area. We realize that the City would like to have the additional property tax money from these additional houses, but not at the cost of our neighborhood, as mentioned above.

We all enjoy our neighborhood very much and we trust that you will keep this neighborhood zoned as it is, as a R1 Estate Residential zone, only.

Thank you very much.

Sincerely yours,

Merritt E. Lawson, Jr.

Dan Catron

From: Alan Macpherson <lakewoodrunner@gmail.com>
Sent: Wednesday, September 23, 2015 8:00 AM
To: Dan Catron
Cc: Becky Newton; Jason Whalen; Marie Barth; Paul Bocchi; Alan Macpherson; jane macpherson
Subject: Planning for corner of Gravelly Lake Drive and Veterans Drive

Mr. Catron -- I have copies of letters written to you by Merritt Lawson and Preston and Elizabeth Carter, neighbors of mine in the Gravelly Lake Drive/Veterans Drive/Pine Street area of Lakewood. I join them in objecting to the idea of radically changing the zoning of the parcel on Veterans Drive to triple the density, a startling notion to us who thought with justification that we were buying into a large-lot neighborhood. This would greatly discourage those who pay significant home property taxes and otherwise invest in the community, from locating in or even staying in Lakewood.

Thanks for your consideration.

Alan Macpherson
12515 Pine Street SW
Lakewood, WA 98498

Disclaimer: Public documents and records are available to the public as required under the Washington State Public Records Act (RCW 42.56). The information contained in all correspondence with a government entity may be disclosable to third party requesters under the Public Records Act.

Talking Paper

Guidelines:

- The City of Lakewood Comprehensive Plan (CLCP 2.2) under "land use considerations", includes the "protection of existing, stable neighborhoods."
- Land Use Designations (CLCP 2.3): Under the Washington State Growth Management Act, all zoning, development regulations and other adopted programs and policies must be consistent with communities' adopted comprehensive plans.
- Residential Estate (CLCP 2.3.1): The Residential Estate designation (R1 & R2) provides for large single family lots in specific areas where a historic pattern of large residential lots and extensive tree coverage exists.
    - Preserves historic identity these "residential estates" contribute
    - Preserves significant tree stands
    - Instills visual open space into urban environment
    - Lowers density around lakes and stream corridors to prevent effects from development upon the lakes, creek habitat, and LWD lands
    - Helps maintain reduced traffic volumes and safety conflicts
- Arterial Corridor (CLCP 2.3.8): Lakewood has several single-family neighborhoods (R3 & R4) adjoining principal and minor arterial streets (e.g., Veterans Dr.). The level of existing vehicle activity adversely impacts the livability of these areas.
- The Residential Estate (R1 & R2) designation provides for Low/High dwelling units allowed (dua) of 1 to 2 dwelling units per acre. The Lakewood Municipal Code (18A.30.160) states:
    - R1 zoning district. 1.45 dua; lot size 25,000 gsf
    - R2 zoning district 2.2 dua; lot size 17,000 gsf
    - R3 zoning district 4.8 dua; lot size 7,500 gsf
    - R4 zoning district 6.4 dua; lot size 5,700 gsf
- Gravelly Lake Dr is arguably the most scenic, beautiful, and grand entrance to the City of Lakewood, with notable spots of blight around Ponders, between I-5 and the Nyanza/Gravelly Lake Dr intersection.

Comparisons:

- Between the Greystone Condominium development and Madera on the north, and the home site directly across from Country Club Dr and TCGC on the south, there are:
    - Approximately 57, R1 zoned Family Estates (the sites between North Dr and Country Club Dr, and Lakewold Garden, were left out because I grew weary looking them up on the Pierce County Assessor site)
    - Total acreage, 64 (2,709,491 ft^2)
    - Avg lot size, 1.12 acre (47,535 $ft^{2)}$
    - Lots > 1 Acre (42,560 Ft^2) = 23

- Lots > 2 Acre (85,120 ft^2) = 6
- Smallest lot size, 18,000 ft^2
- Largest lot size, 134,165 ft^2
- Lots =/> R1 min (25,000 ft^2), 51
- Lots =/< R1 min (25,000 ft^2), 6
- Lot < R2 min (17,000), 0

- Madera has 60 home sites, covering 29 acres, which does not include significant easement acreage. Avg lot size is 0.4858 acre (20,677 ft^2). Density is 2.06 dua.
- Greystone has 8 duplex-type condo units, covering approx. 5.9 acres (251,955 ft^2). Lot sizes are based on joint ownership @ 0.37 acre. There are 16 dua, which equates to an individual lot size of 15,747 ft^2, or 92% of an R2 zoned lot. Unlike Madera, all easements are included in total acreage
- The Barker Estate is 7.01 acre (298,346 ft^2). Under its current R1 zone designation it could support 10 dua. Under the proposed R3 zone designation it could support 33.6 dua. That equates to 0.21 acre per dua, or 2.3X the density of Madera and 1.7X the density of Greystone.

Conclusion:

Re-zoning the Barker Estate is counter-intuitive to all the criteria set out in the CLCP, and the guidelines set forth in the LMC 18A. It will exacerbate the traffic on Gravelly Lake Dr, Veterans Dr, and Washington Blvd; increase safety risk, result in significant mature tree loss, and be inconsistent with the existing neighborhood. The Dir, Cmty Dev and members of Planning staff have been very cooperative. However, they have essentially said that this initiative is not based on any plan, rather, it is based on the hope that it may lead to a future project proposal. Under the circumstances, the environmental DNS would seem to be inappropriate. By rezoning this property, potential project developers could waste valuable time and other resources only to find that their project is a non-starter, due to its environmental impact.

Recommendations:

The Planning Commission should not approve this rezoning, at this time. Rather, the Planning staff should be directed to perform an environmental review based on the potential effects that could result from such rezoning.

Submitted by:

Mark S. Pfeiffer
9004 Dolly Madison St SW
Lakewood, WA 98498

Tel: (253) 588-9228

RECEIVED
SEP 23 2015
COMMUNITY DEVELOPMENT

Dan Catron

From: Russell, James <jrussell@ci.tacoma.wa.us>
Sent: Thursday, September 24, 2015 9:12 AM
To: Dan Catron
Subject: Rezoning Parcel bound by Gravelly, Veterans, and Langlow

Dan,

It came to our attention that the City is considering rezoning this parcel from R1 to R3. We oppose this rezoning as it would allow lot sizes to be reduced from a minimum of 25,000 sf to 7,500 sf. This small lot size would be completely out of character for this parcel adjoining estates on American lake. I fear this rezoning would create further traffic nightmares in this I-5 access "funnel area" as well as degrade the existing "estate" feel of the neighborhood...turning it into a cheap "tract housing" neighborhood, devaluing existing properties.

Hope the comment period is still open so that these comments can be considered. Can you pleas add me to your interested party list (if there is such) to keep me posted. Appreciate a briefing of the public hearing last night and next steps.
Thanks.

James M Russell
Tacoma Power
253-502-8395

Disclaimer: Public documents and records are available to the public as required under the Washington State Public Records Act (RCW 42.56). The information contained in all correspondence with a government entity may be disclosable to third party requesters under the Public Records Act.

Dan Catron

From: CloverdaleCourt HOA President <cloverdalepres@gmail.com>
Sent: Monday, August 10, 2015 8:49 AM
To: Dan Catron
Subject: Lakewood Racquetball Club re-zoning

Good morning,

I am the current President of the Cloverdale Court HOA. We have several homes that are adjacent to the property of the Club and are located on Cloverdale Ct. SW.

Many of our home owners have concerns about the new zoning the Club plans.

A few homeowners will attend the meeting on Sept 16th to provide some input. I have a few questions for you concerning the meeting:

1) Is the meeting scheduled for Sept 16th going to be with the City Council or with the Planning Commission?

2) What type of forum will it be? Will we as an HOA be able to speak and voice some concerns?

If you can provide me with some protocol for these types of meeting I would appreciate it.

Thank you very much,

V/r
"Blake"

David Blake
253-861-7751
Cloverdale Court HOA
President

Disclaimer: Public documents and records are available to the public as required under the Washington State Public Records Act (RCW 42.56). The information contained in all correspondence with a government entity may be disclosable to third party requesters under the Public Records Act.

Lakewood Racquet and Sport Club
5820 - 112th ST SW
Lakewood, WA 98499
August 27, 2015

Mr. David Bugher
Director Community Development
City of Lakewood
Lakewood, WA 98499

Dear Mr Bugher:

I write in response to the question of Councilmember Mike Brandstetter at the August 24, 2015 Study Session of the Lakewood City Council regarding the application of the Club.

The Lakewood Racquet and Sport Club marked its 50th anniversary in 2013. Its original buildings, and those built somewhat later, still stand and are in constant use. Because the Club is member owned it does not have the funding that would enable it to improve the existing plant, a costly proposition because of the need to bring the older buildings up to code. Beginning in 2005, the Club began to look at options, pursuing a lawsuit to remove restrictions on its original deed at time of purchase, and including prior preliminary conversations with the City in 2008 and 2011. Clearly, this began well before 2015.

Now in order to improve services to members, Club has proposed to sell a portion of its vacant land to obtain funds to build some improved facilities. To this end, after several meetings with you and members of your staff, the Club submitted an application for the necessary Comprehensive Plan Amendment and Zoning Change in March 2015.

Subsequent to that submission, Dan Catron of your office informed the Club's Long Range Planning Committee, which I chair, that recently proposed changes to the FEMA Flood Insurance Rate Maps could affect the Club's application at the development stage *even though the Rate Map has not yet been adopted.*

I want to assure Councilmember Brandstetter, other members of the City Council, and City Manager John Caulfield, that our application was not made with a view to circumventing the proposed changes by FEMA. *The changes had not been promulgated at the time of our application.*

In addition, the Club's contracted Professional Wetland Specialist, John Comis, is of the opinion that the FEMA Flood Insurance Rate Map is in error and that the Lakewood Racquet Club project area does not contain either wetlands or "Floodways".

I attach a copy of Mr. Comis' opinion letter and would appreciate your forwarding my letter and Mr. Comis' letter to all members of the City Council and to the City Manager well in advance of the date of the Public Hearing on September 16, 2015.

Thank you for your time and attention to this matter.

Sincerely yours,

Andrea S. Gernon
Chair
Long Range Planning Committee
Lakewood Racquet and Sport Club

cc: Dan Catron, Principal Planner
John Caulfield, City Manager
Mayor Don Anderson
All Member of the Lakewood City Council

Enclosure: Letter from John Comis, PWS
Professional Wetland Specialist
Certified Wetland and Stream Specialist (by Pierce County since 1992)

RECEIVED
SEP 04 2015
COMMUNITY DEVELOPMENT

September 4, 2015

Mr. David Catron, Long-Range Planning Manager
City of Lakewood
6000 Main Street
Lakewood, WA 98499-5027

Re: Proposed re-zoning of property at Lakewood Racquet Club

Thank you for notifying some of the homeowners in the Cloverdale Court Community about the proposed re-zoning. Thank you, also, for providing additional information when I contacted you earlier. We appreciate the opportunity to offer comments on the proposal and trust that our concerns will be given sincere consideration.

We have only seen the draft of the proposal prepared by architects engaged by Lakewood Racquet Club. Two representatives of Lakewood Racquet Club attended a meeting of our homeowners association to advise us of the proposal. Homeowners asked many questions; but, received no meaningful information. The standard answer to our questions was, "we will do what the City of Lakewood will let us do." We interpret this to mean that they will propose whatever will maximize profits to the racquet club, which probably means the highest-density housing that will be allowed. This possibility alarms us.

One of our primary concerns is the nature of the houses that are proposed to be constructed. We urge the city to maintain the nature of our neighborhood and surrounding neighborhoods. Most of Cloverdale Court (all the property adjacent to Lakewood Racquet Club) is zoned R3, according to the zoning map on the Pierce County Assessor's web site. The property in Racquet Club Estates, on 58th Ave., is also zoned R3. We believe that if a portion of the Lakewood Racquet Club's property is to be re-zoned to allow for the construction of homes, that rezoned portion should also be R3 and the zoning of the Racquet Club itself should remain "Open Space and Recreation 2". While the new homes on the racquet club property would still look somewhat different, simply because they will be built about 40 years after those in Cloverdale Court and Racquet Club Estates, the basic nature of the homes would be consistent and the sizes of the lots would be comparable to those in adjacent neighborhoods.

We are under the impression that the racquet club proposes to have the property re-zoned to MR2, which might, we believe, allow three-story townhouse type homes to be constructed on very small lots. That prospect is not one that can be supported by residents of Cloverdale Court for several reasons. First, this would drastically change the nature of the neighborhood and result in an area of much higher density homes between two long-established neighborhoods consisting of single-family homes of one or two stories on lots of approximately one half acre. Second, many of the properties in Cloverdale Court, specifically those adjoining lots identified as numbers 3-11 on the diagram presented by the racquet club have good views, including of Mt. Rainier. Tall homes built on racquet club property would eliminate the views that were certainly important reasons for purchasing these homes in the first place. Third, taller structures would allow residents of the new homes to look down into the back yards and windows of homes on Cloverdale Court. This would not be acceptable. Houses in the proposed development should be no higher than two stories and be single-family homes.

The diagram of the proposed development shows a "20' landscape buffer" along the border of the racquet club property. We are very concerned about the nature of this buffer. The buffer between proposed lots 3-11 and the Cloverdale Court properties should not contain trees that will block the views from those properties. The buffer between proposed lots 23-26 should have plantings that will provide a screen between the properties. Some Cloverdale Court properties adjacent to these lots already have trees along the boundary and additional tree/shrubs on the racquet club side would only enhance the visual screen. Some of the Cloverdale Court properties in this area do not have trees. Plantings in the buffer adjacent to these lots should be carefully selected to provide a visual screen without being so high as to block light coming onto the properties. We are also concerned with noise from a new development. The entire length of the buffer should be of sufficient density and height to provide a good sound buffer. The height of the buffer vegetation needs to balance the need for a visual screen with the requirements of an effective sound barrier and should be tailored to the varying nature of Cloverdale Court properties. Residents of Cloverdale Court will be happy to work with designers of the racquet club properties to select appropriate vegetation to be placed in all areas of the buffer. We are also concerned that the developers of the racquet club properties be held accountable for maintaining the buffer so that it does not grow into an eyesore and a nuisance. Allowing the buffer to grow into a huge blackberry thicket such as already exists on the racquet club property along 112th street would be unacceptable. Allowing the vegetation to die would also be unacceptable.

The proposed diagram shows a street, presumably with sidewalks, between the landscape buffer and the new homes on proposed lots 2-11. The diagram shows the street turning and placing proposed lots 20-26 directly adjacent to the landscape buffer and much closer to the properties in Cloverdale Court. We suggest that the street continue to the corner of the racquet club property and then turn to continue along the landscape buffer on the Racquet Club Estates properties. This would provide additional separation between the houses on proposed lots 20-26 and Cloverdale Court properties and between lots 15-22 and the properties in Racquet Club Estates. The additional space provided by the width of the street and sidewalk will allow a reduced noise level and increased privacy that building homes 20' from the property line will not allow.

We are concerned about the lighting that may be installed in the racquet club development. While we understand that adequate lighting is necessary for the safety, convenience, and appearance of a neighborhood, we do not want to see an overly-bright area adjacent to us, especially one causing light pollution by lighting the sky. Cloverdale Court recently installed new energy-efficient LED street lights on our street. Our new lights provide adequate lighting on the street without overly lighting yards. They also direct all light downward onto the street to prevent light pollution caused by light unnecessarily going upward. We encourage the City of Lakewood to require lighting in the racquet club development that is consistent with these criteria.

We are concerned that additional residences put in this location might adversely affect utilities, by reducing our existing water pressure, for example. We do not believe this should be a major concern, but we respectfully request that the City of Lakewood Planning Commission address these issues to make sure there are no problems caused by degradation of existing services.

We are also concerned about the additional traffic on 112th Street that would result from the addition of a high density home development on the racquet club properties. 112th street is already showing signs of neglect through deferred maintenance and needs to be resurfaced. Additional traffic would only exacerbate this situation.

While we would certainly prefer to see no development on the racquet club property, we realize that some change is inevitable. We are willing to consult with the City of Lakewood and the Lakewood Racquet Club to develop a plan that will allow for desirable development in this portion of our city. Initial contact should be with me. Thank you for giving consideration to our concerns.

Respectfully,

David Blake, President
Cloverdale Court Homeowners Association
11606 Cloverdale CT SW
Lakewood, WA 98499
(253) 861-7751

Dan Catron

From: Joe Lehman <joedlehman@me.com>
Sent: Monday, September 14, 2015 9:16 PM
To: Dan Catron
Subject: Additional Housing in Lakewood

Mr. Dan Catron

My name is Joe Lehman and I live just around the corner of the LW RACQUET club. We regard the club as a good neighbor and we have no problem with putting additional housing adjacent to the club. In fact I believe that it would be an additional benefit for our community.

Sincerely,

Joe Lehman

Disclaimer: Public documents and records are available to the public as required under the Washington State Public Records Act (RCW 42.56). The information contained in all correspondence with a government entity may be disclosable to third party requesters under the Public Records Act.

Clover Park
School District
Creating Promising Futures.

September 14, 2015

Mr. Dan Catron
City of Lakewood
6000 Main Street
Lakewood, Washington 98499

Re: Lakewood Racquet Club

Dear Dan:

The Lakewood Racquet Club is proposing to redesignate and rezone a portion of their property in order to accommodate redevelopment of a portion of the site with residential uses. Based on the information shared to date, the Clover Park School District has no objection to the proposal by the Lakewood Racquet Club and foresees no significant impacts as a result of the redesignation/ rezone to the educational and operational priorities of the District.

Sincerely,

RICK RING
Administrator for Business Services & Capital Projects

cc: Lakewood Racquet Club

LAKEWOOD WATER DISTRICT

COMMISSIONERS
L. R. Ghilarducci, Jr.
J. S. Korsmo, Jr.
G. J. Rediske

GENERAL MANAGER
Randall M. Black

September 14, 2015

RECEIVED
SEP 18 2015
COMMUNITY DEVELOPMENT

Mr. Dan Catron
Long-Range Planning Manager
City of Lakewood
6000 Main Street SW
Lakewood, WA 98499-5027

RE: Application # LU15-00039

Dear Dan:

In reference to the above-mentioned application, the Lakewood Water District is not opposed to the application being submitted by the Lakewood Racquet Club concerning re-designating and rezoning a portion of their property at 5820 112th Street SW in Lakewood.

The District would welcome the additional residential area surrounding the racquet club facilities to help provide increased security for the existing well site, our community's water system, and the customers we all serve.

If you have any other questions, please do not hesitate to give me a call.

Sincerely,

Randall M. Black
General Manager

RMB:ckb

cc: Andrea Gernon

11900 Gravelly Lake Drive SW (P.O. Box 99729) • Lakewood, WA 98496
Phone (253) 588-4423 • Fax (253) 588-7150

LAKEWOOD RACQUET & SPORT CLUB

RECEIVED
SEP 23 2015
COMMUNITY DEVELOPMENT

Regular Meeting Wednesday, September 23, 2015, at 6:30 pm

City Hall, Council Chambers
6000 Main Street SW, Lakewood, Washington

Dear Planning Commission:

I first became a member of Lakewood Racquet Club in 1982. At present, I am the General Manager and Director of Tennis of the Club. In late 2005, the Club Board concluded that the Club should construct homes on the Club property and use the proceeds of the sale of that property to renovate and expand existing facilities.

Among the factors that caused the Board to decide to convert some of its surplus land to residential use were: The Club needs renovation because the facility is close to 50 years old. In addition to renovation, the Club's capacity to meet the needs of young, growing families in the area must be met. Despite being a member owned Club we are in the competitive business of recreation. We compete with numerous other sports for time, attention, and money.

The Club was intended to serve the needs of the community as it does now. If it is to fulfill that role in the next 50 years it is imperative that we have sufficient funds to invest in the Club and develop new outlets and programs.

Indoor tennis is played year round. With only four indoor courts the Club is severely limited in its programming. Each year, the demand from local school districts to host Triple A, Double A, and Single A local tournaments and district tournaments grows. However, with our current 4 court limitation we are not able to accommodate their request.

The sale of Club property will generate the funds required to add additional courts for the use of our members and for young people in the area. The Club is seeking merely to develop a portion of the Club's land so that the Club itself can sustain itself over the years.

Thank you for your consideration in this matter.

Sincerely,

Bruce Dayton

COMMUNITY DEVELOPMENT DEPARTMENT
STAFF REPORT

TO: PLANNING COMMISSION

FROM: FRANK FIORI, PLANNING MANAGER

MEETING DATE: October 7, 2015 AGENDA ITEM:

SUBJECT: FLOODPLAIN MANAGEMENT AND CRITICAL AREAS ORDINANCE AMENDMENTS

BACKGROUND:

The proposed amendments to Title 18A and Title 14A were introduced to the Planning Commission at their August 19, 2015 meeting.

The Washington State Growth Management Act (GMA) requires that cities periodically review and update their Critical Area Ordinances (CAO) to ensure that they are in compliance with current regulations and legislative changes that may have occurred. The City of Lakewood is scheduled to have reviewed and made necessary updates to their CAO in June of 2015. City staff has been working with staff from the Department of Ecology and have prepared draft amendments to the Lakewood Municipal Code (LMC) Title 18A and Title 14A which are believed will bring the City's CAO into compliance.

As a participating jurisdiction in the National Flood Insurance Program (NFIP), the City of Lakewood is required to maintain a floodplain management program and associated ordinances that meet the requirements of the NFIP as established by the Federal Emergency Management Agency (FEMA). The City is currently in compliance with NFIP requirements, however, two actions since the City last updated the codes associated with their floodplain management program will require the City to review their codes make amendments as necessary.

1. The Federal Emergency Management Agency (FEMA) has recently completed a new preliminary Flood Insurance Study and the creation of new Flood Insurance Rate Maps (FIRM) for Pierce County.

2. The National Marine Fisheries Service (NMFS) filed legal action against FEMA over the implementation of the NFIP in the Puget Sound Basin. The NMFS prevailed

in the action and as a result a Biological Opinion (BiOp) was prepared that provided guidance to FEMA regarding the implementation of the NFIP.

In order to continue participation in the NFIP local jurisdictions within the Puget Sound Basin must meet the procedural and substantive requirements of the BiOp. It is the responsibility of FEMA to review the codes of local jurisdictions and determine whether or not they meet the requirements of the BiOp. City staff has been preparing amendments to both LMC Title 18A and Tile 14A using a model ordinance prepared by FEMA and guidance documents provided by Ecology in determining what amendments may be necessary to meet the requirements of the BiOp as well as the requirements of the NFIP.

PROPOSED AMENDMENTS/ UPDATES:

Summary of amendments to Lakewood Municipal Code (LMC)Title 18A and Title 14A to bring City code into compliance with the National Flood Insurance Program (NFIP),Environmental Species Act (ESA) Biological Opinion (BiOp) and State requirements for periodic review of Critical Area Ordinances as required by the Growth Management Act.

Proposed Amendments to comply with NFIP

18A.40.110 – Purpose: Language added in regard to qualifying Lakewood to participate in the flood insurance program and maintaining the quality of water.

18A.40.130 – Administration – Flood Hazard Overlay: Language added in regard to the requirement for a floodplain development permit. Added language in regard to certificates of occupancy and final inspections.

18A40.140.B – Added language in regard to vegetation within an altered or relocated watercourse.

18A.40.170.A.3.c Utilities: Added language requiring a habitat impact assessment as a condition of approval for a septic system in the floodplain.

18A.40.170.6 – Added language in regard to repairs, replacement, reconstruction or improvements within floodways.

18A.40.170.B.8 – Recreational Vehicle (RV) Parks; Added language in regard to requirements for recreational vehicles in RV parks.

18A.40.180 – Allowable Activities Within the Regulatory Floodplain: New section clarifying the types of activities that can occur without a floodplain development permit.

18A.40.190 – Definitions: Added language stating that definitions found in 14A.165 also apply.

Proposed Amendments to comply with the Endangered Species Act (ESA) Biological Opinion

18A.40.110 – Purpose: Language added in regard to retaining natural channel, shoreline and floodplain creation processes. Preventing or minimizing loss of hydraulic, geomorphic and ecological functions of floodplains and stream channels.

18A.40.130 – Administration – Flood Hazard Overlay: Language added in regard to certificates of occupancy and final inspections, and the information required when submitting an application for a floodplain development permit.

18A.40.150 – Interpretation of FIRM Boundaries: Language added in regard to requests for map amendments, Conditional Letters of Map Revision, ability of an applicant to request map amendments and consideration of cumulative effects of anticipated future land use changes.

18A.40.170.A.5 – Provisions for Floodplain Reduction: Added language requiring a note on subdivision plats in reference to floodplains.

18A.40.170.B.9 – Added language in regard to the location of structures on buildable sites, the use of low impact development techniques and the amount of impervious surface.

18A.40.170.B.10 – Added language in regard to hazardous materials in the floodplain.

14A.154.050.A – Added language in regard to removal of vegetation within buffers and listed buffer widths based on the State typing of streams.

14A.154.050.B – Added language in regard to the requirements of a Habitat Impact Assessment.

14A.154.050.C – Added language in regard to the requirements for a habitat Mitigation Plan.

14A.154.050.E – Added language in regard to providing compensatory storage if necessary.

14A.165.010 – Definitions: Added or amended definitions as necessary.

Proposed Amendments to Comply with WAC 173-22-035, Wetland Identification and Delineation

14A.162.020 - Designation of Wetland Areas – Amended and updated the method for identifying and delineating wetlands based on federal wetlands delineation methods.

14A.162.030 - Wetland Categories – Amended the point system for categorizing wetlands based on changes to the State Wetland Rating System.

14A.162.080 - §A. Added new language in regard to buffer widths and new tables based on State regulations; §B.1.g. changed 25% to 75% in regard to minimum buffer widths; §B.2 changed 35% to 25% in regard to maximum reduction in buffer width to comply with state regulations.

General Amendments

14A.154.020 – Designation of Critical Fish and Wildlife Habitat Areas: Deleted language referencing AppendixB. References are already included for CFR and WAC.

DISCUSSION:

The proposed updated FIRM will increase the amount of land within the City that is classified as being in a special flood hazard area, in particular lands along Clover Creek in the Racquet Club Estates and Springbrook neighborhoods. The proposed amendments will bring the City's flood hazard area and critical area ordinances into compliance with the national Flood Insurance Program (NFIP), Federal Emergency Management Agency (FEMA), Endangered Species Act (ESA) and the Growth management Act (GMA).

DRAFT UPDATES:

Proposed amendments to Title 18A and 14A have been submitted to FEMA for review and comment and staff has been working with Ecology on the draft amendments. The proposed amendments have been sent to the Washington Department of Commerce for distribution in accordance with RCW 36.70A.106.

CITY OF LAKEWOOD

DEPARTMENT OF COMMUNITY DEVELOPMENT

ENVIRONMENTAL CHECKLIST APPLICATION FORM

PROJECT: 2015 AMENDMENTS TO THE LAND USE AND DEVELOPMENT CODE AND ENVIRONMENTAL PROTECTION CODE REGARDING FLOODPLAIN MANAGEMENT AND CRITICAL AREAS

A. BACKGROUND

1. **Name of Proposed Project:** 2015 Floodplain Management and Critical Areas Regulations

2. **Proponent:** City of Lakewood

3. **Contact Person:** Frank A. Fiori, Planning Manager
   6000 Main Street SW
   Lakewood, WA 98499

4. **Checklist Date:** September 14, 2015

5. **Lead Agency:** City of Lakewood

6. **Proposed Timing:** Adoption expected in Winter 2015

7. **Future Actions:** The proposed revisions will bring City code into compliance with the National Flood Insurance Program (NFIP), Environmental Species Act (ESA) Biological Opinion (BiOp) and State requirements for periodic review of Critical Area Ordinances as required by the Growth Management Act.

8. **Environmental Information:** National Marine Fisheries Service (NMFS) Biological Opinion (BiOp) on the NFIP.

9. **Other pending government approvals:** None at this time.

10. **Government approvals for this project:** Adoption of an ordinance by the Lakewood City Council.

11. **Project Description**: This proposal involves zoning code amendments to Title 18A of the City of Lakewood Municipal Code in regard to floodplain regulations and to Title 14A of the City of Lakewood Municipal Code in regard to critical areas and natural resource lands regulations. The proposed amendments will apply to all lands within the Lakewood city limits that are located within the regulatory floodplain or

critical areas and natural resource areas as defined. The proposed revisions will bring City code into compliance with the National Flood Insurance Program (NFIP), Environmental Species Act (ESA) Biological Opinion (BiOp) and State requirements for periodic review of Critical Area Ordinances as required by the Growth Management Act.

12. **Project Location:** The proposed amendments will apply to all lands within the Lakewood city limits that are located within the regulatory floodplain or critical areas and natural resource areas as defined.

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature: _____

Name of signee: Frank A. Fiori

Position and Agency/Organization: Planning Manager, City of Lakewood

Date Submitted: September 14, 2015

D. SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emission to air; production, storage, or release of toxic or hazardous substances; or production of noise?

The proposed code amendments are intended to bring City code into compliance with the National Flood Insurance Program (NFIP), Environmental Species Act (ESA) Biological Opinion (BiOp) and State requirements for periodic review of Critical Area Ordinances as required by the Growth Management Act. The proposed revisions will lead to no increased discharges to wate; emissions to air; production, storage or release of toxic or hazardous substances; or production of noise.

Proposed measures to avoid or reduce such increases are:

Pollution impacts will be avoided and reduced by implementation of the proposed regulations.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

The proposed code amendments will lead to further conservation and protection of plants, animals, fish and marine life.

Proposed measures to protect or conserve plants, animals, fish, or marine life?

The proposed code amendments will bring City code into compliance with the National Flood Insurance Program (NFIP), Environmental Species Act (ESA) Biological Opinion (BiOp) and State requirements for periodic review of Critical Area Ordinances as required by the Growth Management Act.

3. How would the proposal be likely to deplete energy or natural resources?

The proposed amendments will not be likely to deplete energy or natural resources.

Proposed measures to protect or conserve energy and natural resources are:

The proposed amendments will protect natural resources through the requirement for providing buffers adjacent to critical areas, limiting the amount of disturbance that can occur within buffers, providing for the protection of fish habitat and by limiting development within flood hazard areas and critical areas.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

The proposed code amendments will bring City code into compliance with the National Flood Insurance Program (NFIP), Environmental Species Act (ESA) Biological Opinion (BiOp) and State requirements for periodic review of Critical Area Ordinances as required by the Growth Management Act.

Proposed measures to protect such resources or to avoid or reduce impacts are:

The proposed code amendments are intended to protect such resources by regulating development in floodplains and critical areas, establishing buffers and requiring mitigation for loss of habitat.

5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

The proposed code changes are compatible with existing plans and are intended to implement existing plans, and regulate land uses and development within the shoreline, floodplain and critical area environments.

Proposed measures to avoid or reduce shoreline and land use impacts are:

The proposed code amendments are intended to protect shorelines and mitigate land use impacts by regulating development in floodplains and critical areas, establishing buffers and requiring mitigation for loss of habitat.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

The proposed amendments will result in no increased demand on transportation services or public services and utilities.

Proposed measures to reduce or respond to such demand(s) are:

Not applicable.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

The proposed amendments are expected to work in concert with local, state, and federal laws intended to protect the environment. The proposed code amendments will bring City code into compliance with the National Flood Insurance Program (NFIP), Environmental Species Act (ESA) Biological Opinion (BiOp) and State requirements for periodic review of Critical Area Ordinances as required by the Growth Management Act.

CITY OF LAKEWOOD
DETERMINATION OF NON-SIGNIFICANCE

PROJECT NAME: 2015 Amendments to the Land Use and Development Code and Critical Areas and Natural Resource Lands Regulations Regarding Floodplain Management and Critical Areas

PROJECT DESCRIPTION: Amendments to the City's Land Use and Development Code and Critical Areas and Natural Resource Lands Regulations to bring the City's floodplain management and critical areas ordinances into compliance with State and Federal requirements.

PROJECT PROPONENT: City of Lakewood
6000 Main Street SW
Lakewood, WA 98499

SUMMARY:

This proposal involves zoning code amendments to Title 18A of the City of Lakewood Municipal Code in regard to floodplain regulations and to Title 14A of the City of Lakewood Municipal Code in regard to critical areas and natural resource lands regulations. The proposed amendments will apply to all lands within the Lakewood city limits that are located within the regulatory floodplain or critical areas and natural resource areas as defined. The proposed revisions will bring City code into compliance with the National Flood Insurance Program (NFIP), Environmental Species Act (ESA) Biological Opinion (BiOp) and State requirements for periodic review of Critical Area Ordinances as required by the Growth Management Act.

FINDINGS OF FACT:

1. On July 10, 2000, the Lakewood City Council adopted a new Comprehensive Plan as required by the Washington State Growth Management Act of 1995. An Environmental Impact Statement was prepared pursuant to the State Environmental Policy Act (SEPA) which addresses the environmental impacts caused by changes in land use proposed by the new Plan.

2. On August 20, 2001 the City adopted a Land Use and Development Code (Chapter 18A of the Lakewood Municipal Code). The broad intent of the Code is to implement the Comprehensive Plan. The adopted Code is intended to foster harmony among land uses, preserve the qualities of desirable residential neighborhoods, improve neighborhoods whose character undermines good-quality living conditions, and promote the well-being of the city through integration of aesthetic, environmental, and economic values.

3. On November 15, 2004 the City adopted Critical Areas and Natural Resource Lands Regulations (Chapter 14A, Environmental Protection, of the Lakewood Municipal Code). It is the intent of the Critical Areas and Natural Resource Lands Regulations to designate and protect critical areas and natural resource lands, including wetlands, critical aquifer recharge areas, fish and wildlife habitat areas, geologically hazardous areas, flood hazard areas, and mineral resource lands, protect the natural environment, including air and water, to preserve the community's high quality of life, protect unique, fragile and valuable elements of the environment, including fish and wildlife habitat; including suitable habitats to maintain native fish and wildlife species within their natural geographic distribution so that isolated sub-populations are not created, protect the public against losses from costs of public emergency rescue and relief operations where the causes are avoidable and the degradation of the natural environment and the expense associated with repair or replacement, protect members of the public and public resources and facilities from injury, loss of life, or property damage due to landslides, steep slope failures, erosion, seismic events, or flooding, avoid, minimize and mitigate for impacts arising from land development and other activities affecting critical areas to maintain their ecological functions and values including water quality, flood attenuation, habitat, recreation, education, and cultural preservation, provide the public with sufficient information and notice of potential risks associated with developing in and adjacent to critical areas, and to implement the goals and requirements of the Growth Management Act and the Lakewood Comprehensive Plan.

4. The Community Development Department is now proposing to amend certain sections of the Land Use and Development Code (Title 18A of the Lakewood Municipal Code) and certain sections of the Critical Areas and Resource Lands Regulations (Title 14A, Environmental Protection, of the Lakewood Municipal Code). The proposed amendments will apply to all lands within the City of Lakewood city limits that are located within the regulatory floodplain or critical areas and natural resource areas as defined.

5. The proposed changes to the Land Use and Development Code and the Critical Areas and Natural Resource Lands Regulations are intended to bring City code into compliance with the National Flood Insurance Program (NFIP), Environmental Species Act (ESA) Biological Opinion (BiOp) and State requirements for periodic review of Critical Areas Ordinances (CAO) as required by the Growth Management Act.

CONCLUSIONS OF RESPONSIBLE OFFICIAL:

The Responsible Official concludes that the proposed amendment to the Land Use and Development Code and the Critical Areas and Natural Resource Lands Regulations will help implement the provisions of the Comprehensive Plan. The proposed amendments to the Land Use and Development Code and the Critical Areas and Natural Resource Lands Regulations will not have any adverse effects on the environment beyond, or separate from, those of the Comprehensive Plan itself. Pursuant to WAC 197-11-350 (3), a DNS may be issued. This conclusion is based on staff review of the proposed code amendments and the environmental checklist. The environmental effects of specific projects allowed by the proposed ordinance

amendments will be analyzed on a case-by-case basis, as required by the State Environmental Policy Act.

Agency: City of Lakewood
Community Development Department
6000 Main Street SW
Lakewood, WA 98499

Date of Issue: _____, 2015

Comment Deadline: _____, 2015

Date of Final Determination: _____

_____
David Bugher, Responsible Official

NOTE: Pursuant to Lakewood Municipal Code Section 14.02.200, decisions of the Responsible Official regarding Process V Legislative Actions are final and are not subject to administrative appeal.

Proposed Amendments to Title 18A.40.100

Flood hazard Overlay Regulations

18A.40.100 - Flood Hazard Overlay

18A.40.110 - Purpose - Flood Hazard Overlay

The Flood Hazard overlay (FHO) is intended to identify and recognize those areas of the city subject to the hazards of periodic flooding and to establish special standards and regulations to guide development and reduce personal injury, property damage and loss of life from flooding in those areas. This overlay shall apply to all areas of special flood hazards within the incorporated areas of the City of Lakewood as identified on Flood Insurance Rate Maps, Flood Boundary Maps, and Floodway Maps. In advancing these principles and the general purposes of the comprehensive plan, the specific objectives are to:

A. Promote the general health, welfare and safety of the city's residents, and protect human life, and property from the dangers of flooding.

B. Prevent the establishment of certain structures and land uses unsuitable for human habitation because of the danger of flooding, unsanitary conditions or other hazards.

C. Minimize the need for rescue and relief efforts associated with flooding.

D. Help maintain a stable tax base by providing for sound use and development in flood-prone areas and to minimize prolonged business interruptions, and future flood blight areas.

E. Minimize damage to public facilities and utilities located in flood hazard areas.

F. Ensure that potential home and business buyers are notified that property is in a flood area.

G. Minimize expenditure of public money for costly flood relief, damage repair and flood control projects.

H. Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.

I. Qualify the City of Lakewood for participation in the National Flood Insurance Program, thereby giving citizens and businesses the opportunity to purchase flood insurance.

J. Maintain the quality of water in rivers, streams, and lakes and their floodplains so as to protect public water supplies, areas of the Public Trust, and wildlife habitat protected by the Federal Endangered Species Act.

K. Retain the natural channel, shoreline, and floodplain creation processes and other natural floodplain functions that protect, create, and maintain habitat for threatened and endangered species.

L. Prevent or minimize loss of hydraulic, geomorphic, and ecological functions of floodplains and stream channels.

18A.40.120 - Applicability - Flood Hazard Overlay

A. Establishment of Flood Zones. This section shall apply to t~~T~~he areas of special flood hazard identified by the Federal Emergency Management Agency (FEMA) in a scientific engineering report entitled "The Flood Insurance Study for the Unincorporated Areas of Pierce County, WA, Vols. 1 and 2," dated August 19, 1987, as amended with an accompanying Flood Insurance Rate Map (FIRM) and Flood Boundary Maps, and any revisions thereto, and all Protected Areas within the City are hereby adopted by reference and declared to be a part of this section. The Flood Insurance Study shall be kept on file by the City Engineer. The best available information for flood hazard area identification, as outlined in this section, shall be the basis for regulation until a new FIRM is issued which incorporates the data utilized in administration of this section.

B. Noncompliance. No structure or land shall hereafter be developed, converted, altered, constructed, or located without full compliance with the terms of this section and other applicable regulations. Violations of the provisions of this section are subject to the penalties identified in this title.

C. Abrogation and Greater Restrictions. This section is not intended to repeal, abrogate, or impair any existing easements, covenants, or deed restrictions. However, where this section and other code, easement, covenant, or deed restriction conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

D. Interpretation of FIRM Boundaries. The Community Development Director shall make interpretations where needed, as to the exact location of the boundaries of the areas of special flood hazards. In the interpretation and application of this section, all provisions shall be:

1. Considered to constitute minimum requirements.
2. Liberally construed in favor of the public trust.
3. Deemed neither to limit nor repeal any other powers granted under state statutes. A party contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretations as provided in this code.

E. Disclaimer of Liability. The degree of flood protection required by this section is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur on occasion. Flood heights may be increased by man-made or natural causes. This section does not imply that land outside the areas of special flood hazards or uses permitted within such areas will be free from flooding or flood damages. This section shall not create liability on the part of the City of Lakewood, or any officer or employee thereof, or FEMA for any flood damages that result from reliance on this section or any administrative decision lawfully made hereunder.
(Ord. 264 § 1 (part), 2001.)

18A.40.130 - Administration - Flood Hazard Overlay

A. Establishment of Building Permit and Land-Use Permit. A building permit and zoning certification shall be required in conformance with the provisions of this section for all structures including manufactured homes and all other development including fill and other activities. ~~Application for a building, land-use, or grading permit shall be made to the City on forms prescribed by the City, which shall specifically include the following information:~~

A certificate of occupancy or final inspection approval for a new or substantially improved structure or an addition shall not be issued until:

1. The applicant provides a completed, signed and sealed Elevation or Floodproofing Certificate showing finished construction data in accordance with this ordinance.
2. If a mitigation plan is required, all work identified in the plan has been completed according to the plan's schedule.
3. The applicant provides copies of all required Federal, State and local permits as noted in the application.
4. All provisions of this ordinance have been met.

~~1. Elevation in relation to mean sea level, of the lowest floor, including basement, of all structures.~~
~~2. Elevation in relation to mean sea level to which any non-residential structure that has been floodproofed.~~
~~3. Certification by a registered professional engineer or architect that any non-residential floodproofed structure meets the floodproofing criteria in LMC 18A.40.170.B.2, Provisions for Flood Hazard Reduction, Specific Standards.~~
~~4. Description of the extent to which any water course will be altred or relocated as a result of proposed development.~~

B. A floodplain development permit shall be obtained before any construction or development begins within the Regulatory Floodplain. Application for a floodplain development permit shall be made on forms prescribed by the City and shall include:

1. A site plan, drawn to scale, showing:

a. The nature, location, dimensions and elevations of the property in question.
b. Names and location of all lakes, water bodies, water ways and drainage facilities within 300 feet of the site.
c. The elevations of the 10, 50, 100 and 500 year floods, where the data are available.
d. The boundaries of the Regulatory Floodplain, SFHA, floodway, riparian habitat zone, and channel migration area delineated in accordance with the provisions of this ordinance.
e. The proposed drainage system including, but not limited to, storm sewers, overland flow paths, detention facilities and roads.
f. Existing and proposed structures, fill, pavement and other impervious surfaces, and sites for storage of materials.
g. All wetlands.
h. Designated fish and wildlife habitat conservation areas.
i. Existing vegetation and proposed vegetation.
j. Description of the extent to which any water course will be altered or relocated as a result of proposed development.

2. If the proposed project involves regrading, excavation or filling, the site plan shall include proposed post-development terrain at one foot contour intervals.

3. If the proposed project includes a new structure, substantial improvement, or repairs to a substantially damaged structure that will be elevated, the application shall include the flood protection elevation (FPE) for the building and site and the proposed elevations of the following:

a. The top of bottom floor (including basement, crawlspace or enclosure floor)
b. The top of the next higher floor.
c. The top of the slab of an attached garage.
d. The lowest elevation of machinery or equipment servicing the structure.
e. The lowest adjacent (finished) grade next to the structure.
f. The highest adjacent (finished) grade next to structure.
g. The lowest adjacent grade at the lowest elevation of a deck or stairs, including structural support.

4. If the proposed project includes dry floodproofing of a new structure, substantial improvement, or repairs to a substantially damaged nonresidential structure, the application shall include the flood protection elevation (FPE) for the building site. The elevation shall be noted in relation to the datum of the effective FIRM and the applicant shall provide certification by a registered professional engineer or licensed architect that the dry floodproofing methods meet the criteria in accordance with this ordinance.

5. If there has been no start of construction, a floodplain development permit shall expire one year after the date of issuance. Where the applicant documents a need for an extension beyond this period due to circumstances beyond the applicant's control, the Community Development Director may authorize one or more extensions.

~~B~~C. Administrative Officials. The Community Development Director, the City Engineer and the Building Official shall jointly administer and implement this section by granting or denying permit applications in accordance with its provisions.

~~C~~D. Duties and Responsibilities. The duties of the administrative officials shall include, but not be limited to the following:

1. Review all permit and land-use applications to determine that the requirements of this section have been satisfied.

2. Review all applications to insure that all necessary permits have been obtained from those federal, state or local governmental agencies from which prior approval is required.

3. Review all applications in the area of special flood hazard to determine if the proposed development adversely affects the flood-carrying capacity of the area.

4. Review all applications to determine if the proposed development is located in the ~~floodway~~ special flood hazard area or protected area ~~If located in the floodway, assure that the encroachment provisions herein are met.~~ and ensure that the provisions of this ordinance are met.

~~D~~E. Use of Other Base Flood Data. When base flood elevation data has not been established, the City shall obtain, review, and reasonably utilize any base flood elevation and floodway data available from a federal, state, or other source, as criteria for requiring that new construction, substantial improvements, or other development in Zone A comply with LMC 18A.40.170.B.1, Residential Construction, LMC 18A.40.170.B.2, Non-Residential Construction, and LMC 18A.40.170.B.3, Manufactured Homes.

~~E~~F. Information to be Obtained and Maintained.

1. Where base flood elevation data is provided by FEMA or required by this section, obtain and record the actual elevation (in relation to mean sea level) of the lowest floor, including basement, of all new or substantially improved structures.

2. For all new or substantially improved flood-proofed structures:

a. Verify and record the actual elevation (in relation to mean sea level); and
b. Maintain the flood-proofing certifications required in LMC 18A.40.170, Provisions For Flood Hazard Reduction.

3. Maintain for public inspection all records pertaining to the provisions of this section.

(Ord. 264 § 1 (part), 2001.)

18A.40.140 - Alteration of Watercourses - Flood Hazard Overlay

A. The floodplain administrator shall ~~N~~ notify adjacent jurisdictions and the state Department of Ecology or successor agency prior to any alteration or relocation of a watercourse, and submit evidence of such notification to FEMA.

B. Require that maintenance be provided within the altered or relocated portion of said watercourse so that the flood carrying capacity is not diminished. If the maintenance program does not call for cutting of native vegetation, the system shall be oversized at the time of construction to compensate for said vegetation growth or any other natural factor that may need future maintenance.

C. An applicant for a project that will alter or relocate a watercourse shall submit a request for a Conditional Letter of Map Revision (CLOMR) where required by FEMA. The City shall not grant any permit unless FEMA issues the CLOMR and the provisions of the letter are made a part of the permit requirements.

(Ord. 264 § 1 (part), 2001.)

18A.40.150 - Interpretation of FIRM Boundaries

A. The City Engineer shall interpret the exact location of the boundaries of the areas of special flood hazard, where there appears to be a conflict between a mapped boundary

and actual field conditions.

B. Any person contesting a flood area boundary may appeal the interpretation as provided in this title.

C. An appeal of the location of a flood area boundary shall consider all technical evaluations, all relevant factors, standards specified in other sections of this title, and:

1. The danger that material may be swept onto other lands to the injury of others.
2. The danger potential to life and property due to flooding or erosion damage.
3. The susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner.
4. The importance of the services provided by the proposed facility to the community.
5. The necessity to the facility of a waterfront location, where applicable.
6. The availability of alternative locations for the proposed use which are not subject to flooding or erosion damage.
7. The compatibility of the proposed use with existing and anticipated development;
8. The relationship of the proposed use to the comprehensive plan for that area.
9. The safety of access to the property in times of flood for ordinary and emergency vehicles.
10. The expected heights, velocity, duration, rate of rise, and sediment transport of the flood waters and the effects of wave action, if applicable, expected at the site.
11. The costs of providing governmental services during and after flood conditions, including maintenance and repair of public utilities and facilities such as sewer, gas, electrical, water systems, streets and bridges.

D. The City may attach such conditions to the granting of variances hereunder as deemed necessary to further the purposes of this section.

E. The City shall maintain records of all appeal actions and report any variances to FEMA upon request.

<u>F. All requests to FEMA to revise or change the flood hazard data, including requests for a Letter of Map Revision and a Conditional Letter of Map Revision shall be reviewed by the Administrative Officials prior to submittal to FEMA.</u>

<u>1. The Administrative Officials shall not sign any Community Acknowledgment Form for any requests based on filling or other development, unless the applicant for the letter documents that such filling or development is in compliance with this ordinance.</u>

2. The Administrative Officials shall not approve a request to revise or change a floodway delineation until FEMA has issued a Conditional Letter of Map Revision that approves the change.

G. If an applicant disagrees with the regulatory data prescribed by this ordinance, he/she may submit a detailed technical study needed to replace existing data with better data in accordance with FEMA mapping guidelines. If the data in question are shown on the published FIRM, the submittal must also include a request to FEMA for a Conditional Letter of Map Revision.

H. All new hydrologic and hydraulic flood studies conducted pursuant to this section shall consider future conditions and the cumulative effects from anticipated future land use changes. This review shall be in accordance with Regional Guidance for Hydrologic and Hydraulic Studies in Support of the Model Ordinance for Floodplain Management under the National Flood Insurance Program and the Endangered Species Act, FEMA Region X, 2010. If there is an existing study that meets the rest of this ordinance's criteria, it may be used, even if it does not account for future conditions.

(Ord. 264 § 1 (part), 2001.)

18A.40.160 - Variances - Flood Hazard Overlay

A. Variances may be issued for the reconstruction, rehabilitation, or restoration of structures listed on the National Register of Historic Places or the State Inventory of Historic Places, without regard to the procedures set forth in this section.

B. Variances shall not be issued within a designated floodway if the proposed development would result in any increase in flood levels during the base flood discharge would result.

C. Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

D. Variances shall only be issued upon:

1. A showing of good and sufficient cause.
2. A determination that failure to grant the variance would result in exceptional hardship to the applicant.
3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, extraordinary public expense, create nuisances, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances.

E. Any applicant to whom a variance is granted shall be given written notice of the

required lowest floor elevation stated in feet below the base flood elevation ~~and~~. Applicants shall be made aware that the cost of flood insurance will be commensurate with the risk resulting from the reduced lowest flood elevation.

F. Variance Time Limit. Authorization of a variance shall be void after six (6) months unless the new construction, substantial improvement or approved activity has taken place. However, the Community Development Director may, at his discretion, extend authorization for one (1) additional six (6) month period upon request.

(Ord. 264 § 1 (part), 2001.)

18A.40.170 - Provisions for Flood Hazard Reduction

A. General Standards. In all areas of special flood hazards, the following standards shall apply for all new construction and substantial improvements:

1. Anchoring.

a. All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure.

b. All manufactured homes must be anchored to prevent flotation, collapse, or lateral movement by providing over-the-top and frame ties to ground anchors. Specific requirements shall be that:

(1) Over-the-top ties provided at each end of the manufactured home, with two (2) additional ties per side at intermediate locations and manufactured homes less than fifty (50) feet long requiring one (1) additional tie per side.
(2) Frame ties be provided at each corner of the home with five (5) additional ties per side at intermediate points and manufactured homes less than fifty (50) feet long requiring four (4) additional ties per side.
(3) All components of the anchoring system be capable of carrying a force of four thousand eight hundred (4,800) pounds; and
(4) Additions to the manufactured home shall be similarly anchored.

c. An alternative method of anchoring may involve a system designed to withstand a wind force of ninety (90) miles per hour or greater. Certification by a registered architect or engineer must be provided to the Building Official that this standard has been met.

2. Construction Materials and Methods.

a. All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.

b. All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.

c. Electrical, heating, ventilation, plumbing, and air-conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

3. Utilities.

a. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system;

b. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters; and

c. On-site waste disposal systems shall be located to avoid impairment to them or contamination from them during flooding. A habitat impact assessment shall be conducted in accordance with LMC 14A.154.050.C as a condition of approval of an onsite waste disposal system to be located in the Regulatory Floodplain.

4. Use of Openings in Enclosures Below a Structure's Lowest Floor. All new construction and substantial improvements, which have fully enclosed areas below the lowest floor that are subject to flooding, shall be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters in those areas. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or must meet or exceed the following minimum criteria: A minimum of two (2) openings having a total net area of not less than one (1) square inch for every square foot of enclosed area subject to flooding shall be provided. The bottom of all openings shall be no higher than one (1) foot above grade. Openings may be equipped with screens, louvers, or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

5. Subdivision Proposals.

a. All subdivision proposals shall be consistent with the need to minimize flood damage.

b. All public utilities and facilities serving subdivision proposals, such as sewer, gas, electrical, and water systems, shall be located and constructed to minimize flood damage.

c. All subdivision proposals shall have adequate drainage provided to reduce exposure to flood damage.

d. Base flood elevation data shall be provided for subdivision proposals and other proposed developments that contain more than fifty (50) lots or five (5) acres, whichever is less.

e. The final recorded subdivision plat shall include a notice that part of the property is in the SFHA, riparian habitat zone and/or channel migration area, as appropriate.

6. Review of Building Permits. Where elevation data is not available either through Flood Insurance Study or from another authoritative source, applications for building and land use permits shall be reviewed to assure that proposed construction will be reasonable safe from flooding. The test of reasonableness is a local judgment and includes use of historical data, high water marks, photographs of past flooding, etc., where available. Failure to elevate at least two (2) feet above grade in these zones may result in higher insurance rates.

7. Encroachments. The cumulative effect of any proposed development, where combined with all other existing and anticipated development, shall not increase the water surface elevation of the base flood more than one (1) foot at any point.

B. Specific Standards. In all areas of special flood hazards where base flood elevation data has been provided, the following provisions apply:

1. Residential Construction. New construction and substantial improvement of any residential structure shall elevate the lowest floor, including basement, at least one (1) foot above the base flood elevation.

2. Non-Residential Construction. New construction and substantial improvement of any commercial, industrial or other non-residential structure shall either elevate the lowest floor, including basement, at least one (1) foot above the base flood elevation or, together with attendant utility and sanitary facilities, shall:

a. Be flood-proofed so that below one (1) foot above the base flood level the structure is watertight, with walls substantially impermeable to the passage of water.

b. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy.

c. Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with the standards of this subsection. Such certification shall be provided to the City for review and approval.

d. Non-residential structures that are elevated and are not flood-proofed must meet the same standards for space below the lowest floor as described in this section.

e. Applicants flood-proofing non-residential buildings shall be advised that flood insurance premiums will be based on rates that are one (1) foot below the flood-proofed level (e.g., a building flood-proofed to the base flood level will be rated as one (1) foot below).

3. Manufactured Homes. All manufactured homes to be placed or substantially improved within Zones A1-A30, AH, and AE shall be elevated on a permanent foundation such that the lowest floor of the manufactured home is elevated at least one (1) foot above the base flood elevation.

a. Manufactured homes shall be securely anchored to an adequately anchored foundation system so that:

(1) The lowest floor of the manufactured home is elevated at least one (1) foot above the base flood elevation; or

(2) The manufactured home chassis is supported by reinforced piers or other foundation elements of at least equivalent strength that are no less than thirty-six (36) inches in height above grade and be securely anchored to an adequately designed foundation system to resist flotation, collapse, and lateral movement.

b. New manufactured home parks and subdivisions. The following provisions apply for expansions to existing manufactured home parks and subdivisions. They also apply to ~~or for~~ existing manufactured home parks and subdivision where the repair, reconstruction or improvement of the streets, utilities and pads equals or exceeds fifty (50) percent of the value of the streets, utilities and pads before repair, reconstruction or improvement has

commen~~d~~ ced~~; and for~~ The same provisions apply to manufactured homes not placed in a manufactured home park or subdivision:

(1) Pads or lots are elevated on compacted fill to or above the base flood level (insurance can be waived).

(2) Stands or lots are elevated on compacted fill or on pilings so that the lowest floor of the mobile home will be at or above the base level (insurance required).

(3) Adequate surface drainage and access for hauler are provided; and

(4) In the instance of elevation on piers or pilings where:
(a) lots are large enough to permit steps.
(b) pier and piling foundations are placed in stable soil no more than ten (10) feet apart.
(c) reinforcement is provided for piers and pilings more than six (6) feet above the ground level.

4. Accessory Structures and Uses.

a. New construction and substantial improvement of residential accessory structures in special flood hazard areas are not subject to the requirements of this section, provided that:

(1) The floor area of all floors of the accessory structure totals one thousand (1,000) square feet or less.
(2) The accessory structure shall not be used for human habitation.
(3) The accessory structure shall be designed to have low flood damage potential.
(4) The accessory structure shall be constructed and placed on the building site so as to offer the minimum resistance to the flow of floodwaters.
(5) The accessory structure shall be firmly anchored to prevent flotation that may result in damage to other structures.
(6) All service facilities, such as electrical and heating equipment associated with the accessory structure, shall be elevated or floodproofed.

b. If it is determined that the accessory structure may cause significant flood risk, all requirements of this section shall be satisfied.

c. When accessory structures built under the provisions of this section exceed a value greater than ten (10) percent of the value of the principal residential structure, substantial increases in insurance rates may result.

5. Critical Facilities. Construction of new critical facilities shall be, to the greatest extent possible, located outside the limits of the special flood hazard area. Construction of new critical facilities shall be permissible within the one hundred (100) year floodplain if no feasible alternative site is available. Critical facilities constructed within the one hundred (100) year floodplain shall have the lowest floor elevated three (3) feet or more above the level of the one hundred (100) year base flood elevation at the site. Flood-proofing and sealing measures must be taken to ensure that toxic substances will not be displaced by or released into floodwaters. All access routes to critical facilities shall be elevated to at least one (1) foot above the base flood elevation, to the greatest extent possible.

6. Floodways. The floodway is an extremely hazardous area due to the velocity of floodwaters that carry debris, potential projectiles, and erosion potential. The following provisions apply:

a. Encroachments, including fill, new construction, substantial improvements, and other development, shall be prohibited, except for:

(1) Repairs, reconstruction, or improvements to a structure which do not increase the ground floor area.
(2) Repairs, reconstruction or improvements to a structure, the cost of which does not exceed fifty (50) percent of the fair market value of the structure either before the repair, or reconstruction is started, or if the structure has been damaged, and is being restored, before the damage occurred.
(3) Any project for improvement of a structure to comply with existing state or local health, sanitary, or safety code specifications, which are solely necessary to assure safe living conditions.
(4) Any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places <u>that do not increase the building's dimensions</u>.
~~(5) New construction or substantial improvements which has been certified by a registered professional engineer~~

~~demonstrating that encroachments will not result in any increase in flood levels during the occurrence of the base flood discharge.~~

(5) Repairs, replacement, reconstruction or improvements to existing farmhouses located in designated floodways and on designated agricultural lands that do not increase the building's total square footage of encroachment and are consistent with all requirements of WAC 173-158-075.

(6) Repairs, replacement, reconstruction or improvements to substantially damaged residential dwellings other than farmhouses that do not increase the building's total square footage of encroachment and are consistent with all requirements of WAC 173-158-075.

(7) Prior to the repair or replacement of a substantially damaged residential structure located within a floodway a recommendation shall be obtained from the Washington Department of Ecology in accordance with WAC 173-158-076.

b. All new construction and substantial improvements permitted pursuant to LMC 18A.40.170.B.6(a), Specific Standards, Floodways., shall comply with all applicable flood hazard reduction provisions of LMC 18A.40.170.B, Provisions For Flood Hazard Reduction, Specific Standards.

7. Shallow Flooding Areas (AO Zones). Shallow flooding areas appear on FIRM as AO zones with depth designations. The base flood depths in these zones range from one (1) to three (3) feet above ground where a clearly defined channel does not exist, or where the path of flooding is unpredictable and where velocity flow may be evident. Such flooding is usually characterized as sheet flow. In all areas of special flood hazards designated as areas of shallow flooding, the following provisions shall apply:

a. All new construction and substantial improvements of residential structures and manufactured homes shall have the lowest floor, including the basement, elevated one (1) foot above the highest grade adjacent to the building site or above the depth number specified on the FIRM; at least two (2) feet if no depth number is specified.

b. All new construction and substantial improvements of non-residential structures shall:

(1) Have the lowest floor, including basement, elevated one (1) foot above the highest adjacent grade of the building site or above the depth number specified on the FIRM, at least two (2) feet if no depth number is specified, or;
(2) Together with attendant utility and sanitary facilities, be completely flood proofed to or above that level so that any space below that level is watertight with walls substantially impermeable to the passage of water and with structural components having the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. If this method is used, compliance shall be certified by a registered professional engineer or architect.

c. Require adequate drainage paths around structures on slopes to guide floodwaters around and away from proposed structures.

8. Recreational Vehicle (RV) Parks.

a. All new RV park proposals shall be consistent with the need to minimize flood damage.

b. All public utilities and facilities serving RV parks, such as sewer, electrical, and water systems, shall be located and constructed to minimize flood damage.

c. All RV park proposals shall have adequate drainage provided to reduce exposure to flood damage.

d. Base flood elevation data shall be provided for any RV park that is five (5) acres or greater in size.

e. Recreational vehicles placed on sites shall be on the site for fewer than 180 consecutive days. To be allowed for longer periods recreational vehicles must be fully licensed and ready for highway use, on their wheels or jacking system, attached to the site only by quick disconnect type utilities and security devices, and have no permanently attached additions; or meet the requirements of Section 18A.40.170.B.3.

9. Site Design

A. Structures and other development shall be located to avoid flood damage.

1. If a lot has a buildable site out of the Regulatory Floodplain, all new structures shall be located in that area.

2. If a lot does not have a buildable site out of the Regulatory Floodplain, all new structures, pavement and other development must be sited in the location that has the least impact on habitat by locating the structures as far from the water body as possible or placing the structures on the highest land and lot.

B. All new development shall be designed and located to minimize the impact on flood flows, flood storage, water quality and habitat.

1. Stormwater and drainage features shall incorporate low impact development techniques that mimic pre-development hydrologic conditions. Such methods include stormwater infiltration, rain gardens, grass swales, filter strips, disconnected impervious areas, permeable pavement and vegetative roof systems.

2.If the proposed project will create new impervious surfaces so that more than 10 percent of the portion of the parcel in the Regulatory Floodplain is covered by impervious surface, the applicant shall demonstrate that there will be no net increase in the rate and volume of stormwater surface runoff that leaves the site or that the adverse impact is mitigated.

10. Hazardous Materials

No new development shall create a threat to public health, public safety, or water quality. Chemicals, explosives, gasoline, propane, buoyant materials, animal wastes, fertilizers, flammable liquids, pollutants, or other materials that are hazardous, toxic, or a threat to water quality are prohibited from the Regulatory Floodplain. This prohibition does not apply to small quantities of these materials kept for normal household use.

(Ord. 264 § 1 (part), 2001.)

18A.40.180 – Allowable Activities Within the Regulatory Floodplain

A. Activities that do not meet the definition of “development” are allowed in the Regulatory Floodplain without the need for a floodplain development permit under this ordinance, provided all other Federal, State and local requirements are met. Activities include, but are not limited to, the following.

1. Routine maintenance of landscaping that does not involve grading, excavation or filling.

2. Removal of noxious weeds and hazard trees and replacement of non-native vegetation with native vegetation.

3. Normal maintenance of structures, such as re-roofing and replacing siding, provided that such work does not qualify as a substantial improvement.

4. Normal maintenance of above ground public utilities and facilities, such as replacing downed power lines.

5. Normal street and road maintenance, including filling potholes, repaving, and installing signs and traffic signals, but not expansion of paved areas.

6. Normal maintenance of a levee or other flood control facility prescribed in the operations and maintenance plan for the levee or flood control facility.

Plowing and other normal farm practices (other than structures or filling) on farms in existence as of the effective date of this ordinance.

B. The following activities are allowed in the Regulatory Floodplain without the analysis required in Sec.18A.40.170.B.6(5) or the habitat impact assessment required under LMC 14A.154.050.C, providing all other provisions of this ordinance are met, including obtaining a floodplain development permit:

1. Repairs or remodeling of an existing structure, provided that the repairs or remodeling are not a substantial improvement or a repair of substantial damage.

2. Expansion of an existing structure that is no greater than ten percent beyond its existing footprint, provided that the repairs or remodeling are not a substantial improvement or a repair of substantial damage. This measurement is counted cumulatively from the effective date of this ordinance. If the structure is in the floodway, there shall be no change in the dimensions perpendicular to flow.

3. Activities with the sole purpose of creating, restoring or enhancing natural functions associated with floodplains, streams, lakes, estuaries, marine areas, habitat, and riparian areas that meet Federal and State standards, provided the activities do not include structures, grading, fill or impervious surfaces.

4.Development of open space and recreational facilities, such as parks, trails and hunting grounds, that do not include structures, grading, fill, impervious surfaces

or removal of more than 5% of the native vegetation on that portion of the property in the Regulatory Floodplain.

18A.40.190 - Definitions

In addition to the definitions under this title, Chapter 18A.90, the definitions in Chapter 14A.165 LMC shall apply.

Proposed Amendments to Title 14A

Environmental Protection Regulations

14A.154.000 - Fish and Wildlife Habitat Areas

Chapter 14A.154

FISH AND WILDLIFE HABITAT AREAS

Sections:

14A.154.010 Purpose and Intent.
14A.154.020 Designation of Fish and Wildlife Habitat Areas
14A.154.030 Habitat Protection Standards.
14A.154.040 Title and Plat Notification.
14A.154.050 Habitat Protection for Rivers and Streams.
14A.154.060 Habitat Protection for Lakes.
14A.154.070 Habitat Protection for Ponds.
14A.154.090 Provisions for Buffers, Where Required.

14A.154.010 - Purpose and Intent

Many land use activities can impact the habitats of fish and wildlife. Where areas of critical fish and wildlife habitat are subject to development, land use shall be managed to protect critical habitats. Managing land use to protect critical habitats is intended to allow proposed development to occur in a manner that is sensitive to the habitat needs of critical fish and wildlife species. The purpose of this Chapter is to identify critical fish and wildlife habitat species and habitats and establish habitat protection procedures and mitigation practices that are designed to achieve no "net loss" of species and habitat due to new development or other regulated activities.

As a necessary first step in achieving the necessary protection of critical fish and wildlife species, it is the intent of this Chapter to:

A. Define and identify critical fish and wildlife species and habitats;

B. emphasize and encourage education, information and voluntary action to enhance, protect, rehabilitate, and restore critical fish and wildlife species and habitats;

C. rely primarily upon existing procedures and laws, such as the State Environmental Policy Act, RCW 43.21C, the City's Shoreline Use Regulations and the Shorelines Management Act, RCW 90.58, that directly or indirectly, protect fish and wildlife species and habitats; and

D. establish buffers adjacent to rivers, streams, and other identified critical habitat areas and locations to protect critical fish and wildlife habitats.

It is not intended that this Chapter repeal, abrogate, or impair any existing law or regulations. If the buffering provisions of this Chapter conflict with any existing City law or regulation, the more stringent shall apply.
(Ord. 362 § 3 (part), 2004.)

14A.154.020 - Designation of Critical Fish and Wildlife Habitat Areas

A. General. This Chapter applies to proposed regulated activities within critical fish and wildlife habitat areas. Critical fish and wildlife habitat areas are those areas identified either by known point locations of specific species (such as a nest or den) or by habitat areas or both.

B. Identification of Critical Fish and Wildlife Species and Habitats.

1. Critical Fish and Wildlife Habitat Areas.

a) Federal and State-Listed Species and their Associated Habitats. Areas which have a primary association with federally or state listed endangered, threatened, or sensitive species of fish or wildlife (specified in 50 CFR 17.11, 50 CFR 17.12, WAC 232-12-014 and WAC 232-12-297) and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long term. ~~Endangered, threatened, or sensitive species found in Lakewood are listed in Appendix B.~~

b) Habitats and Species of Local Importance, including the following:

(1) Areas with which state listed monitor or candidate species or federally listed candidate species have a primary association, and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long term. ~~Special status and monitored species potentially found in Lakewood are listed in Appendix B.~~

(2) Documented habitat areas or outstanding potential habitat areas for fish and wildlife species. These areas include specific habitat types which are infrequent in occurrence in Pierce County and Lakewood, and may provide specific habitats with which endangered, threatened, sensitive, candidate, or monitor species have a primary association, such as breeding habitat, winter range, and movement corridors. These areas include the following:

(a) Priority Oregon White Oak Woodlands
(b) Prairies
(c) Old growth forests
(d) Caves
(e) Cliffs
(f) Snag-rich areas

(g) Rivers and streams with critical fisheries ~~as specifically set forth in 14A.154.050 B.;~~

(h) Naturally occurring ponds under twenty acres and their submerged aquatic beds that provide fish or wildlife habitat;

(i) Waters of the state, including all water bodies classified by the Washington Department of Natural Resources (DNR) water typing classification system as detailed in WAC 222-16-030, together with associated riparian areas;

(j) Lakes, ponds, streams, and rivers planted with game fish by a governmental entity or tribal entity;

(k) State natural area preserves and natural resource conservation areas.

2. Mapping.

The resources listed below provide information on fish and wildlife habitat areas:

a. Puget Sound Environmental Atlas, Puget Sound Water Quality Authority.

b. The following Washington Department of Natural Resources documents and data sources:
   1. Stream Typing Maps.
   2. Natural Heritage Data Base.

c. The following Washington Department of Wildlife documents and data sources:
   1. Priority Habitats and Species Program.
   2. Non-game Data Base.
   3. Washington Rivers Information System.

d. The following Washington Department of Fisheries documents:
   1. Water Resource Index Areas (WRIA).

(Ord. 362 § 3 (part), 2004.)

<u>14A.154.030 - Habitat Protection Standards</u>

A. Education and Information.

A voluntary education program to explain the need for and methods of habitat management will help provide for long-term protection and enhancement of critical fish and wildlife habitat areas. By informing citizens of the declining populations of several fish and wildlife species in Pierce County, the diminishing animal habitat available, and the management techniques that individuals can use to preserve and restore fish and wildlife habitat areas, the City can foster good stewardship of the land by property owners.

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1. The Department will provide educational materials and lists of additional sources of information to applicants proposing regulated activities in the vicinity of critical fish and wildlife habitat areas. Materials will be selected from a variety of state and local resources.

2. The Department will accumulate information on the number of proposed activities associated with fish and wildlife habitat areas as identified by this Chapter and indicated by County maps to be in the vicinity of identified critical fish and wildlife habitats pursuant to 14A.154.020. Information shall include the number of single family residences and other development occurring in the vicinity of critical fish and wildlife areas. Based on this information, additional regulations may be developed.

B. Use of Existing Procedures and Laws~~?~~,Biological Assessments.

The primary procedures used to implement this Chapter shall include this Chapter itself, the City~~?~~' s Land Use and Development Code ~~(particularly Section 18A.40.200 relating to riparian areas)~~, the State Environmental Policy Act (RCW 43.21C), the City's Environmental Regulations, the State Shorelines Management Act (RCW 90.58), and the City's Shoreline Management Regulations.

Regulated activities subject to environmental review shall be reviewed with consideration for impacts on critical fish and wildlife habitat as identified in this Title. The Community Development Director may require a biological assessment prepared by a qualified wildlife biologist whenever the Director finds that a project site may contain, affect, or be affected by, species or habitats designated in this Chapter. Biological assessments shall be prepared in accordance with ~~Appendix A~~ LMC 14A.154.050.B, and are subject to the review and approval of the Director.

Projects undergoing review for fish and wildlife considerations shall be routed to the Washington Department of Fish and Wildlife, the Washington Department of Ecology, the US Fish and Wildlife Service, the US Army Corps of Engineers and any other appropriate state and federal agencies. These agencies will have an opportunity to provide specific habitat information on proposed development sites, advise the City of their jurisdiction and applicable permit requirements, and suggest appropriate project modifications and or other mitigation.

The City shall give substantial weight to the management recommendations contained in the Washington Department of Fish and Wildlife Priority Habitats and Species Program, particularly the management recommendations for Oregon White Oak Woodlands.

(Ord. 362 § 3 (part), 2004.)

14A.154.040 - Title and Plat Notification

For regulated activities where a Habitat Assessment or Habitat Management Plan has been prepared as part of the proposal's environmental review, the owner of the site shall record a notice of the reports with the Pierce County Auditor so that information is known if the property ownership changes.

A. Title Notification.

The owner of any site where a habitat assessment or habitat management plan has been prepared for a development proposal shall record a notice with the Pierce County Auditor in the form set forth below:

Form of Notice:

FISH AND WILDLIFE HABITAT AREA NOTICE

*Parcel Number:*_____

*Address:*_____

Legal Description: _____

*Present Owner:*_____

Notice: This site lies within/ contains a critical fish and wildlife habitat area as defined by Chapter 14A.154 of the Lakewood Municipal Code. The site was the subject of a development proposal for _____ *application number* _____ *filed on*_____ *(date). Restrictions on use or alteration of the site may exist due to natural conditions of the site and resulting regulation. Review of such application has provided information on the location of the fish and wildlife habitat area and any restriction on use.*

_____

Signature of Owner(s)

_____

Date

(NOTARY ACKNOWLEDGMENT)

B. Plat Notification.

For all proposed short subdivision and subdivision proposals within critical fish and wildlife habitat areas, the applicant shall include a note on the face of the plat. ~~The note shall be as set forth below:~~

(Ord. 362 § 3 (part), 2004.)

14A.154.050 - Habitat Protection for Rivers and Streams

Regulated activities proposed along rivers and streams shall provide for habitat protection.

A. Habitat Protection for Rivers and Streams Shall be Provided Through Buffers.

1. The buffer, consisting of undisturbed natural vegetation, shall be required along all streams, as classified by the DNR water typing classification system (WAC 222-16-030). The buffer shall extend landward from the ordinary high water mark of the water body.

   a. Outside of the buffer removal of native vegetation shall not exceed 35 percent of the surface area of the portion of the site in the Regulatory Floodplain. Native vegetation within the buffer portion of the property can be counted toward this requirement.

2. The buffer of a river or stream shall not extend landward beyond an existing substantial improvement such as an improved road, dike, levee, or a permanent structure which reduces the impact proposed activities would have on the river or stream.

3. Buffer widths shall be as established by the City of Lakewood Shoreline Master Program (SMP) as contained in Chapter 4, Section C of the SMP.

4. If a proposed project does not meet the criteria established in LMC 18A.40.180.A. and B. a habitat impact assessment shall be conducted in accordance with Section 14A.154.050.C, and if necessary, a habitat mitigation plan shall be prepared and implemented in accordance with the provisions of this chapter.

~~B. Critical Fishery Rivers and Streams Requiring Buffers. The following river and stream (segments) have been identified by the various Indian tribes, particularly the Puyallup Tribe, as being critical to anadramous fish and, therefore, requiring a larger buffer protection. Critical fishery rivers and streams include:~~

~~Stream Name~~	~~WRIA#~~	~~Buffer Width In Feet~~	~~Tribe Identifying~~
~~Chambers Creek~~	~~12.0007~~	~~150~~	~~Puyallup~~
~~Clover Creek~~	~~12.0007~~	~~50~~	

~~C~~ B. ~~Other Rivers and Streams Requiring Buffers. For rivers and streams other than Chambers and Clover Creek, a habitat protection buffer shall be provided as outlined in LMC Section 18A.40.230 (Riparian Overlay Zone), or 35 feet, whichever is greater.~~ Habitat Impact Assessment.

Unless allowed under Sec. 18A.40.180, a permit application to develop in the Regulatory Floodplain shall include an assessment of the impact of the project on water quality and aquatic and riparian habitat. The assessment shall be:

1. A biological evaluation or biological assessment that has received concurrence from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service, pursuant to Section 7 of the Endangered Species Act; or

2. Documentation that the activity fits within a habitat conservation plan approved pursuant to Section 10 of the Endangered Species Act; or

3. Documentation that the activity fits within Section 4(d) of the Endangered Species Act; or

4. An assessment prepared in accordance with the current Regional Guidance for Floodplain Habitat Assessment and Mitigation, FEMA (Federal Emergency Management Agency) Region X. The assessment shall determine if the project would adversely affect:

a. The primary constituent elements identified when a species is listed as threatened or endangered,
b. Essential fish habitat designated by the National Marine Fisheries Service,
c. Fish and wildlife habitat conservation areas,
d. Vegetation communities and habitat structures,
e. Water quality,
f. Water quantity, including flood and low flow depths, volumes and velocities,
g. The channel's natural planform pattern and migration processes,
h. Spawning substrate, if applicable, and/or,
i. Floodplain refugia, if applicable.

C. Habitat Mitigation Plan

1. If the assessment conducted under Sec. 14A.154.050.C concludes the proposed project is expected to have an adverse effect on water quality and/or aquatic or riparian habitat or habitat functions, the applicant shall provide a plan to mitigate those impacts, in accordance with the current Regional Guidance for Floodplain Habitat Assessment and Mitigation, FEMA (Federal Emergency Management Agency) Region X.

a. If the proposed project is located outside of the protected area, the mitigation plan shall include such avoidance, minimization, restoration, or compensation measures as are appropriate for the situation.

b. If the proposed project is located within the protected area, the mitigation plan shall include such appropriate measures as are needed to ensure that there is no adverse effect due to the project. Minimization measures are not allowed in the protected area, unless they, in combination with other measures result in no adverse effect.

2. The plan's habitat mitigation activities shall be incorporated into the proposed project. The floodplain development permit shall be based on the redesigned project and its mitigation components.

3. A certificate of occupancy or final inspection approval for a project shall not be issued until all work identified in the biological evaluation, biological assessment, or mitigation plan has been completed or the applicant has provided the necessary assurances that unfinished portions of the project will be completed.

D. Compensatory Storage

New development shall not reduce the effective flood storage volume of the Regulatory Floodplain. A development proposal shall provide compensatory storage if grading or other activity displaces any effective flood storage volume. Compensatory storage shall:

1. Provide equivalent volume at equivalent elevations to that being displaced. For this purpose, "equivalent elevation" means having similar relationship to ordinary high water and to the best available 10-year, 50-year and 100-year water surface profiles;

2. Be hydraulically connected to the source of the flooding; and

3. Provide compensatory storage in the same construction season as when the displacement of flood storage volume occurs and before flood season begins.

4. The newly created storage area shall be graded and vegetated to allow fish access during flood events without creating fish stranding sites.

(Ord. 362 § 3 (part), 2004.)

14A.154.060 - Habitat Protection for Lakes

A. Regulated activities proposed on lakes that are urban in character will not be subject to the buffering requirements of this Chapter. The following lakes are urban in character:

American
Gravelly
Louise
Steilacoom

For proposed regulated activities on lakes that are subject to the State Shoreline Management Act, habitat protection shall be provided through education, voluntary agreements, and existing laws as referenced in 14A.154.030.B, and regulation via the City~~?~~ 's Shoreline Master Program and Shoreline Management Regulations.

B. Regulated activities proposed on lakes that are not subject to the State Shoreline Management Act shall be subject to a 35 foot buffer requirement. The buffer, consisting of undisturbed natural vegetation, shall extend landward from the ordinary high water mark of the water body. Existing laws as referenced in Section 14A.154.030.B may also affect such proposals.

(Ord. 362 § 3 (part), 2004.)

14A.154.070 - Habitat Protection for Ponds

Regulated activities proposed on ponds will not be subject to the buffering requirements of this Section. Habitat protection for ponds shall be provided through education, voluntary agreements and existing laws as referenced in 14A.154.030.B. Ponds shall be regulated as wetlands where appropriate. (Ord. 362 § 3 (part), 2004.)

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14A.154.090 - Provisions for Fish and Wildlife, Habitat Buffers, Where Required

A. Building Setback and Construction near Buffer. A minimum setback of eight (8) feet from the buffer shall be required for construction of any impervious surface(s) greater than 120 square feet of base coverage. Clearing, grading, and filling within eight feet of the buffer shall only be allowed when the applicant can demonstrate that vegetation within the buffer will not be damaged.

B. Marking of the Buffer Area. The edge of the buffer area shall be clearly staked, flagged, and fenced prior to and through completion of construction. The buffer boundary markers shall be clearly visible, durable, and permanently affixed to the ground.

C. Fencing from Farm Animals. The Director shall determine if fencing is necessary to protect the functions and values of the critical area. If found to be necessary, the Director shall condition any permit or authorization issued pursuant to this Chapter to require the applicant to install a permanent fence around the habitat conservation area or buffer, when fencing will prevent future impacts to the habitat conservation area. The applicant shall be required to install a permanent fence around the habitat conservation area or buffer when domestic grazing animals are present or may be introduced on site. Fencing installed as part of a proposed activity or as required in this subsection shall be designed so as not to interfere with species migration, including fish runs, and shall be constructed in a manner that minimizes habitat impacts.

D. Enhancements to natural buffers consistent with the education program (such as re-vegetation or nest boxes) are allowed.

E. Allowable Activities Within Buffers. The following activities may occur within the buffer after notification to the Department, provided that any other required permits are obtained.

1. Removal of diseased trees and trees that present an imminent threat to properties. The Director may require a written report by a registered landscape architect, certified nursery professional, or certified arborist assessing the condition of any tree that is purported to be diseased or hazardous.

2. Repair of existing fences.

3. Construction, reconstruction, remodeling, or maintenance of docks and bulkheads as authorized and pursuant to the Shoreline Management Regulations.

4. Construction of a pervious path for purposes of private access to the shoreline.

5. Trimming of vegetation for purposes of providing view corridors, provided that trimming shall be limited to view corridors of 20 feet or less and provided that benefits of the buffer to fish and wildlife habitat are not reduced. Trimming shall be limited to pruning of branches and vegetation. Trimming shall not include felling or removal of trees.

6. Construction of public trails.

7. Roadways, bridges, rights-of-way, and utility lines where no feasible alternative exists, and where the development minimizes impacts on the stream and buffer area. Clear documentation explaining the lack of alternatives and measures taken to minimize impacts on the critical area and buffer shall be provided to the Community Development Department prior to approval.

(Ord. 362 § 3 (part), 2004.)

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14A.158.000 - Flood Hazard Areas

Chapter 14A.158

FLOOD HAZARD AREAS

Sections:
14A.158.010 Purpose.
14A.158.020 Designation
14A.158.030 Protection

14A.158.010 - Purpose

The purpose of this section is to:

A. Promote the general health, welfare and safety of the city's residents.

B. Prevent the establishment of certain structures and land uses unsuitable for human habitation because of the danger of flooding, unsanitary conditions or other hazards.

C. Minimize the need for rescue and relief efforts associated with flooding.

D. Help maintain a stable tax base by providing for sound use and development in flood-prone areas and to minimize prolonged business interruptions

E. Minimize damage to public facilities and utilities located in flood hazard areas.

F. Ensure that potential home and business buyers are notified that property is in a flood area.

G. Minimize expenditure of public money for costly flood relief and control projects.

H. Ensure that those who occupy the areas of special flood hazard assume responsibility for their actions.
(Ord. 362 § 3 (part), 2004.)

14A.158.020 - Designation

All Areas of Special Flood Hazard shall be as identified in the scientific and engineering report entitled "The Flood Insurance Study for Pierce County," dated August 19, 1987, or as amended, with accompanying Flood Insurance Rate Maps prepared by the Federal Emergency Management Agency (FEMA). A copy of which shall be maintained with the City Clerk

(Ord. 362 § 3 (part), 2004.)

14A.158.030 - Protection

All development in Areas of Special Flood Hazard shall be regulated according to the City's Site Development Regulations, and Section 18A.40.100, Flood Hazard Overlay, of the City's Land Use and Development Code. (Ord. 362 § 3 (part), 2004.)

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14A.162.000 - Wetlands Areas

CHAPTER 14A.162

WETLANDS AREAS

14A.162.020 - Designation of Wetland Areas

~~The City will require the use of the following documents to determine the presence or absence of potential wetlands:~~

~~a. Federal Manual for Identifying and Delineating Jurisdictional Wetlands, Corps of Engineers Wetlands Delineation Manual, 1987 Edition and corresponding guidance letters; and~~
~~b. Washington State Wetlands Identification and Delineation Manual, March 1997 Edition (DOE Publication 96-94).~~

(Ord. 362 § 3 (part), 2004.)

Identification of wetlands and delineation of their boundaries pursuant to this Chapter shall be done in accordance with the approved federal wetland delineation manual and applicable regional supplements. All areas within the City meeting the wetland designation criteria in that procedure are hereby designated critical areas and are subject to the provisions of this Chapter.

14A.162.030 - Wetland Categories

In order to provide information on the functions and values of wetlands in a time- and cost-effective way, wetland analysis reports shall categorize wetlands by their attributes and characteristics. Wetlands shall be rated using the latest adopted version of the *Washington State Wetland Rating System for Western Washington* published by the Washington State Department of Ecology. ("State Wetland Rating System").

The State Wetland Rating System provides the detailed criteria for establishing wetland categories. Wetlands are generally designated as follows:

Category I wetlands are those that 1) represent a unique or rare wetland type; or 2) are more sensitive to disturbance than most wetlands; 3) are relatively undisturbed and contain ecological attributes that are impossible to replace within a human lifetime; or 4) provide a high level of functions. Generally, these wetlands are not common and make up a small percentage of the wetlands in the region. The following are considered Category I wetlands:

- Bogs
- Mature and Old-growth Forested Wetlands
- Wetlands That Perform Many Functions Very Well- Wetlands scoring ~~70~~ 23-27 points ~~or more (out of 100)~~ using the *Washington State Wetland Rating System for Western Washington*, Ecology Publication # ~~04-06-025~~ #14-06-029.

Category II wetlands are difficult, though not impossible, to replace, and provide high levels of some functions. These wetlands occur more commonly than Category I wetlands, but still need

a relatively high level of protection. Category II wetlands in western Washington include ~~?~~Wetlands That Perform Functions Well~~?~~ Wetlands scoring between ~~51-69~~ 20-22 points ~~(out of 100)~~ using the *Washington State Wetland Rating System for Western Washington*. Wetlands scoring ~~51-69~~ 20-22 points were judged to perform most functions relatively well, or performed one group of functions very well and the other two moderately well.

Category III wetlands are wetlands with a moderate level of functions (scores between ~~30 -50~~ 16-19 points) using the *Washington State Wetland Rating System for Western Washington.* Category III wetlands usually have been disturbed in some ways, and are often less diverse or more isolated from other natural resources in the landscape than Category II wetlands.

Category IV wetlands have the lowest levels of functions (scores ~~less than 30~~ between 9-15 points) and are often heavily disturbed. These are wetlands that we should be able to replace, and in some cases be able to improve. These wetlands may provide some important functions. (Ord. 362 § 3 (part), 2004.)

14A.162.080 - Protection Standards - Establishing Buffers

A. ~~Buffer widths shall be determined according to the following table:~~

~~Wetland Category~~	~~Buffer Width~~
~~I~~	~~200 feet~~
~~II~~	~~100 feet~~
~~III~~	~~75 feet~~
~~IV~~	~~50 feet~~

Buffer Requirements**.** The buffer widths in Table 14.1 have been established in accordance with the best available science. They are based on the category of wetland and the habitat score as determined by a qualified wetland professional using the Washington state wetland rating system for western Washington.

1. The use of the buffer widths in Table 14.1 requires the implementation of the measures in Table 14.2, where applicable, to minimize the impacts of the adjacent land uses.

2. If an applicant chooses not to apply the mitigation measures in Table 14.2, then a 33% increase in the width of all buffers is required. For example, a 75-foot buffer with the mitigation measures would be a 100-foot buffer without them.

3. The buffer widths in Table 14.1 assume that the buffer is vegetated with a native plant community appropriate for the ecoregion. If the existing buffer is unvegetated, sparsely vegetated, or vegetated with invasive species that do not perform needed functions, the buffer should either be planted to create the appropriate plant community, or the buffer should be widened to ensure that adequate functions of the buffer are provided.

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4. The buffer at its narrowest point is never less than either ¾ of the required width or 75 feet for Category I and II, 50 feet for Category III and 25 feet for Category IV, whichever is greater.

Table 14.1 Wetland Buffer Requirements

	Buffer width (in feet) based on habitat score			
Wetland Category	**3-4**	**5**	**6-7**	**8-9**
Category I: Based on total score	75	105	165	225
Category I: Bogs and Wetlands of High Conservation Value	190			225
Category I: Coastal Lagoons	150		165	225
Category I: Interdunal				225 ft
Category I: Forested	75	105	165	225
Category I: Estuarine	150 (buffer width not based on habitat scores)			
Category II: Based on score	75	105	165	225
Category II: Interdunal Wetlands	110		165	225
Category II: Estuarine	110 (buffer width not based on habitat scores)			
Category III (all)	60	105	165	225
Category IV (all)	40			

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Table 14.2 Required measures to minimize impacts to wetlands

(Measures are required if applicable to a specific proposal)

Disturbance	Required Measures to Minimize Impacts
Lights	• Direct lights away from wetland
Noise	• Locate activity that generates noise away from wetland • If warranted, enhance existing buffer with native vegetation plantings adjacent to noise source • For activities that generate relatively continuous, potentially disruptive noise, such as certain heavy industry or mining, establish an additional 10' heavily vegetated buffer strip immediately adjacent to the outer wetland buffer
Toxic runoff	• Route all new, untreated runoff away from wetland while ensuring wetland is not dewatered • Establish covenants limiting use of pesticides within 150 ft of wetland • Apply integrated pest management
Stormwater runoff	• Retrofit stormwater detention and treatment for roads and existing adjacent development • Prevent channelized flow from lawns that directly enters the buffer • Use Low Intensity Development techniques (for more information refer to the drainage ordinance and manual)
Change in water regime	• Infiltrate or treat, detain, and disperse into buffer new runoff from impervious surfaces and new lawns
Pets and human disturbance	• Use privacy fencing OR plant dense vegetation to delineate buffer edge and to discourage disturbance using vegetation appropriate for the ecoregion • Place wetland and its buffer in a separate tract or protect with a conservation easement
Dust	• Use best management practices to control dust
Disruption of corridors or connections	• Maintain connections to offsite areas that are undisturbed • Restore corridors or connections to offsite habitats by replanting

B. Buffer widths may be modified by averaging, reducing, or increasing.

1. Buffer width averaging may be allowed only where the applicant demonstrates the following:

   a. Buffer encroachment is unavoidable.

b. A habitat assessment has been submitted which demonstrates that the site does not provide habitat for any endangered, threatened, or sensitive fish or animal species; or,

c. For wetlands and/or required buffers associated with documented habitat for endangered, threatened, or sensitive fish, or wildlife species, a habitat assessment report has been submitted that demonstrates that the buffer modification will not result in an adverse impact to the species of study.

d. The wetland contains variations in sensitivity due to existing physical characteristics; and

e. Width averaging will not adversely impact the wetland or critical fish and wildlife habitat; and

f. The total buffer area after averaging is no less than the buffer area prior to averaging; and

g. The minimum buffer width will not be less than ~~twenty-five~~ seventy-five percent of the widths established in 14A.162.080.A above.

h. The averaging is accomplished within the project boundaries.

i. Buffer width averaging shall only be permitted where it is shown that there is no feasible alternatives to the site design that could be accomplished without buffer averaging.

2. Buffer width reduction may be allowed only where the applicant demonstrates the following circumstances. Such reduction shall not result in greater than a ~~thirty-five~~ twenty-five percent (~~3~~ 25%) reduction in the buffer width established in 14A.162.080.A. and shall result in a buffer no less than 30 feet in any case.

a. The proposed buffer area is extensively vegetated and has less than fifteen percent slopes, and the reduction will not result in adverse impacts to the wetland; or

b. The project includes a buffer enhancement plan, as part of the mitigation required by Section 14A.162.100. The buffer enhancement plan shall use plant species which are indigenous to the project area, and shall substantiate that an enhanced buffer will improve the functional attributes of the buffer to provide additional protection for wetland functional values; or

c. The acreage included in the buffer would substantially exceed the size of the wetland and the reduction will not result in adverse impacts to the wetland or the project includes a buffer enhancement plan which ensures that the reduction will not result in adverse impacts to the wetland.

3. The Department may require increased buffer width when a larger buffer is necessary to protect wetland functions and values based on local conditions. This

determination shall be reasonably related to protection of the functions and values of the regulated wetland. Such determination shall demonstrate that:

a. A larger buffer is necessary to maintain viable populations of existing species; or

b. The wetland is used by species listed by the federal government or the state as endangered, threatened, sensitive or as documented priority species or habitats, or essential or outstanding potential sites such as heron rookeries or raptor nesting areas; or

c. The adjacent land is susceptible to severe erosion and erosion control measures will not effectively prevent adverse wetland impacts; or

d. The adjacent land has minimal vegetative cover or slopes greater than fifteen percent.

C. Buffers shall be measured perpendicular from the wetland edge.

D. When buffer boundaries have been determined, they shall be marked in the field by a licensed surveyor. The markers shall be clearly visible, durable, and permanently affixed to the ground.

E. A building setback line of eight (8) feet shall be required from the edge of a buffer.

F. Except as otherwise specified, buffers shall be retained in a natural condition.

G. A wetland buffer shall not be required to extend beyond an existing substantial improvement such as an improved road, dike, levee, or a permanent structure, where the existing improvement obviates the beneficial impact that the buffer would provide for the wetland.

(Ord. 362 § 3 (part), 2004.)

14A.162.090 - Protection Standards for Allowing Regulated Activities in Wetlands and Buffers

A. Regulated activities in Category III and IV wetlands and/or buffers for Category III and IV wetlands may be allowed when the applicant demonstrates to the Department that all adverse impacts to wetlands will be mitigated according to Section 14A.162.100;

B. The placement of access roads, utility lines, and utility poles may be allowed in buffers for Category II wetlands if the following conditions are met:

1. There is no feasible alternative location for an access road and/or utilities to the site; and

2. The applicant demonstrates that all adverse impacts to wetlands will be mitigated according to a mitigation plan which complies with ~~Appendix C~~ 14A.162.100.

C. The following activities may be allowed in a buffer without a complete mitigation plan if the applicant demonstrates to the Department that all adverse impacts to wetlands will be mitigated according to Section 14A.162.100. In cases that require environmental review, a threshold environmental determination may not be made until the Department is satisfied that adequate mitigation will occur. The allowed activities are as follows:

1. One well and necessary appurtenances, including a pump and appropriately sized pump house, but not including a water storage tank (unless the water storage tank can be contained within the pump house), may be allowed on each site in a buffer if all the following conditions are met:

   a. The pump house is a one story building with a ground area of less than 220 square feet; and

   b. The well is more than 75 feet deep; and

   c. For Category I and II wetlands, the minimum distance from the well and appurtenances to the wetland edge is no less than fifty percent of the buffer widths established in the table in Section 14.162.070 A.; and

   d. Access to the well and pump house shall be by a pervious trail for pedestrian traffic only, or, if necessary, by an unimproved access for a maintenance vehicle.

2. Pervious walkways and trails and associated viewing platforms, provided that those pathways are limited to minor crossings having no adverse impact on water quality. They should be generally parallel to the perimeter of the wetland, located only in the outer twenty-five percent (25%) of the wetland buffer area and located to avoid removal of significant trees. They should be limited to pervious surfaces no more than five (5) feet in width for pedestrian use only. Raised boardwalks utilizing non-treated pilings may be acceptable. In the case of Category I wetlands the minimum distance from the wetland edge is no less than fifty percent of the buffer width established in the table in Section 14.162.070 A.

3. The placement of utility lines which do not require excavation, or utility poles, in any part of a buffer for a Category II, III, or IV wetland. They may be placed in a buffer for a Category I wetland, provided that the minimum distance from the wetland edge is no less than fifty percent of the Category I buffer width established in the table in Section 14.162.070 A.

4. Activities within that area of a buffer in which a direct line to the wetland is obstructed by an existing substantial improvement such as an improved road or a permanent structure, the presence of which significantly reduces the likely impact of the proposed activity on the wetland.

A zoning certification, building permit, and/or site development permit shall not be issued for these regulated activities until the applicant demonstrates to the satisfaction of the Department that all adverse impacts to wetlands will be mitigated according to Section 14A.162.100.

D. Reasonable Use Exception- Category I and II Wetlands: Regulated activities in Category I and II wetlands and/or buffers for Category I and II wetlands may be allowed only if, following a public hearing, the Hearing Examiner determines that a reasonable use exception is warranted pursuant to LMC Section 14A.142.080, and the following criteria are met:

1. No reasonable use with less impact on the wetland is possible; and

2. There is no feasible on-site alternative to the proposed activities, including phasing of project implementation, change in timing of activities, revision of road and lot layout, and/or related site planning and density considerations, that would allow a reasonable economic use with less adverse impacts to wetlands; and

3. The proposed activities will result in minimum feasible alteration or impairment to the wetland's functional characteristics and existing contours, vegetation, fish and wildlife resources, and hydrological conditions; and

4. The disturbance of wetlands has been minimized by locating any necessary activities outside the wetland to the extent possible; and

5. The proposed activities will not jeopardize the continued existence of species listed by the federal government or the state as endangered, threatened, sensitive, or documented priority species or priority habitats; and

6. The proposed activities will not cause significant degradation of groundwater or surface water quality; and

7. The proposed activities comply with all state, local and federal laws, including, but not limited to, those related to sediment control, pollution control, floodplain restrictions, and on-site wastewater disposal; and

8. Any and all regulated activities in wetlands and buffers will be mitigated according to Section 14A.162.100. The Examiner may require the preparation of a formal mitigation plan; and

9. There will be no damage to nearby public or private property and no threat to the health or safety of people on or off the property; and

10. The inability to derive reasonable economic use of the property is not the result of actions by the applicant in segregating or dividing the property and creating the undevelopable condition after the effective date of this Chapter.

E. Reasonable Use Provision, Categories III and IV Wetlands: If an applicant for a regulated activity on a Category III or IV wetland and/or associated buffer cannot obtain permission through the procedures described in 14A.162.090 A. and 14A.162.090 C., the activity may be allowed if, following a public hearing, the Hearing Examiner determines the criteria of 14.162.090 D. are met.

(Ord. 362 § 3 (part), 2004.)

14A.162.100- Mitigation

A. All activities in wetlands and/or buffers shall be mitigated according to this Section. ~~Usually,~~ M~~m~~itigation sequencing is used to determine the type and extent of mitigation and is considered in order of preference, however there may be circumstances when an alternative mitigation strategy is preferable such as a mitigation bank, in-lieu fee program, or advance mitigation project that is implemented according to federal and state rules, state policy and state water quality regulations.

The order of preference for mitigation is:

1. Avoiding the impact altogether by not taking a certain action or parts of actions, and providing specified buffers and setbacks. Provision of specified buffers and setbacks is the expected method of mitigation unless an activity is listed as exempt, a reasonable use exception has been granted according to the provisions of this Chapter, or an appropriate alternative mitigation program has been approved through a formal mitigation plan.

2. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to reduce impacts;

3. The following types of mitigation (no order of preference):

   a. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

   b. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;

   c. Compensating for the impact by replacing or providing substitute resources or environments~~., however compensatory mitigation shall not be required for reasonable use exceptions~~;

4. Monitoring the impact and compensation and taking appropriate corrective measures.

5. Mitigation for individual actions may include a combination of the above measures.

~~B. Regulated activities which occur in buffers or within Category III and IV wetlands shall be mitigated according to a mitigation plan approved by the Department. See Appendix D for specific requirements of this mitigation plan. Where environmental review is required, a threshold determination may not be made prior to Department review and approval of the mitigation plan.~~

~~C. Compensatory mitigation shall be required for filling wetlands and for other regulated activities in wetlands (except where the filling or other regulated activity has been found to be necessary to provide for reasonable use of a property through the reasonable use~~

~~exception process). Compensatory mitigation programs shall meet the following minimum requirements:~~

~~1. A wetland specialist shall develop a compensatory mitigation plan that provides for construction, maintenance, and monitoring of any replacement wetlands;~~

~~2. The applicant and/or applicant's representatives shall demonstrate to the Department sufficient scientific expertise to carry out the compensation project;~~

~~3. The compensation area shall be provided with permanent protection and management to avoid further degradation and to provide for the long term persistence of the compensation area as designed.~~

~~4. The compensatory mitigation plan shall be completed in two phases, a conceptual phase and a detailed phase.~~

~~a. Conceptual Phase. The applicant shall submit to the Department a conceptual mitigation plan for compensatory mitigation. Where environmental review is required, the Department shall not make a threshold determination prior to Department review of the conceptual mitigation plan. See Appendix E for specific requirements of the conceptual mitigation plan.~~

~~b. Detailed Phase. Following the Department's approval of the conceptual mitigation plan, the applicant shall submit a detailed mitigation plan for compensatory mitigation to the Department. See Appendix F for specific requirements of the detailed mitigation plan.~~

B. Compensatory mitigation for alterations to wetlands shall be used only for impacts that cannot be avoided or minimized and shall achieve equivalent or greater biologic functions. Compensatory mitigation plans shall be consistent with *Wetland Mitigation in Washington State–Part 2: Developing Mitigation Plans—Version 1,* (Ecology Publication #06-06-011b, Olympia, WA, March 2006, or as revised), and *Selecting Wetland Mitigation Sites Using a Watershed Approach (Western Washington)* (Publication #09-06-32, Olympia, WA, December 2009).

1. Mitigation ratios shall be consistent with Paragraph 3 below.

2. Mitigation requirements may also be determined using the credit/debit tool described in *Calculating Credits and Debits for Compensatory Mitigation in Wetlands of Western Washington: Final Report* (Ecology Publication #10-06-011, Olympia, WA, March 2012, or as revised) consistent with subsection H of this Chapter.

3. Wetland Mitigation Ratios[1]:

Category and Type of Wetland	Creation or Re-establishment	Rehabilitation	Enhancement
Category I: Bog, Natural Heritage site	Not considered possible	Case by case	Case by case
Category I: Mature Forested	6:1	12:1	24:1
Category I: Based on functions	4:1	8:1	16:1
Category II	3:1	6:1	12:1
Category III	2:1	4:1	8:1
Category IV	1.5:1	3:1	6:1

[1] Ratios for rehabilitation and enhancement may be reduced when combined with 1:1 replacement through creation or re-establishment. See Table 1a, *Wetland Mitigation in Washington State – Part 1: Agency Policies and Guidance –Version 1,* (Ecology Publication #06-06-011a, Olympia, WA, March 2006 or as revised).

~~5~~ 4. The detailed mitigation plan shall be signed by the wetland specialist to indicate that the plan is according to specifications determined by the wetland specialist. A signed original mitigation plan shall be submitted to the Department.

~~6~~ 5. Approval of the detailed mitigation plan shall be signified by a notarized memorandum of agreement signed by the applicant and Department Director or designate, and recorded with the County Auditor. The agreement shall refer to all requirements for the mitigation project.

~~7~~ 6. The mitigation project shall be completed according to a schedule agreed upon between the Department and the applicant.

~~8~~ 7. Wetland mitigation shall occur according to the approved wetland mitigation plan, and shall be consistent with provisions of this Chapter.

~~9~~ 8. On completion of construction for the wetland mitigation project, the wetland specialist shall notify the Department. The Department will inspect and review the construction project prior to acceptance.

(Ord. 362 § 3 (part), 2004.)

DRAFT

14A.165.000 - Definitions - Critical Areas

Chapter 14A.165

DEFINITIONS

Section:
14A.165.010 Definitions

14A.165.010 - Definitions

For the purpose of this Title, in addition to the definitions in Chapter 18A.90 LMC, the following definitions shall apply:

"Abutting" means bordering upon, to touch upon, in physical contact with. Sites are considered abutting even though the area of contact may be only a point.

"Activity" means any use conducted on a site.

"Agricultural activities" means the production of crops and/or raising or keeping livestock, including operation and maintenance of farm and stock ponds, drainage ditches, irrigation systems, and normal operation, maintenance and repair of existing serviceable agricultural structures, facilities or improved areas, and the practice of aquaculture. Forest practices regulated under Chapter 76.09 RCW, Title 222 WAC are not included in this definition.

"Alluvial geologic unit" means geologically recent stream, lake, swamp and beach deposits of gravel, sand, silt and peat.

"Animal Containment Area" means a site where two or more animal units of large animals per acre or .75 of an animal unit of small animals per acre are kept, and where a high volume of waste material is deposited in quantities capable of impacting groundwater resources.

"Animal Unit" means the equivalent of 1000 pounds of animal.

"Applicant" means a person, party, firm, corporation, or other legal entity that proposes a development on a site.

"Aquifer" means a saturated geologic formation which will yield a sufficient quantity of water to serve as a private or public water supply.

"Aquifer recharge area" means areas where the prevailing geologic conditions allow infiltration rates which create a high potential for contamination of groundwater resources or contribute significantly to the replenishment of groundwater with potential to be used for potable water. For the purposes of this Title, all of the area located within the Clover/Chambers Creek Basin boundary or the two highest DRASTIC zone boundaries is included in the aquifer recharge area.

"Aquifer Susceptibility" means the ease with which contaminants can move from

the land surface to the aquifer based solely on the types of surface and subsurface materials in the area. Susceptibility usually defines the rate at which a contaminant will reach an aquifer unimpeded by chemical interactions with the vadose zone media.

"Base Flood" means the flood having a one percent chance of being equaled or exceeded in any given year, also referred to as the "100-year flood." The area subject to the base flood is the Special Flood Hazard Area designated on Flood Insurance Rate Maps as Zones “A” or “V”.

“Base Flood Elevation” means the elevation of the base flood above the datum of the effective firm.

“Basement” means any area of a structure having its floor sub-grade (below ground level) on all sides.

"Best management plan" means a plan developed for a property which specifies best management practices for the control of animal wastes, stormwater runoff, and erosion.

"Buffer" means an area contiguous with a critical area that is required for the integrity, maintenance, function, and structural stability of the critical area.

"Building footprint" means the horizontal area measured within the outside of the exterior walls of the ground floor of all principal and accessory buildings on a lot.

“Channel Migration Area” means that area within the lateral extent of likely stream channel movement due to stream bank destabilization and erosion, rapid stream incision, aggradation, avulsions, and shifts in location of stream channels plus 50 feet.

"Class" means one of the wetland classes used to categorize wetlands by their attributes and characteristics. Wetlands shall be rated using the latest adopted version of the Washington State Wetland Rating System for Western Washington published by the Washington State Department of Ecology.

“Class I Injection Well” means a well used to inject industrial, commercial, or municipal waste fluids beneath the lowermost formation containing, within 1/4 mile of the well bore, and underground source of drinking water.

“Class II Injection Well” means a well used to inject fluids:
Brought to the surface in connection with conventional oil or natural gas exploration or production and may be commingled with wastewater’s from gas plants that are an integral part of production operations, unless those waters are classified as dangerous wastes at the time of injection. For enhanced recovery of oil or natural gas; or for storage of hydrocarbons that are liquid at standard temperature and pressure.

“Class III Injection Well” means a well used for extraction of minerals, including but not limited to the injection of fluids for: In-situ production of uranium or other metals that have not been conventionally mined; Mining of sulfur by Frasch process; or Solution mining of salts or potash.

“Class IV Injection Wells” means a well used to inject dangerous or radioactive waste fluids.

“Class V Injection Wells” means all injection wells not included in Classes I, II, III, or IV.

"Classification" means defining value and hazard categories to which critical areas and natural resource lands will be assigned.

"Clearing" means the cutting, moving on site, or removal of standing or fallen timber; the removal or moving on site of stumps; or the cutting or removal of brush, grass, ground cover, or other vegetative matter from a site in a way which exposes the earth's surface of the site. In addition to the above, clearing is an activity which does not require reforestation per an approved Forest Practices Application/notification issued by the Department of Natural Resources.

"Cliff" means a steep vertical or overhanging face of rock or earth greater than 25 feet in height.

"Compensatory mitigation" means mitigation to compensate for loss of wetland habitat due to filling of wetlands or other regulated activities in wetlands.

"Confined aquifer" means an aquifer bounded above and below by beds of distinctly lower permeability than that of the aquifer itself and that contains ground water under sufficient pressure for the water to rise above the top of the aquifer.

"Confining Formation" means the relatively impermeable formation immediately overlying an artesian aquifer.

"Contaminant" means any chemical, physical, biological, or radiological substance that does not occur naturally or occurs at concentrations and duration as to be injurious to human health or welfare or shown to be ecologically damaging.

"Critical Aquifer Recharge Area" means areas that are determined to have a critical recharging effect on aquifers used as a source for potable water, and are vulnerable to contamination from recharge.

"Critical areas" means wetlands, flood hazard areas, fish and wildlife habitat areas, aquifer recharge areas, and geologically hazardous areas as defined in this chapter.

"Critical facilities" means those facilities occupied by populations or which handle dangerous substances including but not limited to hospitals, medical facilities; structures housing, supporting or containing toxic or explosive substances; covered public assembly structures; school buildings through secondary including day-care centers; buildings for colleges or adult education; jails and detention facilities; and all structures with occupancy of greater than 5,000 people.

"Degraded" means to have suffered a decrease in naturally occurring functions and values due to activities undertaken or managed by persons, on or off a site.

"Delineation" means identification of wetlands and their boundaries done in accordance with the approved federal wetland delineation manual and applicable regional supplements. ~~a wetland study conducted in accordance with the most current Federal Manual for Identifying and Delineating Jurisdictional Wetlands, 1989 edition (Unified Federal Manual) and the most current Washington State Wetlands Identification and Delineation Manual, March 1997 Edition (DOE Publication 96-94)~~.

"Delineation report" means a written document prepared by a wetland specialist which includes data sheets, findings of the delineation and a site plan which identifies the wetland boundaries.

"Department" means the City of Lakewood Department of Community Development.

"Designation" means taking formal legislative and/or administrative action to adopt classifications, inventories, and regulations.

“Developed Lot” means any lot developed with a primary use and structure(s), not generally subject to further development with additional units or other primary uses.

"Development" means any human-induced change to improved or unimproved real property including, but not limited to, the construction of buildings or other structures, placement of manufactured home/mobile, mining, dredging, clearing, filling, grading, paving, excavation, drilling operations, or the subdivision of property, removal of substantial amounts of vegetation, or alteration of natural site characteristics.

"Director" means the Director of the Department of Community Development or his/her designee.

"DRASTIC" means a model developed by the National Water Well Association and Environmental Protection Agency used to measure aquifer susceptibility.

“Dry Floodproofing” means any combination of structural and non-structural measures that prevent flood waters from entering a strtucture.

"Ecotone" means a transition area between two adjacent vegetation communities.

“Elevation Certificate” means the official form (FEMA form 81-31) used to provide elevation information necessary to ensure compliance with provisions of this ordinance and determine the proper flood insurance premium rate.

"Erosion" means the wearing away of the earth's surface as a result of the movement of wind, water, or ice.

"Erosion hazard areas" means those areas that because of natural characteristics, including vegetative cover, soil texture, slope, gradient, and rainfall patterns, or human-induced changes to such characteristics, are vulnerable to erosion.

"Earth/earth material" means naturally occurring rock, soil, stone, sediment, or combination thereof.

"Enhancement" means actions performed to improve the condition of existing degraded wetlands and/or buffers so that the quality of wetland functions increases (e.g., increasing plant diversity, increasing wildlife habitat, installing environmentally compatible erosion controls, removing non-indigenous plant or animal species, removing fill material or solid waste).

"Excavation" means the mechanical removal of earth material.

“Existing” means those uses legally established prior to incorporation whether conforming or nonconforming.

"Extirpation" means the elimination of a species from a portion of its original geographic range.

"Fill/fill material" means a deposit of earth material, placed by human or mechanical means.

"Filling" means the act of placing fill material on any surface, including temporary stockpiling of fill material.

"Fish and wildlife habitat areas" means those areas identified as being of critical importance to maintenance of fish, wildlife, and plant species, including: areas with which endangered, threatened, and sensitive species have a primary association; habitats and species of local importance; naturally occurring ponds under twenty acres and their submerged aquatic beds that provide fish or wildlife habitat; waters of the state; lakes, ponds, streams, and rivers planted with game fish by a governmental or tribal entity, or private organization; state natural area preserves and natural resource conservation areas.

"Fisheries biologist" means a professional with a degree in fisheries, or certification by the American Fisheries Society, or with five years professional experience as a fisheries biologist.

"Flood or Flooding" means a general and temporary condition of partial or complete inundation of normally dry land areas from:

1. The overflow of inland or tidal waters, and/or

2. The unusual and rapid accumulation of runoff of surface waters from any source.

"Floodfringe" means the area subject to inundation by the base flood, but outside the limits of the floodway, and which may provide needed temporary storage capacity for flood waters.

"Flood hazard areas" means areas of land located in floodplains which are subject to a one percent or greater chance of flooding in any given year. These areas include, but are not limited to, streams, rivers, lakes, coastal areas, wetlands, and the like.

<u>“Flood Insurance Rate Map (FIRM)” means the official map on which the Federal Emergency Management Agency has delineated both the Special Flood Hazard Areas and the risk premium zones applicable to the community.</u>

"Floodplain" means the total area subject to inundation by the base flood, including the floodfringe and the floodway areas.

<u>“Flood Protection Elevation” (FPE) means the elevation above the datum of the effective FIRM to which new and substantially improved structures must be protected from flood damage.</u>

"Floodway" means the channel of a river, or other watercourse, and the land areas that must be reserved in order to convey and discharge the base flood without cumulatively increasing the water surface elevation by more than one foot, and those areas designated as deep and/or fast-flowing water.

“Geological assessment" means an assessment prepared by a professional engineer licensed by the State of Washington with expertise in geotechnical engineering or prepared by a professional geologist, hydrologist, or soils scientist, who has earned the related bachelor's degree from an accredited college or university, or equivalent educational training, and has a minimum of five (5) years experience assessing the relevant geologic hazard. A geological assessment must detail the surface and subsurface conditions of a site and delineate the areas of a property that might be subject to specified geologic hazards.

"Geologically hazardous areas" means areas that because of their susceptibility to erosion, sliding, earthquake, or other geological events, may pose a risk to the siting commercial, residential, or industrial development consistent with public health or safety concerns.

"Geotechnical report" means a report prepared by a professional engineer licensed by the State of Washington with expertise in geotechnical engineering, evaluating the site conditions and mitigating measures necessary to reduce the risks associated with development in geologically hazardous areas.

“Grading" means any excavating, filling, clearing, creating (or combination thereof) of impervious surfaces.

"Ground amplification" means an increase in the intensity of earthquake induced ground shaking which occurs at a site whereby thick deposits of unconsolidated soil or surficial geologic materials are present.

"Groundwater" means all water found beneath the ground surface, including slowly-moving subsurface water present in aquifers and recharge areas.

“Groundwater Management Area” means a specific geographic area or subarea designated pursuant to Chapter 173-100 WAC for which a ground water management program is required.

“Groundwater management program” means a comprehensive program designed to protect ground water quality, to assure ground water quantity, and to provide for efficient management of water resources while recognizing existing ground water rights and meeting future needs consistent with local and state objectives, policies and authorities within a designated ground water management area or subarea and developed pursuant to Chapter 173-100 WAC.

"Habitat assessment" means a report prepared by a professional wildlife biologist or fisheries biologist, which identifies the presence of fish and wildlife habitat conservation areas in the vicinity of the proposed development site.

"Habitat management plan" means a report prepared by a professional wildlife biologist or fisheries biologist, which discusses and evaluates the measures necessary to maintain fish and wildlife habitat conservation areas on a proposed development site.

"Habitat of local importance" means an area, range or habitat within which a species has a primary association and which, if altered, may reduce the likelihood that the species will maintain and reproduce over the long-term. Examples include areas of high relative density or species richness, breeding habitat, winter range, and movement corridors. These areas may also include habitats that are of limited availability or high vulnerability to alteration. The

Lakewood City Council may designate specific Habitats of Local Importance by ordinance or resolution.

"Hazardous Substance(s)" means any liquid, solid, gas, or sludge, including any materials, substance, product, commodity, or waste, regardless of quantity, that exhibits any of the physical, chemical or biological properties described in Chapter 173-303-090 or 173-303-100 WAC.

"Hazardous Substance Processing or Handling" means the use, storage, manufacture, or other land use activity involving hazardous substances, but does not include individually packaged household consumer products or quantities of hazardous substances of less than five (5) gallons in volume per container. Hazardous substances shall not be disposed on-site unless in compliance with Dangerous Waste Regulations, Ch. 173-303 WAC, and any pertinent local ordinances, such as sewer discharge standards.

"Hazardous waste" means and includes all dangerous waste and extremely hazardous waste as designated pursuant to Chapter 70.105 RCW and Chapter 173-303 WAC.

1. "Dangerous waste" means any discarded, useless, unwanted, or abandoned substances including, but not limited to, certain pesticides, or any residues or containers of such substances which are disposed of in such quantity or concentration as to pose a substantial present or potential hazard to human health, wildlife, or the environment because such wastes or constituents or combinations of such wastes:

a. Have short-lived, toxic properties that may cause death, injury, or illness or have mutagenic, teratogenic, or carcinogenic properties; or

b. Are corrosive, explosive, flammable, or may generate pressure through decomposition or other means.

2. "Extremely hazardous waste" means any waste which:

c. Will persist in a hazardous form for several years or more at a disposal site and which in its persistent form presents a significant environmental hazard and may be concentrated by living organisms through a food chain or may affect the genetic make-up of humans or wildlife, and

d. Is disposed of at a disposal site in such quantities as would present an extreme hazard to humans or the environment.

"Hazardous Waste Treatment and Storage Facility" means a facility that treats and stores hazardous waste and is authorized pursuant to Ch. 70.105 RCW, Ch. 173-303 WAC. It includes all contiguous land and structures used for recycling, reusing, reclaiming, transferring, storing, treating, or disposing of hazardous waste. Treatment includes using physical, chemical, or biological processing of hazardous wastes to make such waste non-dangerous or less dangerous and safer for transport, amenable for energy or material resource recovery. Storage includes the holding of waste for a temporary period but not the accumulation of waste on the site of generation as long as the storage complies with applicable requirements of Ch. 173-303 WAC.

“Historic Structure” means a structure that:

A. Is listed on the National Register of Historic Places, the Washington Heritage Register, or the Washington Heritage Barn Register, or

B. Has been certified to contribute to the historical significance of a registered historic district.

"Hydrologically isolated wetland" means a wetland which:

1. Is not contiguous to any 100-year floodplain of a lake, river or stream; and
2. Has no contiguous surface hydrology, hydric soil or hydrophytic vegetation between the wetland and any other wetland or stream system.

"Hydrogeologic Assessment" means a report detailing the subsurface conditions of a site and which indicates the susceptibility and potential for contamination of groundwater supplies.

"Hydrologic soil groups" means soils grouped according to their runoff-producing characteristics under similar storm and cover conditions. Properties that influence runoff potential are depth to seasonally high water table, intake rate and permeability after prolonged wetting, and depth to a low permeable layer. Hydrologic soil groups are normally used in equations that estimate runoff from rainfall, but can be used to estimate a rate of water transmission in soil. There are four hydrologic soil groups: A, with low runoff potential and a high rate of water transmission; B with moderate infiltration potential and rate of water transmission; C, with a slow infiltration potential and rate of water transmission; and D, with a high runoff potential and very slow infiltration and water transmission rates.

“Hyporheic Zone” means a saturated layer of rock or sediment beneath and/or adjacent to a stream channel that contains some proportion of channel water or that has been altered by channel water infiltration.

"Impervious Surface" means natural or human-produced material on the ground that does not allow surface water to penetrate into the soil. Impervious surfaces may consist of buildings, parking areas, driveways, roads, sidewalks, and any other areas of concrete, asphalt, plastic, etc.

"Infiltration" means the downward entry of water into the immediate surface of soil.

"In-kind mitigation" means to replace wetlands with substitute wetlands whose characteristics and functions and values are intended to replicate those destroyed or degraded by a regulated activity.

"Lakes" means impoundments of open water 20 acres or larger in size.

"Landfill" means a disposal facility or part of a facility at which solid waste is permanently placed in or on land and which is not a landspreading disposal facility.

"Landslide" means the abrupt downslope movement of soil, rocks, or other surface matter on a site. Landslides may include, but are not limited to, slumps, mudflows, earthflows, rockfalls, and snow avalanches.

"Landslide hazard areas" means areas which are potentially subject to risk of mass movement due to a combination of geologic, topographic, and hydrologic factors.

"Large Animal" means an animal with an average weight of 100 pounds or more.

"Liquefaction" means a process by which a water-saturated granular (sandy) soil layer loses strength because of ground shaking commonly caused by an earthquake.

"Long-term commercial significance" means the growing capacity, productivity, and soil composition of land which makes it suitable for long-term commercial production, in consideration with the land's proximity to population areas, and the possibility of more intense uses of land.

"Minerals" means gravel, sand, and valuable metallic substances.

"Mineral resource lands" means lands primarily devoted to the extraction of minerals or which have known or potential long-term commercial significance for the extraction of minerals.

"Mitigation" means to avoid, minimize or compensate for adverse environmental impacts. "Mitigation" includes:

(1) Avoiding the impact altogether by not taking a certain action or parts of an action;

(2) Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;

(3) Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

(4) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;

(5) Compensating for the impact by replacing, enhancing, or providing substitute resources or environments; and/or

(6) Monitoring the impact and taking appropriate corrective measures.

<u>“Natural Floodplain Functions” means the contribution that a floodplain makes to support habitat, including but not limited to providing flood storage and conveyance, reducing flood velocities, reducing sedimentation, filtering nutrients and impurities from runoff, processing organic wastes, moderating temperature fluctuations and providing breeding and feeding grounds for aquatic and riparian species.</u>

"Natural resource lands" means mineral resource lands which have long-term commercial significance.

“Oregon White Oak” means the species Quercus Garryana, also known as a Garry Oak. All references to Oak trees in this Chapter refer to Oregon White Oak. See also “Priority Oregon White Oak Woodland.”

"Old growth forests" means stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age; and > 10 snags/ha (4 snags/acre) over 51 cm (20 in) diameter and 4.6 m (15 ft) tall; with numerous downed logs, including 10 logs/ha (4 logs/acre) > 61 cm (24 in) diameter and > 15 m (50 ft) long. High elevation stands (> 762m [2500ft]) may have lesser dbh [> 76 cm (30 in)], fewer snags [> 0.6/ha (1.5/acre)], and fewer large downed logs [0.8 logs/ha (2 logs/acre) that are > 61 cm (24 in) diameter and > 15 m (50 ft) long

"Ordinary high water" means that mark on all lakes, streams, ponds, and tidal water that will be found by examining the bed and banks and ascertaining where the presence and action of water are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation as that condition exists on the effective date of this Chapter or as it may naturally change thereafter. Provided, that in any area where the ordinary high water mark cannot be found, the ordinary high water mark adjoining fresh water shall be the mean high water.

"Out-of-kind mitigation" means to replace wetlands with substitute wetlands whose characteristics do not approximate those destroyed or degraded by a regulated activity.

"Perched ground water" means ground water in a saturated zone is separated from the main body of ground water by unsaturated rock.

"Permanent erosion control" means continuous on-site and off-site control measures that are needed to control conveyance and/or deposition of earth, turbidity or pollutants after development, construction, or restoration.

"Permeability" means the capacity of an aquifer or confining bed to transmit water. It is a property of the aquifer and is independent of the force causing movement.

"Permeable Surfaces" mean sand, gravel, and other penetrable deposits on the ground which permit movement of groundwater through the pore spaces, and which permit the movement of fluid to the groundwater.

"Person" means an individual, firm, company, partnership, association, corporation, or other legal entity.

"Ponds" means naturally occurring impoundments of open water less than 20 acres in size and larger than 2,500 square feet which maintain standing water throughout the year.

“Potable water" means water that is safe and palatable for human use.

"Prairies" means open areas predominated by native, drought-resistant, grasses, forbs (flowering non-woody plants) and herbs. In Pierce County, prairies are an unusual vegetation regime found in areas of extremely well-drained soils.

“Priority Oregon White Oak Woodland” means forested areas of pure oak, or of oak/conifer associations 1 acre or larger, and all oak trees located within, where oak canopy coverage of the area is at least 25%. Stands of oaks less than 1 acre in size may also be considered priority habitat when found to be particularly valuable to fish and wildlife (i.e.; they contain many

cavities, have a large diameter at breast height (dbh), are used by priority species, or have a large canopy).

"Private organization" means a nonprofit corporation organized pursuant to RCW 24.03, which includes the planting of game fish among its purposes for organizing as a nonprofit corporation.

<u>“Protected Area” means the lands that lie within the boundaries of the floodway, the riparian habitat zone and the channel migration area. Because of the impact that development can have on flood heights and velocities and habitat, special rules apply in the Protected Area.</u>

"Public services" include fire protection and suppression, law enforcement, public health, education, recreation, environmental protection, and other governmental services.

"Qualified ground water scientist" means a hydrogeologist, geologist, engineer, or other scientist who meets all the following criteria:

A. Has received a baccalaureate or post-graduate degree in the natural sciences or engineering; and
B. Has sufficient training and experience in ground water hydrology and related fields as may be demonstrated by state registration, profession certifications, or completion of accredited university programs that enable that individual to make sound professional judgments regarding ground water vulnerability.

"Recharge" means the process involved in the absorption and addition of water to ground water.

"Regolith" means any body of loose, noncemented particles overlying and usually covering the bedrock.

"Restoration" means the re-establishment of a ecological and/or habitat resources and features from a previously disturbed or degraded critical area site.

“Regulated activities" include, but are not limited to, any activities which are directly undertaken or originate in a regulated critical area or resource land or their buffer that require any of the following entitlements from the City: building permit, commercial or residential; binding site plan; boundary line adjustment; conditional use permit; franchise right-of-way construction permit; site development permit; master plan development; right-of-way permit; shoreline conditional use permit; shoreline environmental redesignation; shoreline substantial development permit; shoreline variance; large lot subdivision, short subdivision; special use permit; subdivision; unclassified use permit; utility and other use permit; variance; zone reclassification; or any subsequently adopted permit or required approval not expressly exempted by this Chapter. Regulated activities also include those specific activities listed in Section 14A.142.060.

<u>“Regulatory Floodplain” means the area of the Special Flood Hazard Area and all Protected Areas within the jurisdiction of the City of Lakewood.</u>

"Recessional outwash geologic unit" means sand and gravel materials deposited by melt-water streams from receding glaciers.

“Riparian” means of, adjacent to, or living on, the bank of a river, lake, pond, ocean, sound, or other water body.

"Seismic hazard areas" means areas subject to severe risk of damage as a result of earthquake induced ground shaking, slope failure, settlement, or soil liquefaction.

"Short subdivision" or "short plat" means the division or redivision of land into four or fewer lots, tracts, parcels, sites or divisions for the purpose of sale, lease, or transfer of ownership.

"Site" means a lot, parcel, tract, or combination of lots, parcels, or tracts where a development is proposed.

"Slope" means an inclined earth surface, the inclination of which is expressed as the ratio of horizontal distance to vertical distance.

"Slump" means the downward and outward movement of a mass of bedrock or regolith along a distinct surface of failure.

"Snag-rich areas" means forested areas which contain concentrations of standing dead trees, averaging ten snags or greater per acre, and averaging greater than 15 inches in diameter at breast height.

"Soil Survey" means the most recent National Cooperative Soil Survey for the local area or county by the Soil Conservation Service, United States Department of Agriculture.

"Sole Source Aquifer" means an area designated by the U.S. Environmental Protection Agency under the Safe Drinking Water Act of 1974, Section 1424(e). The aquifer(s) must supply 50% or more of the drinking water for an area without a sufficient replacement available.

“Special Flood Hazard Area (SFHA)” means the land subject to inundation by the base flood. Special Flood Hazard Areas are designated on Flood Insurance Rate Maps with the letters “A” or “V”, including AE, AO, AH, A1-99, and VE. The Special Flood Hazard Area is also referred to as the area of special flood hazard or SFHA.

"Species of local importance" means species that are of local concern due to their population status or their sensitivity to habitat manipulation.

"Stockpiling" means the placement of material with the intent to remove it at a later time.

"Subdivision" or "formal subdivision" means the division or redivision of land into five (5) or more lots, tracts, parcels, sites, or division for the purpose of sale, lease, or transfer of ownership.

"Substrate" means the soil, sediment, decomposing organic matter or combination of those located on the bottom surface of a wetland.

"Temporary erosion control" means on-site and off-site control measures that are needed to control conveyance or deposition of earth, turbidity or pollutants during development, construction, or restoration.

"Toe of slope" means a distinct topographic break in slope at the lower-most limit of the landslide or erosion hazard area.

"Top of slope" means a distinct topographic break in slope at the uppermost limit of the landslide or erosion hazard area.

"TPCHD" means the Tacoma-Pierce County Health Department.

"Underground Tank" means any one or a combination of tanks (including underground pipes connected thereto) which are used to contain or dispense an accumulation of hazardous substances or hazardous wastes, and the volume of which (including the volume of underground pipes connected thereto) is ten percent or more beneath the surface of the ground.

"Unconfined aquifer" means an aquifer not bounded above by a bed of distinctly lower permeability than that of the aquifer itself and containing ground water under pressure approximately equal to that of the atmosphere. This term is synonymous with the term "water table aquifer".

"Utility line" means pipe, conduit, cable or other similar facility by which services are conveyed to the public or individual recipients. Such services shall include, but are not limited to, water supply, electric power, gas, communications and sanitary sewers.

“Vadose Zone” is the distance between the land surface and the uppermost aquifer. This distance is also defined as the “depth to water” zone or unsaturated zone.

"View corridor" means an area which affords views of lakes, mountains, or other scenic amenities normally enjoyed by residential property owners.

<u>“Water Typing” means a system for classifying water bodies according to their size and fish habitat characteristics. The Washington Department of Natural Resources” Forest Practices Water Typing classification system defines four water types:</u>

<u>A. Type “S” = Shoreline: Streams that are designated “shorelines of the State,” including marine shorelines.</u>

<u>B. Type “F” = Fish: Streams that are known to be used by fish or meet the physical criteria to be potentially used by fish.</u>

<u>C. Type “Np” = Non-Fish Perennial streams.</u>

<u>D. Type “Ns” = Non-Fish Seasonal Streams.</u>

“Wellhead Protection Area” means the surface and subsurface area surrounding a well or well field that supplies a public water systems through which contaminants are likely to pass and eventually reach the water well(s) as designated under the Federal Clean Water Act.

"Water table" means that surface in an unconfined aquifer at which the pressure is atmospheric. It is defined by the levels at which water stands in wells that penetrate the aquifer just far enough to hold standing water.

"Well" means a bored, drilled or driven shaft, or a dug hole whose depth is greater than the largest surface dimension.

"Urban governmental services" include those governmental services historically and typically delivered by cities, and includes storm and sanitary sewer systems, domestic water systems, street cleaning services, and other public utilities associated with urban areas and normally not associated with non-urban areas.

"Urban growth" refers to growth that makes intensive use of the land for the location of buildings, structures, and impermeable surfaces to such a degree as to be incompatible with the primary use of such land for the production of food, other agricultural products, or fiber, or the extraction of mineral resources. When allowed to spread over wide areas, urban growth typically requires urban governmental services. `Characterized by urban growth' refers to land having urban growth located on it, or to land located in relationship to an area with urban growth on it as to be appropriate for urban growth.

"Wetland" or "Wetlands" means areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands generally do not include those artificial wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities. However, wetlands may include those artificial wetlands intentionally created from non-wetland areas created to mitigate conversion of wetlands~~, if permitted by the City~~.

"Wetland specialist" means a person with experience and training in wetlands issues, and with experience in performing delineations, analyzing wetland functions and values, analyzing wetland impacts, and recommending wetland mitigation and restoration. Qualifications include:

1. Bachelor of Science or Bachelor of Arts or equivalent degree in biology, botany, environmental studies, fisheries, soil science, wildlife, agriculture or related field, and two years of related work experience, including a minimum of one year experience delineating wetlands using the Unified Federal Manual and preparing wetland reports and mitigation plans. Additional education may substitute for one year of related work experience; or,

2. Four years of related work experience and training, with a minimum of two years experience delineating wetlands using the Unified Federal Manual and preparing wetland reports and mitigation plans.

The person should be familiar with the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, The City Site Development Regulations, The City Wetland Management Policies, and the requirements of this Chapter.

"Wildlife biologist" means a professional with a degree in wildlife, or certification by The Wildlife Society, or with five years professional experience as a wildlife biologist.
(Ord. 362 § 3 (part), 2004.)

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