QUARRY SECTOR SUBAREA

TECHNICAL REPORT

June 1, 1999

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ACKNOWLEDGMENTS

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QUARRY SECTOR SUBAREA TECHNICAL REPORT

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EXECUTIVE SUMMARY

The Quarry Sector Subarea project encompasses approximately 140 acres located in the northwest quadrant of Tualatin bordered by SW Pacific Highway, SW 124th Avenue and SW Cipole Road. The project began in September of 1994 to address modifying the planning district designation for approximately 80 acres of General Manufacturing (MG) designated land to Light Manufacturing (ML) in conformance with the Leveton Tax Increment Plan (LTIP). To facilitate the project, a working group was created which included thirteen (13) property owners within the study area boundaries, Oregon Department of Transportation (ODOT), Washington County (WACO), and the City of Tualatin. This group was generally known as the Quarry Sector Working Group (QSWG).

At the first meeting with the property owner component of the QSWG, transportation issues (future streets and access to SW Pacific Highway and SW 124th Avenue) were identified as critical aspects of any planning district modification. Due to the transportation issues being raised by the property owners, the project's focus was expanded to include this component. This change also brought along other public facility issues including sanitary sewer, water and storm drainage.

Because of the expanded project focus, ten topic categories were identified with subtopics which required evaluation. These included:

- Land Use
- Topography
- Wetlands
- Flood Plan
- Soils
- Transportation
- Access Management
- Sanitary Sewer
- Water
- Storm Drainage and Water Quality
- Funding Options

Nine QSWG property owner group meetings in addition to meetings with ODOT and WACO were conducted. In September of 1996 a compromise planning district modification and transportation alternative was being developed. This alternative was not actualized due to a number of circumstances, and the project stalled. The project was reinitiated in February 1998, building on the previous work and utilizing the same topic categories.

An additional nine QSWG meetings were held. Planning district designations and four transportation alternatives were redeveloped based on these meetings for evaluation, which are contained in Chapters 1 and 7. During transportation analysis work conducted by Kittelson & Associates, Inc. a fifth alternative was identified coined Alternative 1 (Modified). Ultimately a sixth alternative was created based on additional property owner comments which was named Alternative 1 (Modified A).

This report analyzes the specific elements which went in to the Quarry Sector project. The report format is structured as follows:

- Topic
- Background Information
- Objectives
- Options
- Conclusion

There are two primary issues addressed in this report:

- Planning district designations, and
- Transportation with associated public infrastructure.

To summarize the detailed analysis in the report, Table 1, Planning District Rating Summary, and Table 2, Public Infrastructure Alternative Rating Summary, was prepared. Each table is a matrix identifying the merits of the various options. Shaded circles have been used in the following scheme to symbolize and reflect the value of a particular option based on identified objectives and technical merit:

● Above Average ◗ Average ○ Below Average

The rating system was developed by City of Tualatin staff as a mechanism to reflect the merits of each of the alternatives.

Table 1

Alternative Planning District Summary

	Light Manufacturing (ML)	General Manufacturing (MG)	Plan Text Changes*
Reduction Noise/dust/ odor/vibration	○	◑	○
Conflicting uses	●	○	○
Commercial opportunities	○	◑	◑
Non-conforming uses	○	●	○

* Plan Text changes includes setbacks, landscaping and non-conforming uses.

Based on the four evaluation areas, modification to the ML Planning was identified to be the preferred compromise alternative. Chapter 2 provides a detailed written description of the merits of the ML Planning District designation.

Table 2

Public Infrastructure Alternative Rating Summary

	Base Scenario	Alternative 1	Alternative 1 (Modified)	Alternative 1 (Modified A)	Alternative 2	Alternative 3
Topography	◑	◑	◑	◑	◑	○
Wetlands	○	●	●	●	●	●
Flood Plain	○	○	○	○	○	○
Soils	○	◗	◗	◗	◗	●
Transportation	◑	◑	◑	○	◑	◑
Access Management	●	○	◗	◗	○	○
Sanitary Sewer	◑	○	○	○	◑	◑
Water	◗	●	●	●	◗	○
Storm Sewer	◑	○	○	○	◑	◑

Based on the nine topic areas and their respective sub-topic areas, Alternative 1 (Modified A) was identified to be the preferred compromise alternative. The benefits of this alternative over the remaining five alternatives include:

1. Topography modification similar to other alternatives;
2. Avoiding wetland areas and associated permitting and mitigation requirements;
3. Locating the transportation system and other public facilities out of the 100-year flood plain;
4. Locating the transportation system out of hydric soil areas;
5. Providing a transportation system which:
    a. allows trip distribution within the transportation network;
    b. reduces the reliance on SW Pacific Highway;
    c. meets the City and ODOT requirements for LOS, v/c ratio and delay;
    d. allows phasing of the system over time;
6. Allowing limited access to SW Pacific Highway while reducing the overall number of existing access and establishing a public access location onto SW 124th Avenue;
7. Reducing the need for public sanitary sewer easements to connect to existing sewer lines;
8. Locating the 12 inch water line out of the wetland area and within a public street; and
9. Providing a flexibility for a storm water system and associated treatment.
10. Utilizes the existing topography as much as possible in development of the transportation and storm drainage system.

Chapters 7 and 13 provide a detailed description of the merits of Alternative 1 (Modified A).

CHAPTER 1: INTRODUCTION

The Quarry Sector Subarea is approximately 140 acres in size, has a planning district designation of General Manufacturing (MG) and is characterized undeveloped land and land extensive industrial operations. The area is located in the northwest corner of the City of Tualatin bordered by SW Pacific Highway on the north, SW 124th Avenue in the east, SW Cipole Road on the west and an irregular boundary line on the south defined by Cummins Creek and two properties at the cul-de-sac bulb of SW 125th Court. Maps 1 and 2 , Pages 5 and 7 are Vicinity and Study Area Boundary maps.

The Quarry Sector Subarea Technical Report is the culmination of a 4 1/2 year collaborative planning process involving 13 property owners with various industrial business operations. Map 3, Page 9 contains information on the parcel ownership and land use operations. Other participants included the Oregon Department of Transportation (ODOT) which has jurisdiction over SW Pacific Highway, Washington County (WACO) with jurisdiction over Cipole Road, the City of Tualatin, and the Tualatin Urban Renewal Agency. The overall work program included a multitude of issues including land use, topography, wetlands, flood plains, soils, transportation, access management, sanitary sewer and water systems and storm drainage to refine how this area would develop and redevelop over the next 40 years. The overall group was identified as the Quarry Sector Working Group (QSWG).

The Quarry Sector Subarea evaluation process was initiated in September 1994 to address modifying the planning district designation for approximately 80 acres of industrial land from the MG Planning District designation to the Light Manufacturing (ML) Planning District designation in accordance with the Leveton Tax Increment Plan (LTIP). The LTIP had identified the planning district change to address conflicts from uses allowed in the MG Planning District which abuts the Manufacturing Park (MP) Planning District. The MP Planning District allows for development of high technology businesses in a campus style setting with large lots which are sensitive to noise, dust, odor, and vibration which could occur from uses allowed in the MG Planning District.

At the initiation of the work program, the focus was implementing the planning district change. At the initial meeting, participating property owners identified a bigger issue concerning the existing planned transportation system and brought up issues related to zoning requirements for existing and future development. The Frontage Road paralleling SW Pacific Highway and the east/west road, generally known as Quarry Road, along the southern boundary of the study area were specifically identified. Due to the property owner interests, the focus expanded to encompass transportation.

There were seventeen (17) QSWG meetings held between the property owners and City staff since 1994. In addition, individual meetings between City staff and individual property owners were held to gain further insight as to how they envisioned the area developing or re-developing. Varying view points were expressed from the group and personal meetings. Property owners also held meetings without City staff to discuss relevant topics associated with the project.

City staff additionally met with ODOT on six occasions to discuss various transportation related scenarios in 1998 and 1999. WACO discussions also occurred primarily via phone and correspondence.

During the time period 1994-1996, transportation and planning district concepts were identified with a westward extension of SW Tualatin Road from the planned intersection of SW 124th Avenue and SW Tualatin Road. The westward extension was identified to connect with SW Pacific Highway approximately midway between SW 124th Avenue and SW Cipole Road. This concept was premised on changing the area north of the SW Tualatin Road extension to the City's General Commercial (CG) Planning District designation along with reducing the amount of land to be changed to the ML Planning District designation. The CG designation was proposed to increase land values to fund development of the SW Tualatin Road extension. A private roadway was also outlined to connect SW Cipole Road to the SW Tualatin Road extension. No traffic analysis work was prepared at this time to determine if the transportation and planning district concepts could be supported. General cost estimates were prepared though for cost sharing of the transportation system. It was envisioned in September of 1996 that all of the property owners would sign agreements to the cost sharing arrangements among themselves and work on traffic analysis for the changes to transportation and planning district designations would begin. Ultimately only two owners signed the agreement and the project came to an impasse.

In February 1998, after a 1 ½ year hiatus, the project was reinitiated. The focus continued to be transportation. Property owners restated their concerns over the concept of the Frontage Road paralleling SW Pacific Highway, retaining access to SW Pacific Highway and questioned the necessity for a collector street (Quarry Road) connection between SW Cipole Road and SW 124th Avenue along the southern boundary of the study area. Based on these areas of concern, three alternatives were developed in addition to the transportation provisions contained in the Tualatin Development Code (TDC). These alternatives included specific and detailed comments from individual property owner meetings along with ODOT, WACO and City of Tualatin issues.

A trip distribution analysis was prepared on the four alternatives (3 Alternatives and Base Scenario) to assess their respective impacts. The distribution analysis

began to provide answers to the Frontage Road, SW Pacific Highway and Quarry Road questions raised by the property owners. Concerning the Frontage Road, three alternatives were determined generally viable for deleting the planned Frontage Road. SW Pacific Highway access options were also evaluated with a range of 3-4 driveways acceptable in three of the alternatives. Concerning Quarry Road, it was found that a east/west connection between SW Cipole Road and SW 124th Avenue was necessary to relieve traffic on SW Pacific Highway. In addition a fifth alternative was created to address traffic concerns identified in the analysis work. The initial trip distribution analysis was augmented with a traffic operations summary to further refine traffic impacts of the five alternatives.

Ultimately a sixth alternative was prepared and reviewed which reflects concerns of the individual property owners on the alignment of the future roadway corridors. A traffic operations analysis was conducted on this alternative. A detailed discussion of the transportation issues is contained in Chapters 7 and 8.

With this information in hand, the QSWG was able to evaluate the six alternatives. Based on traffic impacts, ODOT and City concerns, Alternative 1 (Modified A) was identified as the compromise which best addressed all of the issues. Chapters 3 through 12 provide an evaluation of options and conclusions. Chapter 2 discusses the planning district modification issue. Chapter 13 provides an overall conclusion and a recommendation on which alternative meets the overall objectives.

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Quarry Sector Subarea Technical Report Map 2: Study Area Boundary Map

Study Area Boundary

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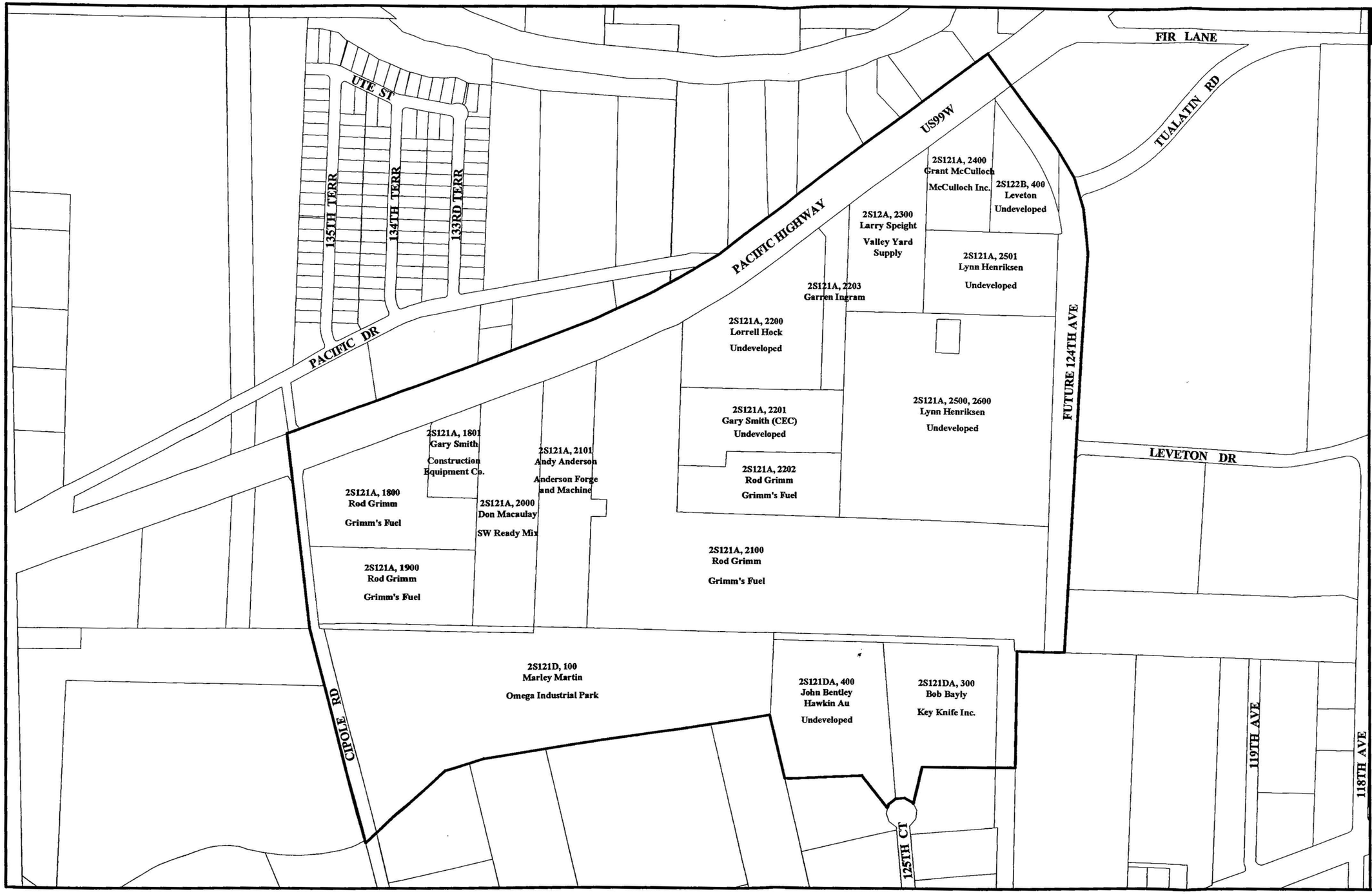

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Quarry Sector Subarea Technical Report Map 3: Parcel Ownership and Use

Study Area Boundary

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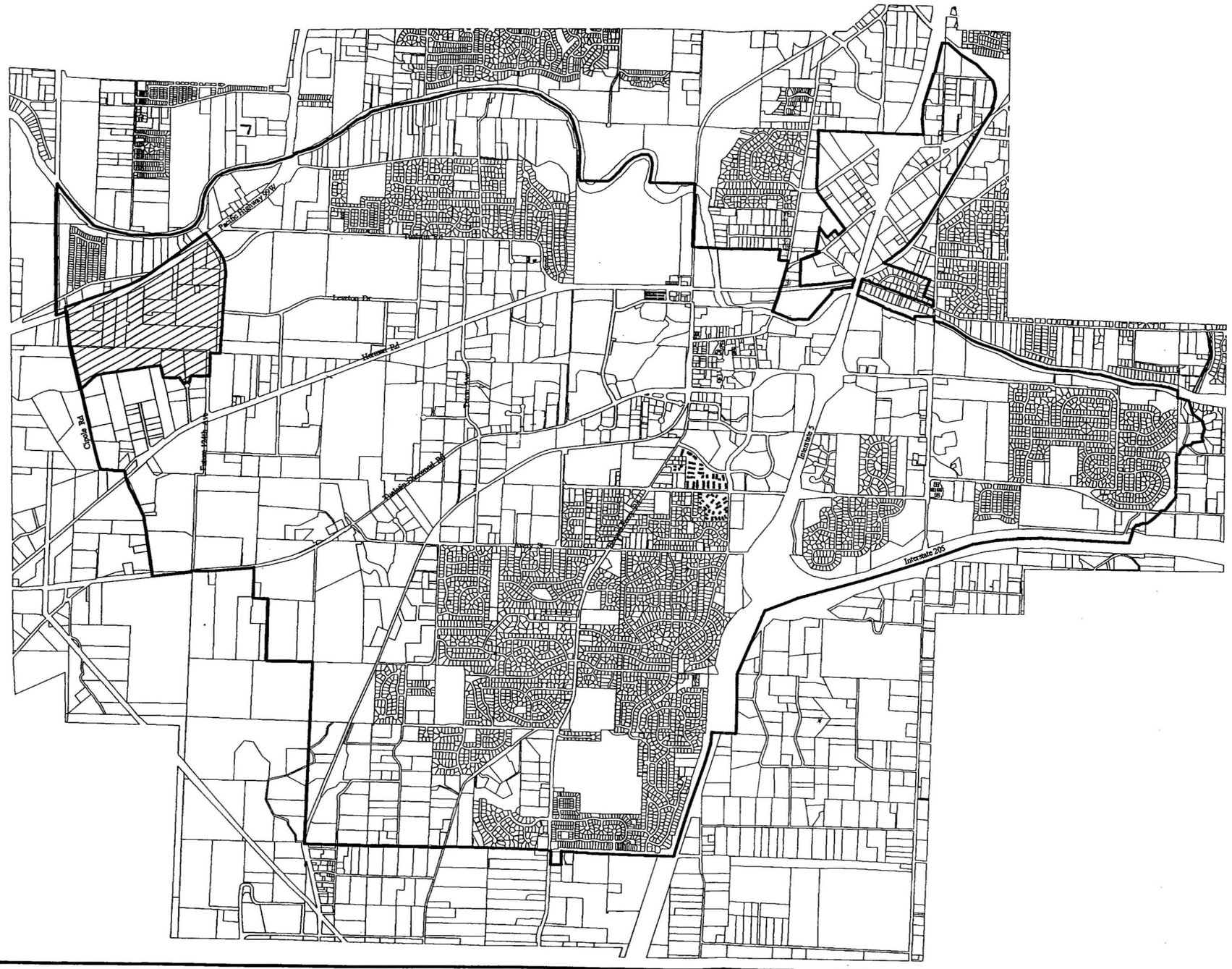

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Quarry Sector Subarea Technical Report
Map 1: Vicinity Map

Planning Area Boundary

Quarry Sector Study Area

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corridors. Finally, storm drainage improvements were added for the area of the Quarry Road alignment.

Development Actions

In reviewing development actions in the Quarry Sector, there has been minimal activity in relationship to the balance of the Tualatin Planning area. A total of 13 Architectural Review applications have been received since 1983 with decisions issued. Ten of these decisions lead to actual development improvements. The following is a list of projects and their locations:

AR-83-28, Meter Box (2S121A, 2400) - expansion
AR-85-11, AR-87-33, AR-88-08, AR-91-18, Construction Equipment Company (2S121A, 1801) - expansion
AR-86-04, Grimm's Fuel (2S121A, 2100) - expansion
AR-87-02, AR-95-08, Grimm's Fuel (2S121A, 1800, 1900) - expansion
AR-90-03, Valley Yard Supply (2S121A, 2300) - expansion
AR-93-17, Martin Mini Storage (2S121D, 100) - not constructed
AR-96-15, Southwest Ready Mix (2S121A, 2000) - not constructed
AR-97-32, Key Knife (2S121DA, 300) - new development
AR-98-22, Classic Air Manufacturing (2S121DA, 400) - not constructed

There have been other land use actions which include:

CUP-85-05, Construction Equipment Company (2S121A, 1801), sales and service of heavy equipment.
CUP-94-11, CUP-97-03, Grimm's Fuel (2S121A, 1800, 1900), resource recovery operation.
VAR-85-01, Construction Equipment Company (2S121A, 1801), reduce asphalt paving areas, withdrawn.
PLA- 97-09, Ingram (2S121A, 2203, 2500, 2501, 2600) - not finalized, adjust lot lines to create new parcel configurations.
SUB (1985), Herman Road Business Center, 8 lot industrial subdivision.

Metro Urban Growth Management Functional Plan (UGMFP)

Metro adopted the UGMFP in February 1997. As part of the adoption, design types were identified for the Quarry Sector area. This included Industrial Sanctuary and Corridor. The Corridor designation is located along SW Pacific highway. The City in its preliminary submittal of August 1998 to Metro refined the boundary of the Corridor area which is identified on Map 5, Page 21. A Corridor is defined as "along good quality transit lines, corridors feature a high-quality pedestrian environment, convenient access to transit, and somewhat higher than current densities". The proposed corridor designation encompasses approxi-

mately 35 acres of the Quarry Sector. The specific provisions which will apply to a corridor have not been developed by the City.

Objectives

1. Further the objectives of Chapter 4, Community Growth of the TDC.

2. Further the objectives of Chapter 7, Industrial Planning Districts of the TDC.

3. Further the objectives of Chapter 10, Community Design of the TDC.

4. Amend the TDC to be consistent with the LTIP.

5. Provide planning district designations which reduce the impacts of noise, dust, odor and vibration on the adjacent businesses in the MP Planning District.

6. Provide planning district designations which will stimulate development activity within the Quarry Sector.

7. Provide a planning district designation which furthers the commercial and/or industrial development opportunities desired by property owners in the northeast quadrant of the Quarry Sector.

Planning District Options

The LTIP identified the area bounded by SW 124th Avenue, SW Pacific Highway, and the south and west boundary of Tax Lot 2100, Tax Map 2S121A (Grimm) to be changed to the ML designation from the MG designation (Map 6, Page 23).

Light Manufacturing (ML) Planning District

During the QSWG meetings it was discussed changing the location of the proposed ML District to the west side of Tax Lots 2300 (Speight), 2600 (Ingram/Henricksen) and bisect 2100 (Grimm), Tax Map 2S121A. Map 7, Page 25 identifies the proposed location. The reasoning provided by property owners was their desire to continue land extensive outdoor operations which were occurring to the west of this line. QSWG members west of the newly identified planning district line indicated their modification and expansion plans would conflict with the original proposed planning district designation (ML) prohibiting them from realizing those expansion plans. Additionally property owners provided information indicating that the outdoor operations west of the proposed planning district boundary line could be mitigated or were of limited impact due to technology or the geologic conditions of the sand strata.

East of the newly-proposed planning district boundary line two of the existing businesses would shift from permitted uses in the MG District (Valley Yard Supply and G. H. McCulloch) to non-conforming uses. The non-conforming status would allow them to continue to operate but would not allow the non-conforming elements of the uses to be altered or enlarged except for paving, landscaping, or other aesthetic improvements. These two properties comprise 6.97 acres of the 48.83 acres (plus ROW) in the modified ML District alternative.

Property owners identified to be located in the proposed ML District expressed additional concerns. These owners, primarily those with frontage on SW Pacific Highway, desired to have a CG Planning District designation based on the 1994-1996 discussions. Traffic information prepared in 1998 indicated a CG designation would be worse for traffic congestion and was not a viable option due to projected traffic volumes on SW 124th Avenue at the SW Tualatin Road and SW Pacific Highway intersections.

As an alternative, information was provided to these property owners about utilization of the Industrial Business Park Overlay District (IBPOD) contained in Chapter 69 of the TDC. This district allows for some of the commercial uses desired by the owners such as offices (general, medical, business, government, real estate), food stores less than 4,000 square feet, restaurants, and health and fitness facilities. The uses are dependent on the acreage size of the development (10 acre minimum or 20 acre minimum). The use of the IBPOD also requires a separate traffic analysis beyond the scope of the traffic analysis done for the overall Quarry Sector area. Prospects to utilize the IBPOD and associated commercial uses would need to be balanced with industrial uses and not overload critical intersections and their functional capabilities. Appendix 1 contains a copy of the TDC provisions.

In general 5 of the 6 property owners whose property would be changed to the ML Planning District designation do not oppose the modification. Several negotiation areas were identified for the change which included:

- Obtaining two right-in/right-out driveways between SW 130th Avenue and SW 124th Avenue.
- Allowing 125th Place to be either a public cul-de-sac street or shared driveway access with cross easements.
- Investigating the ability for Traffic Impact Fee (TIF) and System Development Charge (SDC) credits for streets, sewer and water.
- Investigating the ability to allow non-conforming uses to expand with some type of time-frame limitation.

No comments have been received from the sixth property owner on the proposed planning district change.

The issue concerning driveway access to SW Pacific Highway is discussed in Chapter 8.

The alignment of SW 125th Place could be either a public street or developed as a shared access driveway and is discussed in Chapter 7.

Concerning the availability of TIF credits, only streets listed on the TIF list are eligible and limited to selected as arterials and collectors. SW Cipole Road from SW Herman Road to SW Pacific Highway is a listed TIF street. Credits are only available if additional capacity for the future is provided. In the various alternatives proposed internal roadways would not be classified as arterials of collectors and thus are not eligible for TIF credits. For SDC's the 12" water line may be available for a credit. This issue would need to be further evaluated at the time the water line is proposed to be constructed.

Finally, for non-conforming uses, Valley Yard Supply, a rock and bark dust operation, and G. H. McCulloch, a metal fabricator, would become non-conforming uses with a change to the ML Planning District designation. Non-conforming uses are permitted to continue but are not allowed to be enlarged or altered except for paving, landscaping and aesthetic improvements in accordance with TDC Chapter 35. If a non-conforming use ceases for a twelve-month period, the use can only be reinstated with City Council approval.

City staff investigated Transitional Use provisions contained in TDC Chapter 34 and determined that the provisions were not applicable due to criteria for transitional uses being less intense than the current use. To meet the desire of the two property owners, minor modifications could be made to the Transitional Use criteria allowing uses equal to or as intense as existing or previous uses.

Another option investigated was changing the list of uses (conditional uses) in the ML Planning District to allow these types of business operations. It was concluded this option was counter to the objective to limit uses which do not create noise, dust, odor and vibration.

Variances were also looked at, but variances are applicable only to standards and not to the list of uses within a planning district.

The ML Planning District option was rated to have above average merits.

General Manufacturing (MG) Planning District

A second option discussed was retaining the MG District. The City was concerned about this approach as it did not address the original concern to limit uses allowed which create noise, dust, odor and vibration which would be detrimental to business in the MP District to the east. Additionally, it would not further the goals and objectives outlined in the LTIP.

Property owners indicated it may be a viable option due to the changed circumstances in the area. What had been envisioned as development opportunities has changed based on property ownership. Owners indicated that previously identified conflicting uses which could create noise, dust, odor and vibration were not likely to occur. City staff responded that there was no guarantee conflicting uses would not occur due to list of uses was expansive in the MG Planning District verses the ML Planning District. Furthermore, ML uses are in large part restricted to businesses contained inside buildings whereas MG uses can be outdoor operations.

This option has below average merits.

Setbacks and Landscaping Standards

The third option investigated was modifying setback and landscape provisions for development adjacent SW 124th Avenue while retaining the MG Planning District designation. In this approach building and parking setbacks requirements would be increased over the 50-foot building and 10-foot parking setback required when adjacent to or across the street from a MP District. In the expanded setback area additional dense evergreen landscaping would be required. The effect of these types of changes are to provide a visual buffering for proposed development, but they do not address the use question. It is the uses listed within the MG District and possible expansion of existing outdoor uses which raise the issues of noise, dust, odor and vibration and their affects on the adjoining MP Planning District.

This option has below average merits.

Conclusion

Based on the three options evaluated, modification from the MG to ML District with a reduced area than identified in the LTIP best addressed the noise, dust, odor and vibration issues and was rated above average. The basis for this is the ML District reduces the opportunity for industrial operations which conflict with the uses allowed in the adjoining MP District. Furthermore, the ML District provides the opportunity for some commercial activities through the IBPOD desired by owners which would be affected by the planning district change.

Retaining the MG Planning District designation does not address the issues raised in the LTIP and was rated below average. The City staff concluded modification to setbacks and landscaping was not a desirable option and was rated below average.

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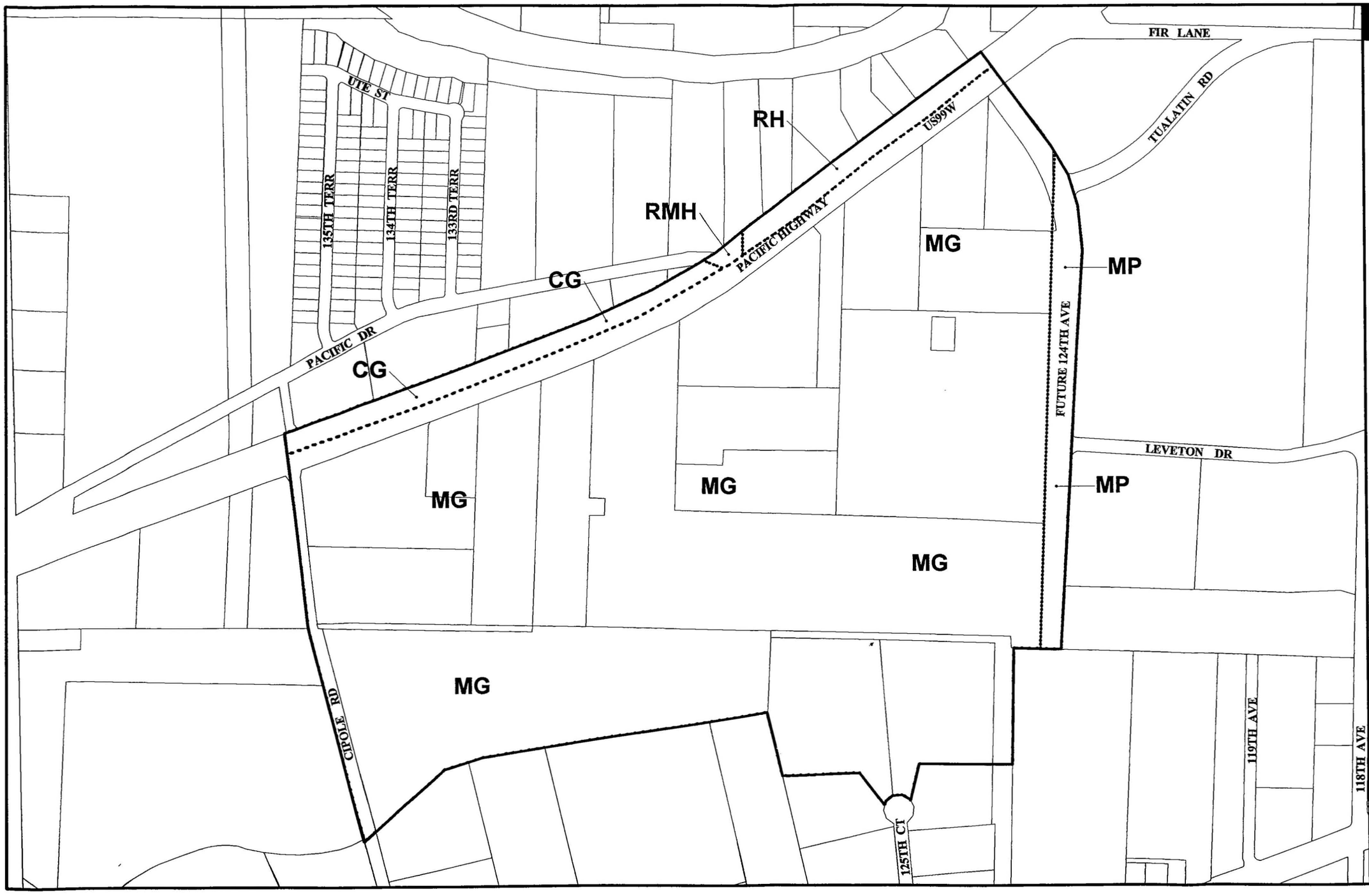

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Quarry Sector Subarea Technical Report Map 4: Planning District Designations

Study Area Boundary

Planning Districts

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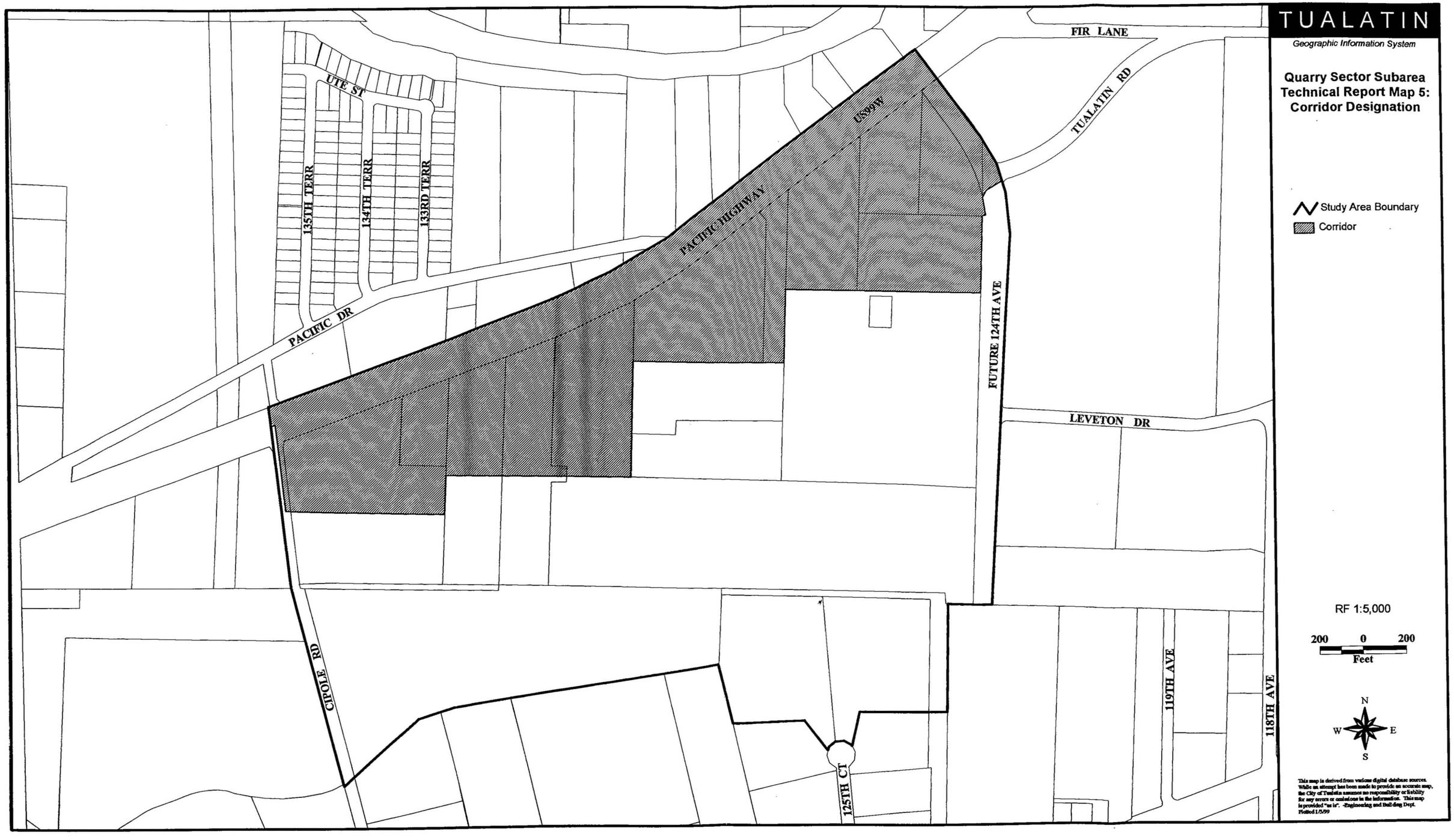

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Quarry Sector Subarea Technical Report Map 5: Corridor Designation

Study Area Boundary

Corridor

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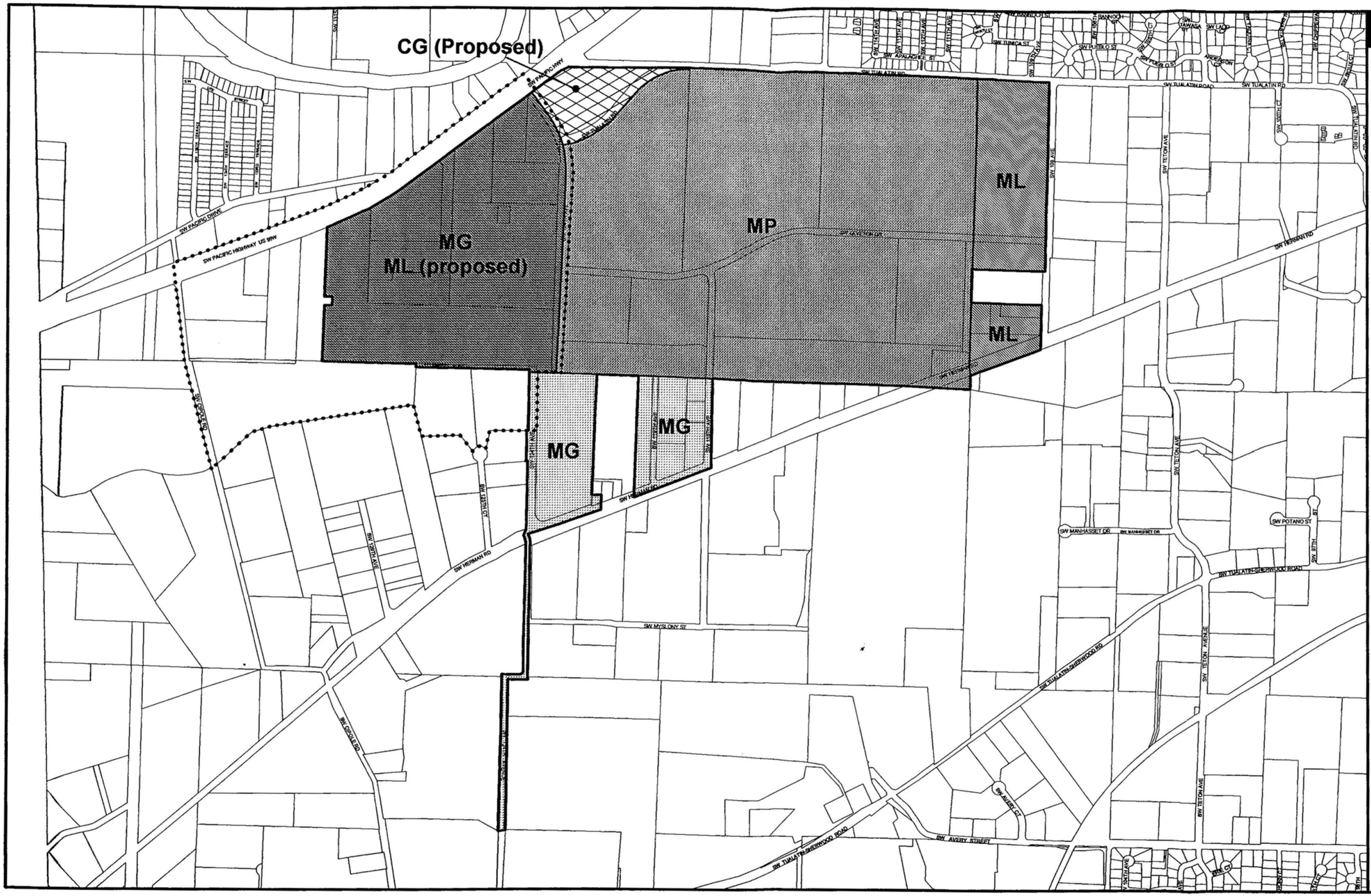

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Quarry Sector Subarea Technical Report Map 6: LTIP Planning District Designation

Study Area Boundary

LTIP Boundary

COMMERCIAL

CG (General)

MANUFACTURING

MG (General)

MG (General, Light Prop.)

ML (Light)

MP (Park)

500 0 500

Feet

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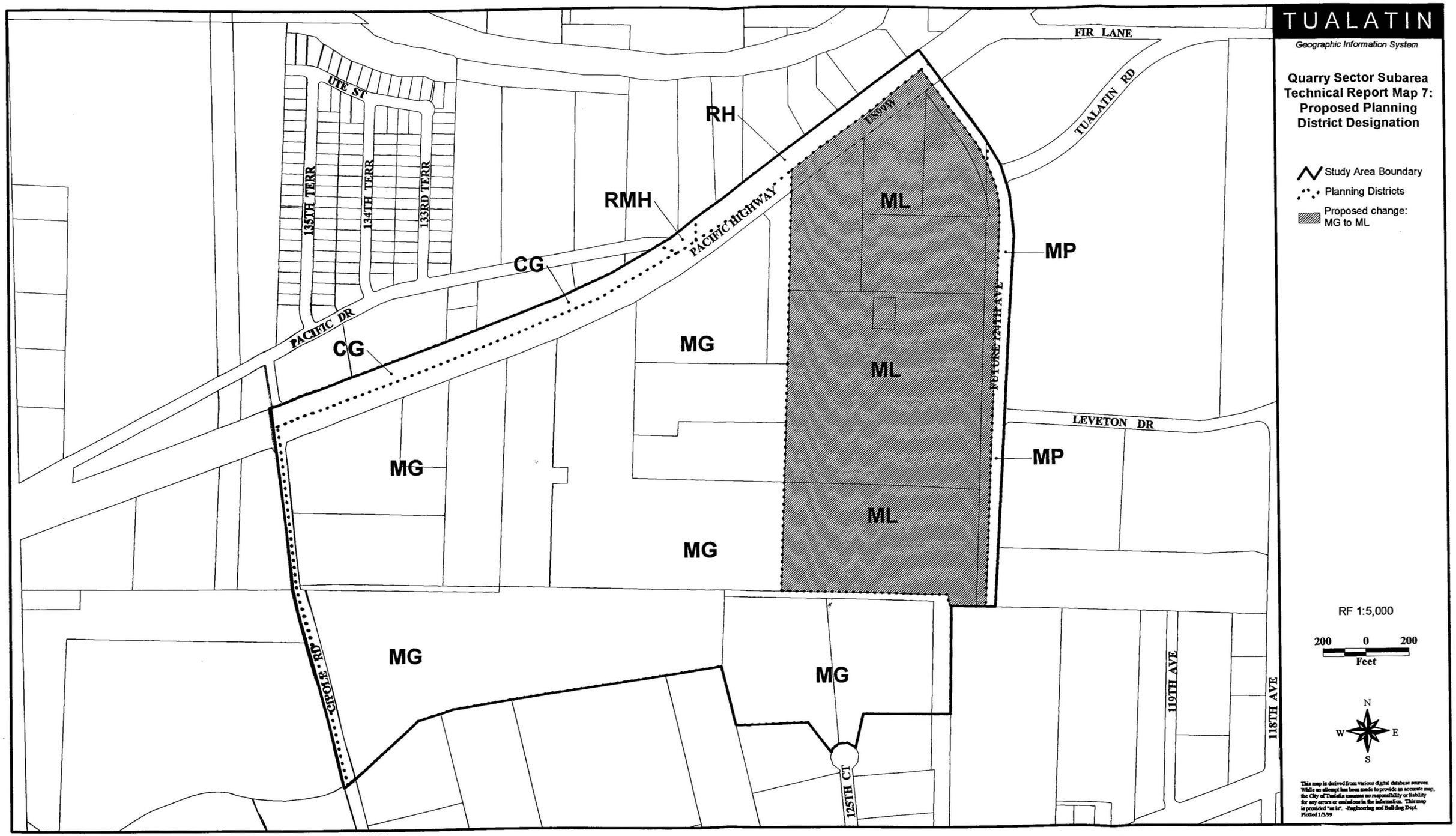

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Quarry Sector Subarea Technical Report Map 7: Proposed Planning District Designation

Study Area Boundary

Planning Districts

Proposed change: MG to ML

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CHAPTER 3: TOPOGRAPHY

Background

General Topography

The Quarry Sector has a diverse topography. On the north boarder is SW Pacific Highway. Parallel to the highway is a terrace area of varying width which mirrors the profile of the highway. South of this terrace is a steep slope with a grade change of 40-50 feet. This transitions to a lower terrace which slopes downward to the south to Cummins Creek.

Mining Operations

In addition to the various plan amendments and developments outlined in Chapter 2 which have occurred within the Quarry Sector, property owners have embarked on a number of private land modification activities. These generally fall into the category of mining or filling operations.

The Quarry Sector area historically has seen extensive land surface alterations. These activities generally were to remove sand through surface mining operations which affected 11 parcels. Most of the activity occurred prior to initiation of 1972 regulations of the Oregon Department of Geology and Mineral Industries (DOGAMI) and before annexation to the City in 1982. On two of the parcels being mined for sand, Washington County approved conditional use permits. These included:

CU-24-65 (now Tax Lot 2600) Tax Lot 2700, Tax Map 2S121A, August 1965.
CU-15-63 (now Tax Lot 2501) Tax Lot 2500, Tax Map 2S121A, July 1963.

DOGAMI has also issued permits for mining on Tax lots 2500, 2501 and 2600 (Ingram) under a total exemption provision due to the amount of material being removed. Because of the exemption there are no requirements for a reclamation plan for these parcels. This permit was not renewed in 1999 and has expired.

Filling Operations

Several parcels within the area have commenced filling operations to reclaim land for development opportunities. This is reflected in the filling operations past and present on Tax Lots 1801 (CEC), 2000 (Macaulay), 2100 (Grimm), 2200 (Hock), 2203 (Ingram), 2300 (Speight), and 2500, 2501, 2600 (Ingram/ Henriksen). It is the intent of the various owners to re-establish the topography in the area such that industrial development can occur over the long term.

Objectives

1. Reclaim areas which have been mined for top soil and sand with material which can accommodate future industrial development.

2. Provide development areas with grades which accommodate industrial development.

3. Provide fill in the upper terrace area which can accommodate industrial development and provide vehicular access.

4. Further the objectives listed in the LTIP related to land reclamation.

Topography Options

Topography options for the Quarry Sector area are based on the five transportation alternatives and existing grades.

Base Scenario (Current Plan)

In this scenario filling activities are generally associated with the Frontage Road. Adequate fill would need to be provided to accommodate the 60-foot right-of-way and associated improvements. In order to provide developable areas associated with this roadway additional fill would be required based on the size of building to be constructed. In general terms about one acre of fill, exclusive of the roadway, would be required to accommodate the typical 20,000 - 30,000 square foot industrial building constructed in Tualatin. The filling activities would generally create a 1:1 slope with a grade difference of 40-50 feet between the upper terrace and lower terrace. Rock walls may be utilized to as outlined by owners in the 1:1 slope areas.

Fill also is required for Quarry Road in the wetland areas. Enough fill would be required to cross the wetland area through permits issued from State and Federal agencies. The National Marine Fisheries Service (NMFS) listing of salmon and steelhead make filling wetlands a more complicated task.

This alternative rates below average.

Alternative 1

In Alternative 1, fill to establish the upper terrace area is similar to the Base Scenario. To accommodate the transportation system fill would be required for SW 130th Avenue, Leveton Drive and Aspen Court. In order to meet the 10% maximum grade requirement for SW 130th Avenue, the intersection of

SW 130th Avenue and SW Leveton Drive would need to be at approximately 143 feet. This requires approximately 4 feet to 15 feet of fill with associated side slopes of 2:1.

For Leveton Drive the minimum grade would need to be .05%. The planned elevation of the SW Leveton Drive/SW 124th Avenue intersection is approximately 146 feet. The existing surface elevation varies from 138.5 feet to 134 feet in the roadway corridor.

To accommodate Aspen Court, fill would be required to provide a finish elevation of approximately 180 feet at the cul-de-sac bulb.

To address the shared access easements east and west of SW 130th Avenue, additional fill would be required on Tax Lots 2000 and 2100. Existing buildings preclude this option.

With this transportation system and filling, terrace levels would be created which have a relationship to the respective roadway alignments and grades. The terraces east of SW 130th Avenue would consist of 3-4, while west of SW 130th there likely would be 2-3 terraces.

This alternative rates average.

Alternative 1 (Modified)

This Alternative exhibits the same issues as Alternative 1 with the exception of access to the northeast quadrant. Due to the corridor for 125th Place, fill will be required from SW Leveton Drive to the north. Land on ether side would need to be terraced to have a relationship with this roadway. Three to four terraces would be created.

This alternative rates average.

Alternative 1 (Modified A)

This Alternative exhibits the same issues as Alternative 1 with the exception of access to the northeast quadrant. Due to the corridor for 125th Place, fill will be required from SW Leveton Drive to the north. Land on ether side would need to be terraced to have a relationship with this roadway. Three to four terraces would be created. SW Leveton Drive elevations will need to be coordinated amongst the property owners due to the number of alternatives available and due t the alignment of SW 128th Avenue.

This alternative rates average.

Alternative 2

Alternative 2 provides similar topographic relief as Alternative 1. The exception is the removal of SW 130th Avenue and the maximum grade requirements. This alternative would require less topography modification than Alternative 1.

This alternative rates average.

Alternative 3

Alternative 3 requires the least amount of topography modification. The primary issue would be the shared accesses to the mid-block access point on SW Pacific Highway.

This alternative rates above average.

Conclusion

With the past mining operations which have occurred in this area, the topography has been severely altered. Reclamation of the area can be achieved in a number of ways based on the transportation alternatives. There are two primary issues presented which are the upper terrace adjacent to SW Pacific Highway and the lower terrace. These two areas are separated by approximately 40 feet in elevation. Each alternative discussed requires fill to be provided to establish a transportation system with developable parcels. The outcome of the fill activity will be to create 2-4 terrace areas from north to south within the study area. Alternative 3 has the best rating due to the least amount of topography modification for streets and associated public infrastructure.

CHAPTER 4: WETLANDS

Background

The Quarry Sector is an area which has been identified to have numerous wetlands which are both natural and man made. Overall the study area has approximately 8.81 acres.

Fishman Study 1992

In 1992 the first wetland study was conducted in the area through a grant from the Oregon Division of State Lands (ODSL) to the City. The study was conducted by Fishman Environmental Services. This study identified the main east/west channel (Cummins Creek) along the southern boundary of the study area as a wetland. In addition, wetlands were identified on Tax Lots 300 and 400, Tax Map 2S121DA (Key Knife & Au/Bentley) and in the alignment of the future east/west road connecting SW Cipole Road and the future SW 124th Avenue. On Tax Lot 100, Tax Map 2S121D (Martin) the fire pond was determined to have been man-made and was not classified as a wetland.

CH2M Hill Study 1991

In 1991 the Tualatin Development Commission hired CH2M Hill to conduct wetland work as part of a wetland boundary/fill/mitigation project for SW 118th Avenue and SW 124th Avenue. The report for that study indicated wetlands were present within the anticipated alignment of SW 124th Avenue and on Tax Lots 2100 and 2600, Tax Map 2S121A (Grimm and Ingram/Henriksen). A ODSL and U.S. Army Corps of Engineers (USACE) permit was issued to fill wetlands within SW 124th Avenue (ODSL # 6283).

ODSL Permit 12257

In 1997 wetlands located on Tax Lots 300 and 400, Tax Map 2S121DA (Key Knife & Au/Bentley) south of the east/west road (Quarry Road) were permitted by the ODSL and the USACE to be filled and mitigated. This project changed the channel location for a portion of Cummins Creek, but retained the wetlands within the existing ROW for the east/west road (Quarry Road).

Goal 5

In 1997 the City prepared a comprehensive wetland program for the City's planning area (ORD. No. 979-97, PTA-95-07). As part of the work program, further clarification was provided on the location of possible wetlands. As previously indicated the Cummins Creek was identified along with wetlands

immediately west of SW 124th Avenue. In addition, pond areas created by mining activities were evaluated. Certain wetlands were identified to be protected and noted under the Natural Resource Protection Overlay District (NRPOD) as Wetland Conservation (WCNA). This designation allows 30% of a wetland to be filled. Other wetlands (man-made pond areas which are remnants of mining activity) were not designated to be protected. Map 8, Page 35 identifies the location of wetlands and possible wetlands and man-made ponds within the study area.

Objectives

1. Minimize the impact on wetland areas.

2. Protect identified wetland areas in compliance with the NRPO.

3. Delineate wetland areas identified in the NRPO on a parcel by parcel basis in conjunction with development applications.

4. Comply with the Oregon Division of State Lands (ODSL) and U.S. Army Corps of Engineers (USACE) permitting process for filling jurisdictional wetlands.

5. Utilize wetlands as part of the study areas overall storm drainage system.

Wetland Options

Based on the available wetland boundary information along with approved ODSL and USACE permits it was identified that the east/west road (Quarry Road) presented a significant conflict. Options were considered in identifying alternative transportation, sewer, water and storm drainage systems ranging from filling portions of significant wetland areas to avoiding wetland areas.

Base Scenario - (Current Plan)

The Base Scenario provides the greatest impact to identified wetlands. Calculations indicate that approximately 1 acre would need to be filled to accommodate the east/west road (Quarry Road). Additionally, mitigation would have to occur for the fill area at a ratio ranging from 1:1 to 4:1 depending on the type of mitigation proposed. Required mitigation would reduce the amount of available developable land and be a costly option.

This alternative rates below average.

Alternative 1

Alternative 1 significantly reduces the impact on wetland areas, specifically wetlands which fall under the WCNA designation. By deleting the east half of the east/west road (Quarry Road) and moving it 800 feet to the north as an extension of Leveton Drive, the alignment would extend through wetlands classified by the City as non-significant. These non-significant wetlands are man-made ponds which do not require ODSL and USACE permits to be filled. A substantial amount of this non-significant wetland was filled in 1998. This alignment also removes the impact of a water line project through the WCNA identified in the Base Scenario (see Chapter 10). The result is a reduction in wetland impacts, elimination of mitigation requirements, providing additional developable land and reducing public infrastructure construction costs.

This alternative rates above average for minimizing wetland impacts.

Alternative 1 (Modified)

Alternative 1 has the same issues and benefits as Alternative 1 described above.

This alternative rates above average for minimizing wetland impacts.

Alternative 1 (Modified A)

Alternative 1 has the same issues and benefits as Alternative 1 described above. The alignment of SW 128th Avenue through a pond which was man-made should not present any wetland issues.

This alternative rates above average for minimizing wetland impacts.

Alternative 2

Alternative 2 has the same issues and benefits as Alternatives 1 and 1 (Modified) described above.

This alternative rates above average for minimizing wetland impacts.

Alternative 3

This alternative has the least amount of impact on wetlands in the area due to minimal roadway development. The primary impact is on the non-significant wetlands in the alignment of SW Leveton Drive.

This alternative rates above average for minimizing wetland impacts.

Conclusion

Based on the identified objectives, Alternatives 1, 1 (Modified), 2 and 3 provide minimal impact on wetlands within the study area and are rated above average. These alternatives additionally provide for maintaining hydrology to wetland areas via storm drain systems. The Base Scenario has the greatest impact on wetlands and requires ODSL/USACE permits and mitigation and is rated below average.

TUALATIN

Geographic Information System

Quarry Sector Subarea Technical Report Map 8: Wetland/Natural Areas

- Study Area Boundary
- Wetland Conservation District
- Open Space Preservation District
- Other Natural Areas
- Nonsignificant Wetlands

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Alternative 1 (Modified)

Alternative 1 (Modified) indicates all public rights-of-way will be located out of the 100-year flood plain as discussed in Alternative 1.

This alternative rates above average for flood plain issues.

Alternative 1 (Modified A)

Alternative 1 (Modified A) indicates all public rights-of-way will be located out of the 100-year flood plain as discussed in Alternative 1.

This alternative rates above average for flood plain issues.

Alternative 2

Alternative 2 exhibits the same pro and con issues as Alternative 1 and 1 (Modified).

This alternative rates above average for flood plain issues.

Alternative 3

Alternative 3 indicates all public rights-of-way will be located out of the 100-year flood plain as discussed in the above alternatives.

This alternative rates above average for flood plain issues.

Conclusion

All five of the transportation alternatives identify roadways located out of the 100-year flood plain. Overall, all five of the transportation alternatives meet the objective of locating a transportation system out of the 100 year flood plain and would be acceptable and rate above average.

TUALATIN

Geographic Information System

Quarry Sector Subarea Technical Report Map 9: Flood Plain

Study Area Boundary

100 Year Floodplain

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CHAPTER 6: SOILS

Background

Soils within the study area were identified by the United States Department of Agriculture, Soil Conservation Service (SCS) in 1975. There are six soils types identified which include:

13	Cove silty clay loam
21B	Hillsboro loam, 3-7 percent slopes
22	Huberly loam
30	McBee silty clay loam
37B	Quatama loam, 3-7 percent slopes
43	Wapato silty clay loam

In addition there is a Borrow Pit designation. These soil types are identified on Map 10, Page 45.

Soils with symbols 13, 22, 30, 37B and 43 are classified as hydric or have hydric soil inclusions. These soils are generally wet, moderate to poorly drained, flood and are representative of wetland environments.

According to the SCS, Table 8, the soils within the Quarry Sector have the following issues when associated with roadway development:

13	Cove silty clay loam. Severe: floods, wetness, low strength.
21B	Hillsboro loam, 3-7 percent slopes. Moderate: low strength
22	Huberly loam. Severe: wetness
30	McBee silty clay loam. Severe: floods.
37B	Quatama loam, 3-7 percent slopes. Moderate: low strength.
43	Wapato silty clay loam. Severe: floods, wetness.

As identified in Chapter 3 of this report, the study area has been historically mined for sand. These operations have removed significant amounts of the native soil which will need to be reclaimed in order to establish a transportation system and create developable parcels of land. It will be important as parcels within the study area are reclaimed through the City's permitting process that soils with the correct structural integrity are utilized.

Objectives

1. Locate roadways on the best possible soils within the study area and out of hydric soil areas.

2. Provide replacement soils for mined areas conducive to the sub-grade structural integrity for development of a transportation system and future industrial development.

Soils Options

Base Scenario (Current Plan)

The transportation system reflected in the Base Scenario, specifically Quarry Road, is located on three of the hydric soil classification areas (22 & 43) which provides an unstable base due to their wet conditions. Additionally, the Frontage Road is located partially in a borrow pit area which will require soil import to develop the roadway. To mitigate these situations, additional costs would be incurred either privately or publicly.

This alternative rates below average due to hydric soils.

Alternative 1

Alternative 1 indicates SW Leveton Drive, SW Cummins Street, SW 130th Avenue and SW Aspen Court to be located on soils which are moderately stable. A short segment of SW Cummins Street would be located within a hydric soil area (43). This alternative also requires import of soil material to provide suitable grades for development of the transportation system and developable parcels.

This alternative rates average due to soil stability.

Alternative 1 (Modified)

Alternative 1 (Modified) indicates SW Leveton Drive, SW Cummins Street, SW 130th Avenue and SW 125th Place to be located on soils which are moderately stable. A short segment of SW Cummins Street would be located within a hydric soil area (43). This alternative also requires import of soil material to provide suitable grades for development of the transportation system and developable parcels.

This alternative rates average due to soil stability.

Alternative 1 (Modified A)

Alternative 1 (Modified A) indicates SW Leveton Drive, SW Cummins Street, SW 130th Avenue and SW 125th Place to be located on soils which are moderately stable. A segment of SW Cummins Street would be located within

a hydric soil area (43). This alternative also requires import of soil material to provide suitable grades for development of the transportation system and developable parcels.

This alternative rates average due to soil stability.

Alternative 2

Evaluation of Alternative 2 indicates it has the same soil issues as Alternatives 1 and 1 (Modified).

This alternative rates average for soil stability.

Alternative 3

Alternative 3 indicates SW Cummins Street would be located on soils which are moderately stable. A short segment of SW Cummins Street would be located within a hydric soil area (43). This alternative requires the least amount of soil import for development of a transportation system and developable parcels.

This alternative rates above average for soil stability.

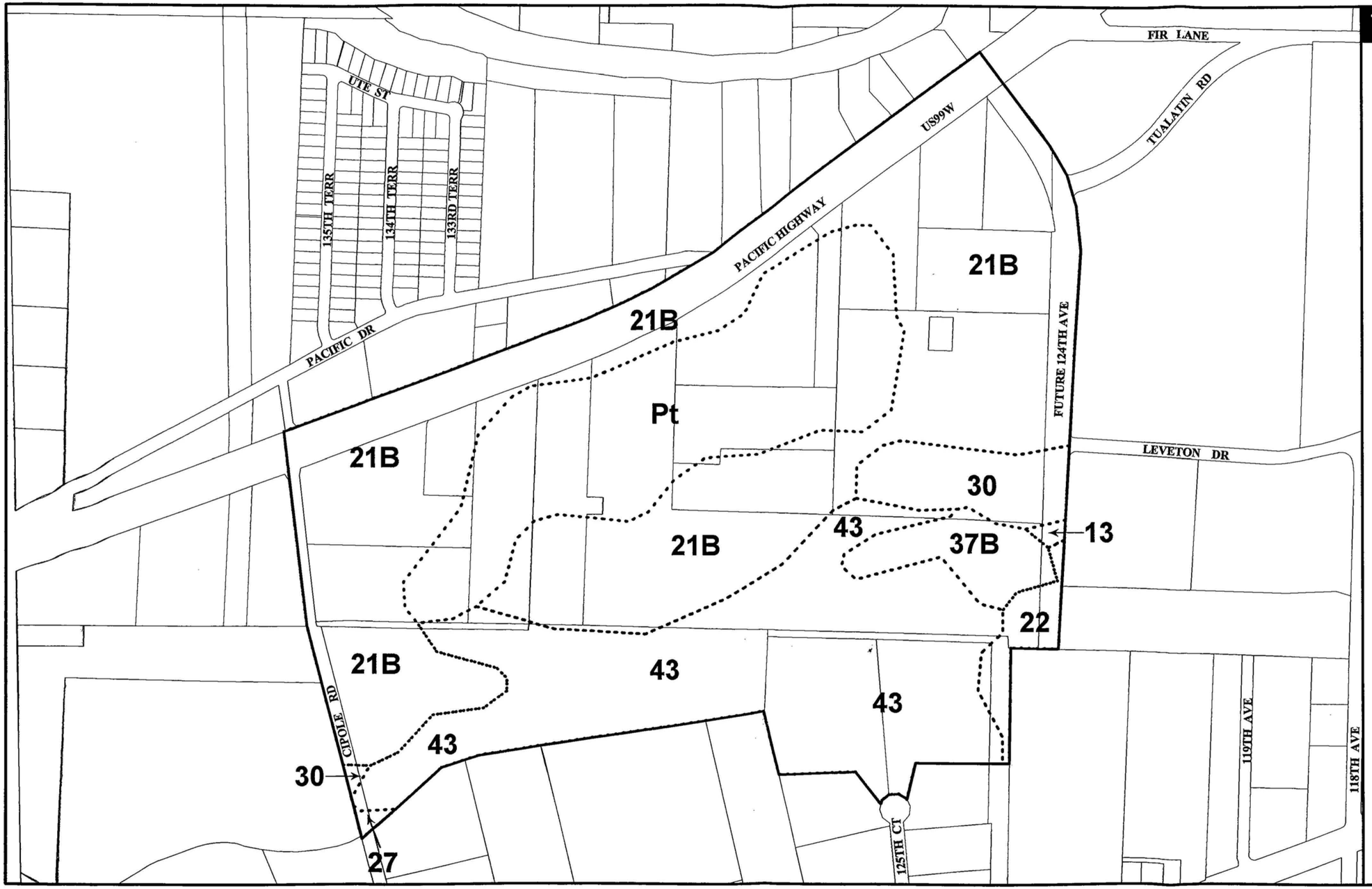
Conclusion

Soil conditions within the study area are represented by types which are moderate to severe concerning development of a transportation system. These soils though are reflective of soils located throughout the Tualatin area where other transportation systems have been developed. The Base Scenario is the most problematic of the five (5) alternatives due to hydric soil conditions and the need to import soil to establish a terrace area for the development of the Frontage Road. This alternative rates below average due to hydric soils.

Alternatives 1, 1 (Modified), 1 (Modified A) and 2 eliminate the issue of addressing hydric soils and the need to provide fill material for development of the Frontage Road. Some fill will be necessary for development of SW 130th Avenue and the cul-de-sac of Aspen Court. Alternatives 1, 1 (Modified), 1 (Modified A) and 2 rate average for soil stability.

Alternative 3 has similar issues to Alternatives 1, 1 (Modified) and 2 with the exception that there is no soil import necessary because there are no internal streets proposed. Alternative 3 rates above average.

Overall, Alternatives 1, 1 (Modified), 1 (Modified A), 2 and 3 meet the objectives of locating a transportation system out of hydric soil areas.



TUALATIN

Geographic Information System

Quarry Sector Subarea Technical Report Map 10: Soils

- Study Area Boundary
- Soil Boundaires

13	COVE SILTY CLAY LOAM
22	HUBERLY SILT LOAM
27	LABISH MUCKY CLAY
21B	HILLSBORO LOAM, 3-7% SLOPES
30	MCBEE SILTY CLAY LOAM
Pt	PIT
37B	QUATAMA LOAM, 3-7% SLOPES
43	WAPATO SILTY CLAY LOAM

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CHAPTER 7: TRANSPORTATION

Background

PA-83-03 (ORD. NO. 592-83) established the transportation system at the boundary of the Quarry Sector area. This included the existing SW Pacific Highway classified as an arterial and SW Cipole Road classified as a collector. New roadways were also identified which included SW 124th Avenue identified as an arterial and a westward extension of SW Tualatin Road from its intersection with SW 124th Avenue identified as a local street.

The extension of SW Tualatin Road was identified as the Frontage Road and began the implementation of access management provisions along SW Pacific Highway discussed in further detail in Chapter 8. In addition to the existing roadways and new street alignments, new intersections were identified which included SW 124th Avenue/SW Tualatin Road and SW Pacific Highway/SW 124th Avenue.

Leveton Tax Increment Plan (1985 and 1988)

The 1985 version of the LTIP identified a new roadway connecting SW 124th Avenue and SW Cipole Road. The corridor identified was through the middle of the Quarry Sector area, but did not align with SW Leveton Drive. On the north side of this roadway was a loop roadway to service the lower terrace area.

In 1988 the corridor for this roadway was shifted to the south approximately 500 feet and identified as a collector. The loop portion extending north of this roadway was eliminated from the plan.

Tualatin Development Code, Chapter 11

Following the initial planning of the transportation system in 1983, several amendments have occurred. The most notable was the modification in 1993 to the right-of-way (ROW) width for arterial and collector streets to accommodate bicycles in compliance with the Transportation Planning Rule (TPR). This increased the ROW width from 60 feet to 72 feet for Quarry Road. Figure 1, Page 51, shows the 72-foot cross-section.

Transportation Jurisdiction

The jurisdiction over the existing or planned transportation system is a hierarchy of the State, County and City. ODOT controls SW Pacific Highway. WACO controls SW Cipole Road. Finally, the City has the authority over SW 124th Avenue and any internal roadways within the study area (Frontage Road and

Quarry Road). All three jurisdictions must coordinate changes to the transportation system.

Objectives

1. Develop a transportation plan which meets the objectives of Chapter 11, Transportation, of the TDC.

2. Develop a transportation plan which best fits the topography of the area.

3. Develop a transportation plan which minimizes the displacement of existing businesses.

4. Develop a transportation plan which meets objectives of the Oregon Department of Transportation, Washington County and the City of Tualatin.

5. Develop a transportation system which minimizes the impacts to existing wetlands in the study area.

6. Develop a transportation system which maximizes access to all parcels within the study area.

7. Develop a transportation plan which can be developed in phases during the next 2 to 40 years.

Transportation Options

Appendix 2 and 3 contain a trip distribution analysis and traffic operations summary for the six alternatives which are discussed below. The two reports detail the impacts of the various alternatives based on PM peak hour year 2015 traffic assuming 35 percent building coverage for general light industrial development using the 1994 Highway Capacity Manual. The reports provide advantages and disadvantages for each street network alternative, describe Level of Service (LOS) and Volume to Capacity (v/c) ratios at identified intersections, outline lane configurations, indicate future traffic signal locations and provides recommendations as to the best alternative. The difference in trips generated in the various alternatives is due to differing amounts of developable land which is a function of the amount of rights-of-way necessary.

Street Systems

The following summarizes the six alternative street systems, lane configurations and traffic signal locations. Detailed information is contained in Appendix 2 and 3.

Base Scenario (Current Plan)

Map 11, Page 63 identifies the planned transportation system outlined within the TDC and is referred to as the Base Scenario. The Base Scenario identifies a major collector (Quarry Road) with a 72-foot ROW on the southern boundary and a 60-foot ROW for the Frontage Road paralleling SW Pacific Highway. This alternative generates 1,860 PM peak hour trips.

Advantages:

- Allows some traffic movement between SW Cipole Road and SW 124th avenue without utilizing SW Pacific Highway.

Disadvantages:

- Generated trips would need to travel through congested intersections at SW 124th/SW Pacific Highway, SW 124th/SW Tualatin Road and SW Cipole Road/SW Pacific Highway.
- In order for the Frontage Road to function it would need to be approximately 400-450 feet south of the SW Cipole Road/SW Pacific Highway intersection. This leaves inadequate spacing between the Frontage Road and Quarry Road to accommodate left turn pockets.
- Compounds the congested situation at SW 124th Avenue/SW Tualatin intersection.
- Does not provide for north/south traffic movement through internal portions of the study area.
- Requires traffic signal at Quarry Road and SW 124th Avenue at a reverse curve location.
- Requires a third lane north bound on SW Pacific Highway.
- Displaces existing business and bisects property creating less desirable development areas.
- Requires second right turn lane from SW 124th Avenue to SW Pacific Highway.
- Requires two right and two left turn lanes from SW Cipole Road onto SW Pacific Highway.

This alternative is the least desired by the property owners due to business displacement and access restrictions to SW Pacific Highway and by WACO due to impacts on SW Cipole Road. ODOT also does not support this alternative due to congestion issues at SW 124th Avenue and SW Pacific Highway. Their comments are contained in Appendices 4 and 5.

This alternative rates below average for transportation issues.

Alternative 1

This alternative is identified on Map 12, Page 65. In this alternative 1,905 PM peak hour trips are generated. Alternative 1 eliminates the Frontage Road and shifts the eastern half of the east/west road north as an extension of SW Leveton Drive. The western half retains its original alignment and becomes SW Cummins Street. In addition a new north/south roadway, SW 130th Avenue, is identified midway between SW Cipole Road and SW 124th Avenue. In the northeast quadrant of the study area a cul-de-sac is indicated which connects to SW 124th Avenue. New traffic signals would be required at SW 124th/SW Leveton Drive and SW Cipole Road/SW Cummins Street.

Under this alternative the ROW's would be 60 feet and classified as Local Commercial Industrial (B-CI) streets. Figure 1, Page 51 provides an example of the street cross-section.

Advantages:

- Provides greater overall connectivity than the Base Scenario.
- Relieves some of the congestion at the SW Pacific Highway intersections.
- Provides for north/south public traffic movement through the study area.
- Provides the east/west connection between SW 124th Avenue and SW Cipole Road.

Disadvantages:

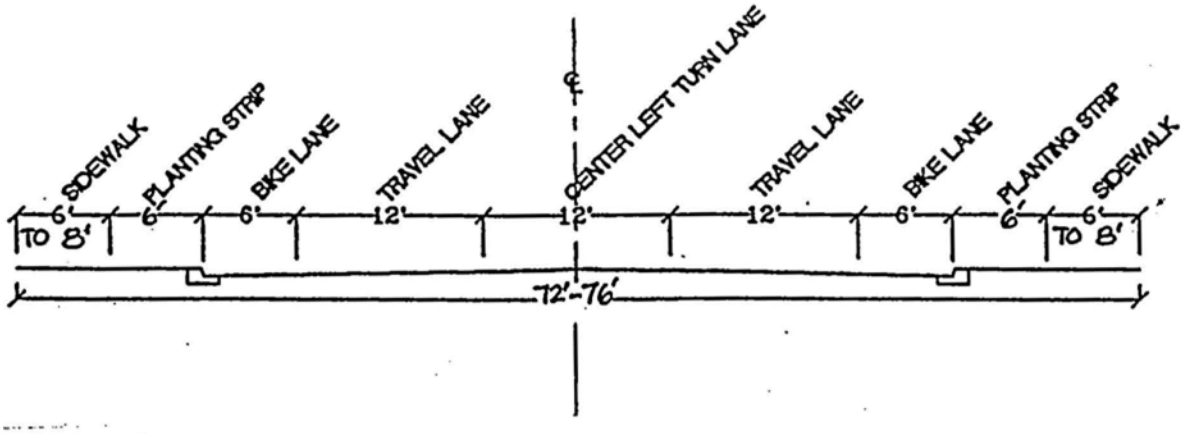
- The cul-de-sac connection to SW 124th Avenue increases congestion.
- Adds additional right turn lane from SW Cipole Road to SW Pacific Highway.
- Requires a third lane north bound on SW Pacific Highway.
- Requires traffic signal at SW Leveton Drive/SW 124th Avenue.
- Requires traffic signal at SW Cummins Street/SW Cipole Road.
- Requires second right turn lane from SW 124th Avenue to SW Pacific Highway.
- Requires two left turn lanes from SW Cipole Road onto SW Pacific Highway.

This alternative rates below average for transportation issues.

FIGURE 1

STREET CROSS-SECTIONS

Cb&t



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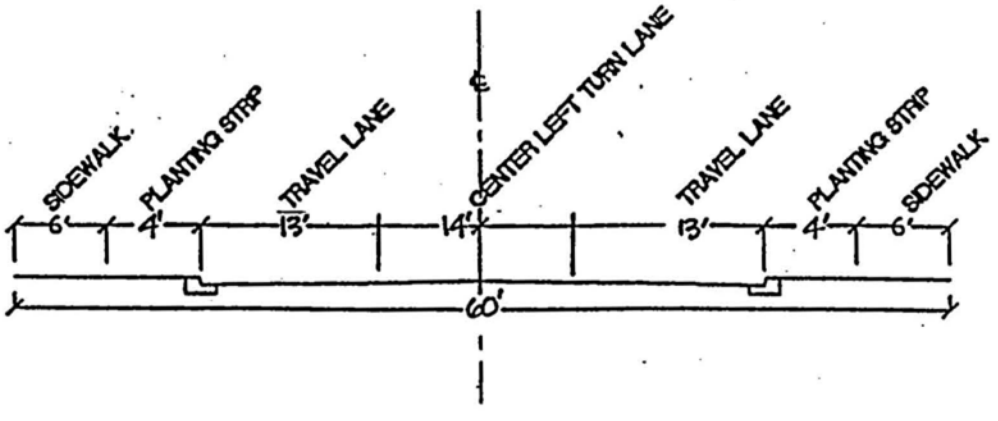

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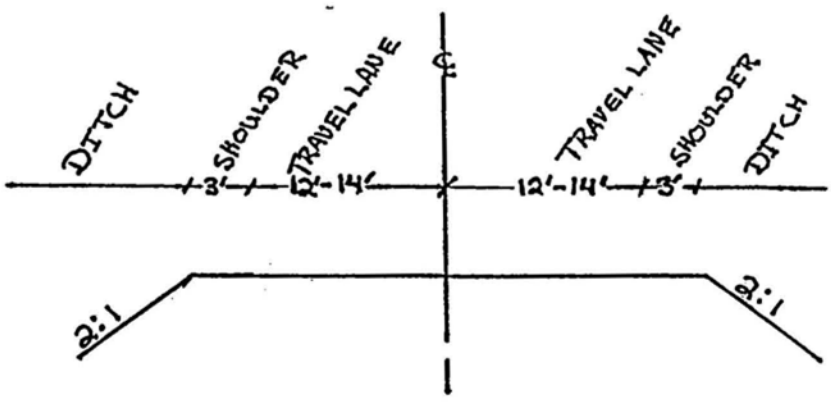

Alternative 1 (Modified)

This alternative is identified on Map 13, Page 67. In this alternative, 1,905 PM peak hour trips are generated. Alternative 1 (modified) eliminates the Frontage Road and shifts the eastern half of east/west road north as an extension of SW Leveton Drive. The western half retains its original alignment and becomes SW Cummins Street. In addition a new north/south roadway , SW 130th Avenue, is identified midway between SW Cipole Road and SW 124th Avenue. In the northeast quadrant of the study area a cul-de-sac is indicated which connects to SW Leveton Drive. New traffic signals would be required at SW 124th/SW Leveton Drive and SW Cipole Road/SW Cummins Street.

Under this alternative the ROW's would be 60 feet and classified as Local Commercial Industrial (B-CI) streets. Figure 1, Page 51, provides an example of the street cross-section.

Advantages:

- Reduces critical tuning movements at congested intersections.
- Provides greater overall connectivity than the Base Scenario.
- Relieves some of the congestion at the SW Pacific Highway intersections.
- Eliminates the fourth leg at the SW 124th Avenue/SW Tualatin Road intersection.
- Provides the east/west traffic movement between SW 124th Avenue and SW Cipole Road reducing traffic volumes on SW Pacific Highway.
- Provides for north/south public traffic movement through the study area.
- Identifies a traffic signal at SW Pacific Highway/SW 130th Avenue.

Disadvantages:

- Requires a traffic signal at SW 124th Avenue/SW Leveton Drive.
- Identifies a traffic signal at SW Pacific Highway/SW 130th Avenue which does not meet ODOT spacing requirements.
- Requires a third lane north bound on SW Pacific Highway.
- Requires second right turn lane from SW 124th Avenue to SW Pacific Highway.
- Requires two left turn lanes from SW Cipole Road onto SW Pacific Highway.
- Elimination of the signal at SW 130th Avenue/SW Pacific Highway requires a traffic signal at SW Cipole Road/SW Cummins Street.

This alternative rates above average for transportation issues.

Alternative 1 (Modified A)

This alternative is identified on Map 14, Page 69. In this alternative 1,905 PM peak hour trips are generated. Alternative 1 (Modified A) eliminates the Frontage Road and shifts the eastern one-third of east/west road north as an extension of SW Leveton Drive. The western two-thirds retains its original alignment and becomes SW Cummins Street. In addition a new north/south roadways, SW 130th Avenue and 128th Avenue are identified between SW Cipole Road and SW 124th Avenue which connect to SW Leveton Drive. In the northeast quadrant of the study area a cul-de-sac is indicated which connects to SW Leveton Drive. New traffic signals would be required at SW 124th/SW Leveton Drive and SW Cipole Road/SW Cummins Street.

Under this alternative the ROW's would be 60 feet and classified as Local Commercial Industrial (B-CI) streets. Figure 1, Page 51, provides an example of the street cross-section.

Advantages:

- Reduces critical tuning movements at congested intersections.
- Provides greater overall connectivity than the Base Scenario.
- Relieves some of the congestion at the SW Pacific Highway intersections.
- Eliminates the fourth leg at the SW 124th Avenue/SW Tualatin Road intersection.
- Provides the east/west traffic movement between SW 124th Avenue and SW Cipole Road reducing traffic volumes on SW Pacific Highway.
- Provides for north/south public traffic movement through the study area.

Disadvantages:

- Requires a traffic signal at SW 124th Avenue/SW Leveton Drive.
- Identifies a traffic signal at SW Pacific Highway/SW 130th Avenue which does not meet ODOT spacing requirements.
- Requires a third lane north bound on SW Pacific Highway.
- Requires second right turn lane from SW 124th Avenue to SW Pacific Highway.
- Requires two left turn lanes from SW Cipole Road onto SW Pacific Highway.
- Elimination of the signal at SW 130th Avenue/SW Pacific Highway requires a traffic signal at SW Cipole Road/SW Cummins Street.

This alternative rates above average for transportation issues.

Alternative 2

This alternative is identified on Map 15, Page 71. In this alternative 1,950 PM peak hour trips are generated. Alternative 2 eliminates the Frontage Road and shifts the eastern half of east/west road north as an extension of SW Leveton Court terminating as a cul-de-sac. SW Cummins Court also terminates a cul-de-sac. Connection between these two cul-de-sacs is via shared access easements. A north/south shared access roadway is identified midway between SW Cipole Road and SW 124th Avenue. In the northeast quadrant of the study area a cul-de-sac is indicated which connects to SW 124th Avenue. New traffic signals would be required at SW 124th/SW Leveton Court and SW Cipole Road/SW Cummins Court.

Under this alternative, the ROW's would be 60 feet and classified as Local Commercial Industrial (BCI). Figure 1, Page 51 provides an example of the street cross-section.

Advantages:

- Similar to Alternative 1.

Disadvantages:

- Similar to Alternative 1.
- Does not provide the public east/west connection between SW 124th Avenue and SW Cipole Road.
- Adds congestion to the critical SW Pacific Highway intersections.
- Requires a third lane north bound on SW Pacific Highway.
- Requires second right turn lane from SW 124th Avenue to SW Pacific Highway.
- Requires two left turn lanes from SW Cipole Road onto SW Pacific Highway.

This alternative rates below average.

Alternative 3

This alternative is identified on Map 16, Page 73. In this alternative 1,975 PM peak hour trips are generated. Alternative 3 eliminates the Frontage Road and the eastern half of the east/west Quarry Road. A north/south shared access roadway is identified midway between SW Cipole Road and SW 124th Avenue. The eastern half of the study area has no roadways identified. Access to SW 124th Avenue would be via driveways.

Under this alternative the ROW's would be 60 feet and classified as Local Commercial Industrial (B-CI) streets. Figure 1, Page 51 provides an example of the street cross-section.

Advantages:

- The mid block SW Pacific Highway shared driveway access eases congestion at the SW Cipole and SW 124th Avenue intersections with SW Pacific Highway.

Disadvantages:

- Limited access to the study area.
- Does not provide the public east/west connection between SW 124th Avenue and SW Cipole Road.
- Adds congestion to the critical SW Pacific Highway intersections.
- Requires two right-turn lanes from SW 124th Avenue to SW Pacific Highway.
- Requires a third lane north bound on SW Pacific Highway.
- Requires second right turn lane from SW 124th Avenue to SW Pacific Highway.
- Requires two left turn lanes from SW Cipole Road onto SW Pacific Highway.

This alternative rates below average for transportation issues.

Level of Service (LOS) and Volume to Capacity Ratios (v/c)

The LOS and v/c ratio varies based on the alternative evaluated. The targeted maximum LOS and v/c is D and .90 based in the new 1999 Oregon Highway Plan for SW Pacific Highway and LOS of E in Urban Growth Management Functional Plan for all other roadways. Table 3, Page 57-58 is a summary of the LOS and v/c ratios described in the text of Appendix 3. Included in the table is the associated average delay. The values indicated are based on the 1994 Highway Capacity Manual which is used by the City to establish LOS and v/c. This methodology differs from ODOT's which uses v/c and not delay to determine the LOS. There are situations where the LOS and v/c ratio are similar for the various alternatives, but the delay figure is wide ranging.

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Table 3

Quarry Sector Level of Service, Volume/Capacity Ratios and Delay Summary

	BASE SCENARIO	ALTERNATIVE 1	ALTERNATIVE 1 (MODIFIED)	ALTERNATIVE 1 (MODIFIED A) (using Alt 4 #'s)	ALTERNATIVE 2	ALTERNATIVE 3
Cipole Rd/Quarry Rd	LOS = E	LOS = C	LOS = E	LOS = B	LOS = B	LOS = C
(Cummins Street)	V/C = .49	V/C = .70	V/C = .67	V/C = .72	V/C = .66	V/C = .79
	DEL = 31.5	DEL = 15.4	DEL = 40.5	DEL = 12.5	DEL = 13.6	DEL = 19.2
	CM = WBLT					
		Signalized		Signalized*	Signalized	Signalized
Cipole Rd/Frontage	LOS = E					
Rd	V/C = .35					
	DEL = 30.7					
	CM = WBLT					
99W/Cipole Rd	LOS = C ***(D)***	LOS = D ***(E)***	LOS = D ***(E)***	LOS = D ***(E)***	LOS = D ***(E)***	LOS = D ***(E)***
	V/C = .84	V/C = .91	V/C = .95	V/C = .93	V/C = .94	V/C = .93
	DEL = 22.7	DEL = 27.1	DEL = 27.2	DEL = 27.7	DEL = 27.8	DEL = 28.7
	Signalized	Signalized	Signalized	Signalized	Signalized	Signalized
99W/West Side		LOS = C	LOS = C	LOS = C	LOS = C	LOS = C
RIRO		V/C = .20	V/C = .21	V/C = .21	V/C = .29	V/C = .45
		DEL = 10.1	DEL = 10.2	DEL = 10.2	DEL = 11.3	DEL = 14.5
		CM = NBRT	CM = NBRT	CM = NBRT	CM = NBRT	CM = NBRT
99W/Center RIRO		LOS = C	LOS = C	LOS = E	LOS = D	LOS = F
		V/C = .55	V/C = .87	V/C = .80	V/C = .64	V/C = >1.0
		DEL = 17.9	DEL = 15.8	DEL = 32.5	DEL = 22.1	DEL = >45
		CM = NBRT		CM = NBRT	CM = NBRT	CM = NBRT
			Signalized**			
99W/East Side		LOS = C	LOS = C	LOS = C	LOS = C	LOS = D
RIRO		V/C = .21	V/C = .27	V/C = .27	V/C = .18	V/C = .61
		DEL = 12.0	DEL = 13.6	DEL = 13.6	DEL = 11.9	DEL = 27.4
		CM = NBRT	CM = NBRT	CM = NBRT	CM = NBRT	CM = NBRT

	BASE SCENARIO	ALTERNATIVE 1	ALTERNATIVE 1 (MODIFIED)	ALTERNATIVE 1 (MODIFIED A) (using Alt 4#'s)	ALTERNATIVE 2	ALTERNATIVE 3
99W/124th Ave	LOS = D *(E)*	LOS = D *(E)*	LOS = D *(E)*	LOS = D *(E)*	LOS = D *(E)*	LOS = C *(D)*
	V/C = .94	V/C = .94	V/C = .95	V/C = .96	V/C = .97	V/C = .90
	DEL = 26.4	DEL = 26.1	DEL = 27.5	DEL = 27.9	DEL = 29.3	DEL = 22.8
	Signalized	Signalized	Signalized	Signalized	Signalized	Signalized
124th Ave/Tualatin Rd/	LOS = D	LOS = C	LOS = C	LOS = C	LOS = C	LOS = C
Frontage Road/	V/C = .80	V/C = .74	V/C = .76	V/C = .77	V/C = .79	V/C = .77
Cul-de-sac	DEL = 27.9	DEL = 20.6	DEL = 15.9	DEL = 15.9	DEL = 22.3	DEL = 20.4
	Signalized	Signalized	Signalized	Signalized	Signalized	Signalized
124th Ave/Leveton Dr.	LOS = F	LOS = C	LOS = C	LOS = C	LOS = C	LOS = C
	V/C = .79	V/C = .56	V/C = .55	V/C = .55	V/C = .60	V/C = .43
	DEL = >45	DEL = 21.0	DEL = 20.9	DEL = 21.1	DEL = 21.7	DEL = 16.4
	CM = WBLT					
		Signalized	Signalized	Signalized	Signalized	Signalized
124th Ave/Quarry Rd	LOS = B					
	V/C = .38					
	DEL = 12.6					
	Signalized					

LOS values based on 1994 Highway Capacity Manual Procedures

(D) & (E) based on ODOT Volume/Capacity Values to Establish LOS

Signalized* - Signal may be necessary due to no signal at 99W/130th Avenue

Signalized** - Signal is opposed by ODOT

c:Quarry/Table1QuarrySectorLOSChart6199

The LOS value attributed to the various alternatives, as previously stated, is derived from the 1994 Highway Capacity Manual. The methodology used bases the LOS on average vehicle delay which is at both signalized and un-signalized intersections. This methodology is summarized in the following tables.

Table 4

Level of Service Criteria for Signalized Intersections

Level of Service (LOS)	Stopped Delay per Vehicle (seconds)
A	≤ 5.0
B	5.1 to 15.0
C	15.1 to 25.0
D	25.1 to 40.0
E	40.1 to 60.0
F	> 60.0

Table 5

Level of Service Criteria for Un-signalized Intersections

Level of Service (LOS)	Average Total Delay per Vehicle (seconds)
A	≤ 5.0
B	5 to 10
C	10 to 20
D	20 to 30
E	30 to 45
F	> 45

The LOS and v/c are critical to the implementation of a transportation system. One of the objectives is to provide a transportation system which optimizes the distribution of traffic while ensuring intersections function adequately. There are three primary transportation streets which include SW Pacific Highway, SW 124th Avenue and SW Cipole Road.

Base Scenario - (Current Plan)

As Table 3, Page 57-58 and Appendix 3 indicates the LOS at the street intersections on SW Cipole Road function at E. On SW Pacific Highway the LOS is C and D. For SW 124th Avenue the LOS is either B, D or F at the respective intersections.

Alternative 1

Table 3, Page 57-58 and Appendix 3 indicates that with Alternative 1 there is a distribution of traffic with all intersections (signalized and un-signalized) operating at a LOS of C or D.

Alternative 1 (Modified)

Alternative 1 (Modified) if similar to Alternative 1 with and LOS range of C or D with two exceptions. The first is the SW Cipole Road/SW Cummins Street intersection. Table 3, Page 57-58 and Appendix 3 indicate a LOS of E. Due to ODOT's objection to a signal at SW 130th Avenue/SW Pacific Highway a signal would need to be installed at SW Cipole Road/SW Cummins Street which modifies the LOS to B. The LOS at SW 130th Avenue/SW Pacific Highway would be E.

Alternative 1 (Modified A)

Alternative 1 (Modified A) if similar to Alternative 1 with and LOS range of C or D with two exceptions. The first is the SW Cipole Road/SW Cummins Street intersection. Table 3, Page 57-58 and Appendix 3 indicate a LOS of E. Due to ODOT's objection to a signal at SW 130th Avenue/SW Pacific Highway a signal would need to be installed at SW Cipole Road/SW Cummins Street which modifies the LOS to B. The LOS at SW 130th Avenue/SW Pacific Highway would be E.

Alternative 2

In Alternative 2 the LOS would range from B to D as indicated in Table 3 Page 57-58 and Appendix 3. The primary issue here is that the v/c and delay increase over Alternatives 1 and 1 (Modified).

Alternative 3

Alternative 3 has an LOS which ranges from C to F. At all of the analyzed intersections the delay is increased over all other alternatives except for SW Pacific Highway/SW 124th Avenue. The v/c ratio is also higher than all other alternatives.

Trip Generation

One of the questions of the property owners was the trip generation which could be expected on a parcel by parcel basis as build-out of the area occurs. Appendix 6 provides information based on the Institute of Transportation

Engineers Trip Generation, January 1991, all for trip generation for all of the alternatives. Map 17, Page 75, identifies the trip generation for Alternative 1 (Modified A).

Street Phased Improvement

Property owners expressed concerns over the phasing of street improvements in all of the alternatives. This included ½ street requirements and if there was an ability to have an interim cross-section provision for street development. This issue was evaluated and alternatives presented.

An interim cross-section was developed which identified a 24-28-foot pavement width, 3-foot shoulders, and 2:1 slopes to a ditch. Figure 1, Page 51, is a cross-section detail. This interim standard was identified to be utilized for segments of SW Cummins Street, SW 130th Avenue, SW 128th Avenue and SW Leveton Drive. The primary purpose of the interim standard was to allow phasing of the transportation system over time such that a desire to build a portion of the roadway now would be allowed, or to reflect less intensive development which would increase over time. In addition a portion of SW Leveton Drive and SW 130th Avenue were identified to be constructed initially as private drive aisles with conversion to public streets as traffic volumes warrant. The two property owners where this situation exists have agreed to dedicate the necessary right-of-way when required if the City of Commission develops the streets.

In regard to the phasing question, Map 18, Page 77, identifies how this could occur under Alternative 1 (Modified A). The concept is to develop segments of the transportation system over time to serve development proposals and in some cases at an interim cross-section.

The phasing option inspired an additional question as to when the complete system would need to be developed. This was also evaluated and determined that complete development of the system is dependent on development activity. As development projects are proposed, additional traffic analysis will need to occur to establish what mitigation needs to take place. Development will reach a threshold where connecting the internal streets together becomes more cost effective than mitigating at the intersections. Ultimately, though, the intersection will also need to be upgraded. The phasing approach additionally allows parcels which have two or more street frontages an option as to which street gets improved first.

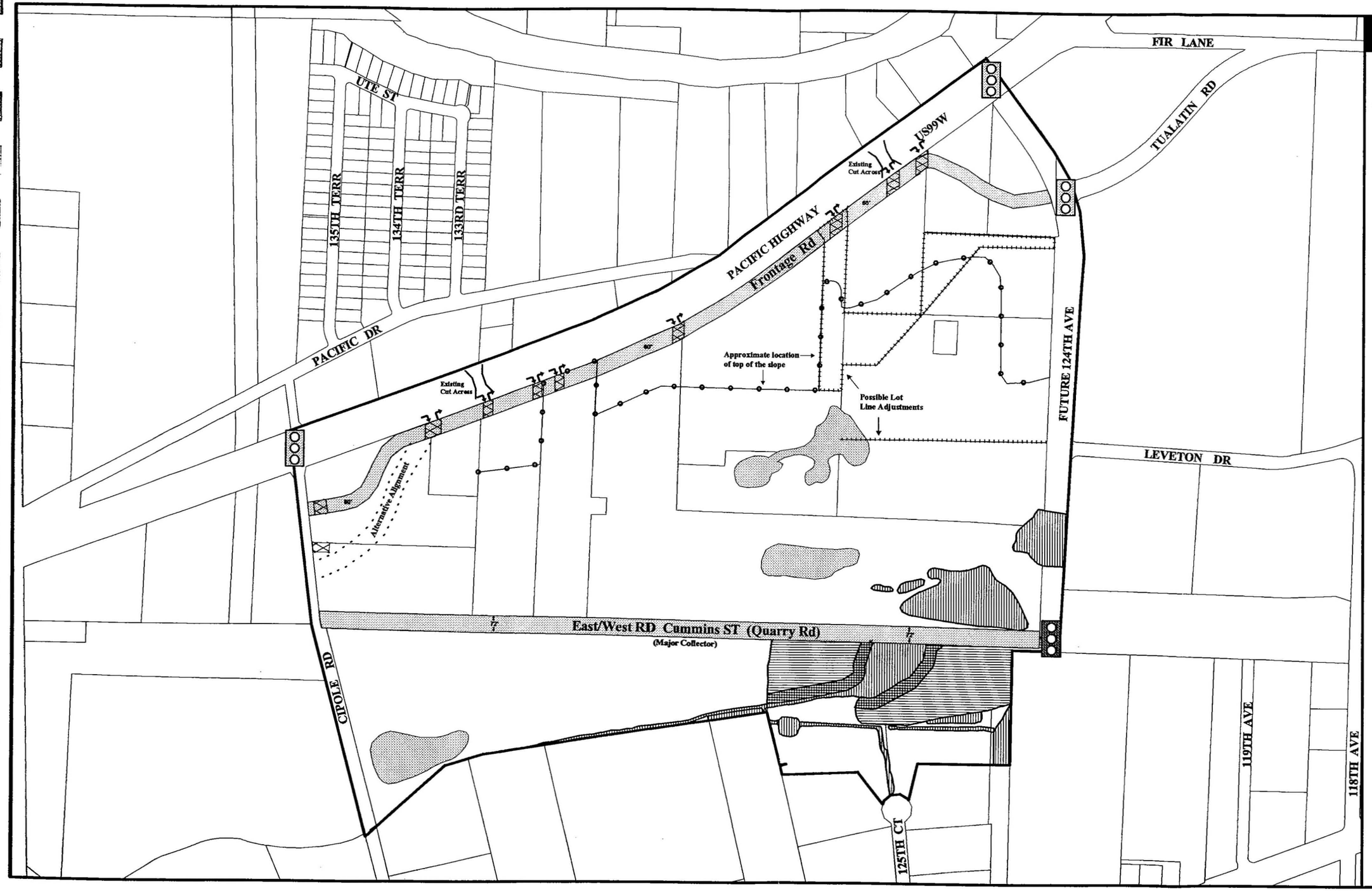
Conclusion

Each of the six transportation alternatives evaluated presented advantages and disadvantages. Alternative 1 (Modified A) was concluded to provide the best overall system as it:

- Reduces critical tuning movements at congested intersections.
- Provides greater overall connectivity than the Base Scenario.
- Relieves some of the congestion at the SW Pacific Highway intersections.
- Eliminates the fourth leg at the SW 124th Avenue/SW Tualatin Road intersection.
- Provides the east/west traffic movement between SW 124th Avenue and SW Cipole Road reducing traffic volumes on SW Pacific Highway.
- Provides for north/south traffic movement through the study area.
- Has a LOS and v/c ratio at the SW Pacific Highway intersections which meets acceptable thresholds.

In order to implement Alternative 1 (Modified A) the following improvements need to occur as traffic volumes and warrants are met:

- Modification to the SW Cipole Road/SW Pacific Highway intersection to accommodate two left turns from SW Cipole Road to SW Pacific Highway southbound movements.
- A traffic signal at the SW Cipole Road/SW Cummins Street intersection.
- Addition of a third northbound lane on SW Pacific Highway both north and south of the SW Pacific Highway/SW 124th Avenue intersection.
- A traffic signal at the SW 124th Avenue/SW Leveton Drive intersection.
- Two right turn lanes from SW 124th Avenue onto SW Pacific Highway.



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Quarry Sector Subarea Technical Report Map 11: Base Scenario

- Study Area Boundary
- Proposed Public ROW
- Existing Driveway Access
- Signalized Intersection
- Future Signalized Intersection
- Approximate location of top of slope
- Possible Lot Line Adjustments
- Wetland Conservation District
- Open Space Preservation District
- Other Natural Areas
- Nonsignificant Wetlands

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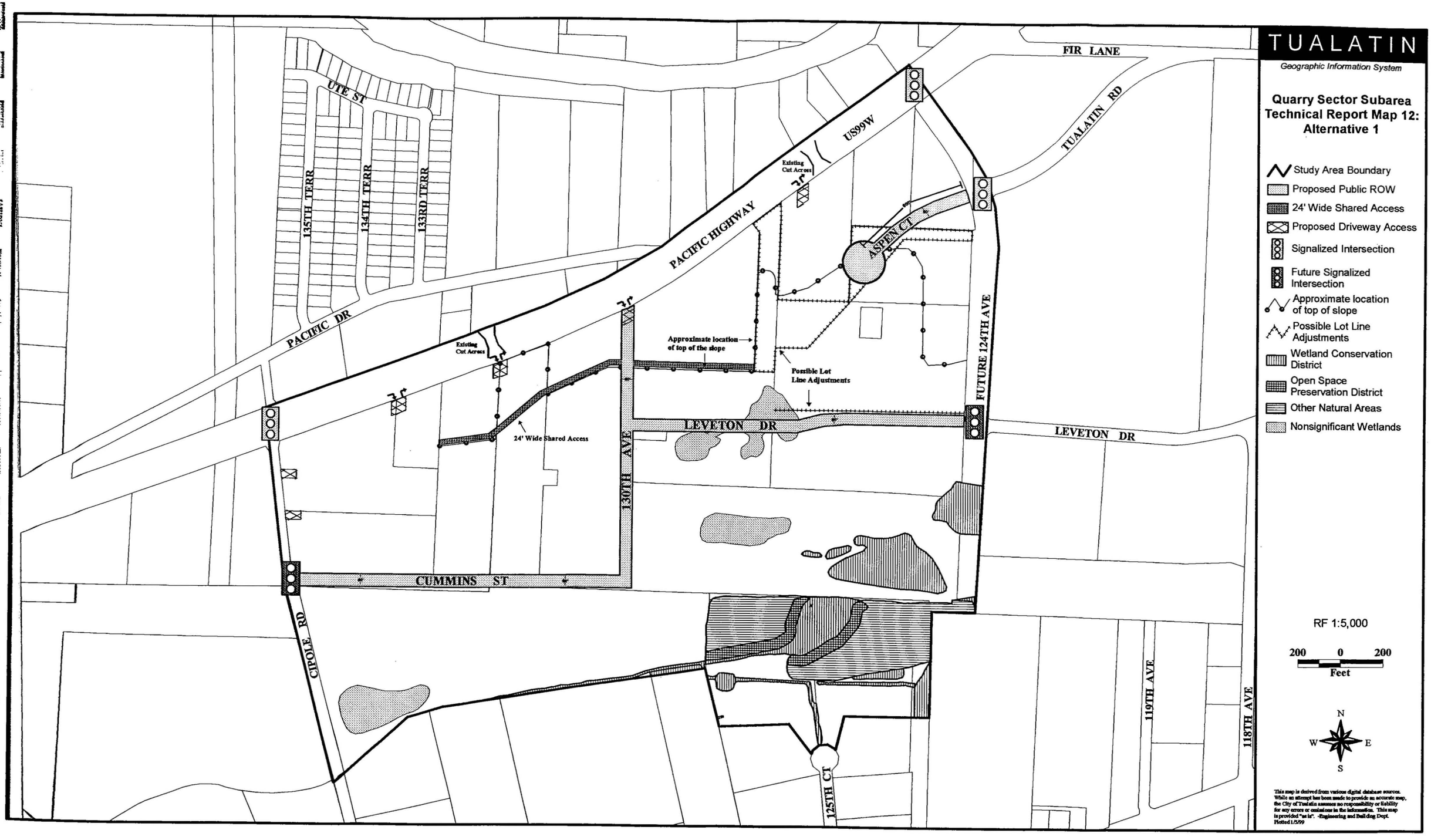
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Quarry Sector Subarea Technical Report Map 12: Alternative 1
Study Area Boundary
Proposed Public ROW
24' Wide Shared Access
Proposed Driveway Access
Signalized Intersection
Future Signalized Intersection
Approximate location of top of slope
Possible Lot Line Adjustments
Wetland Conservation District
Open Space Preservation District
Other Natural Areas
Nonsignificant Wetlands
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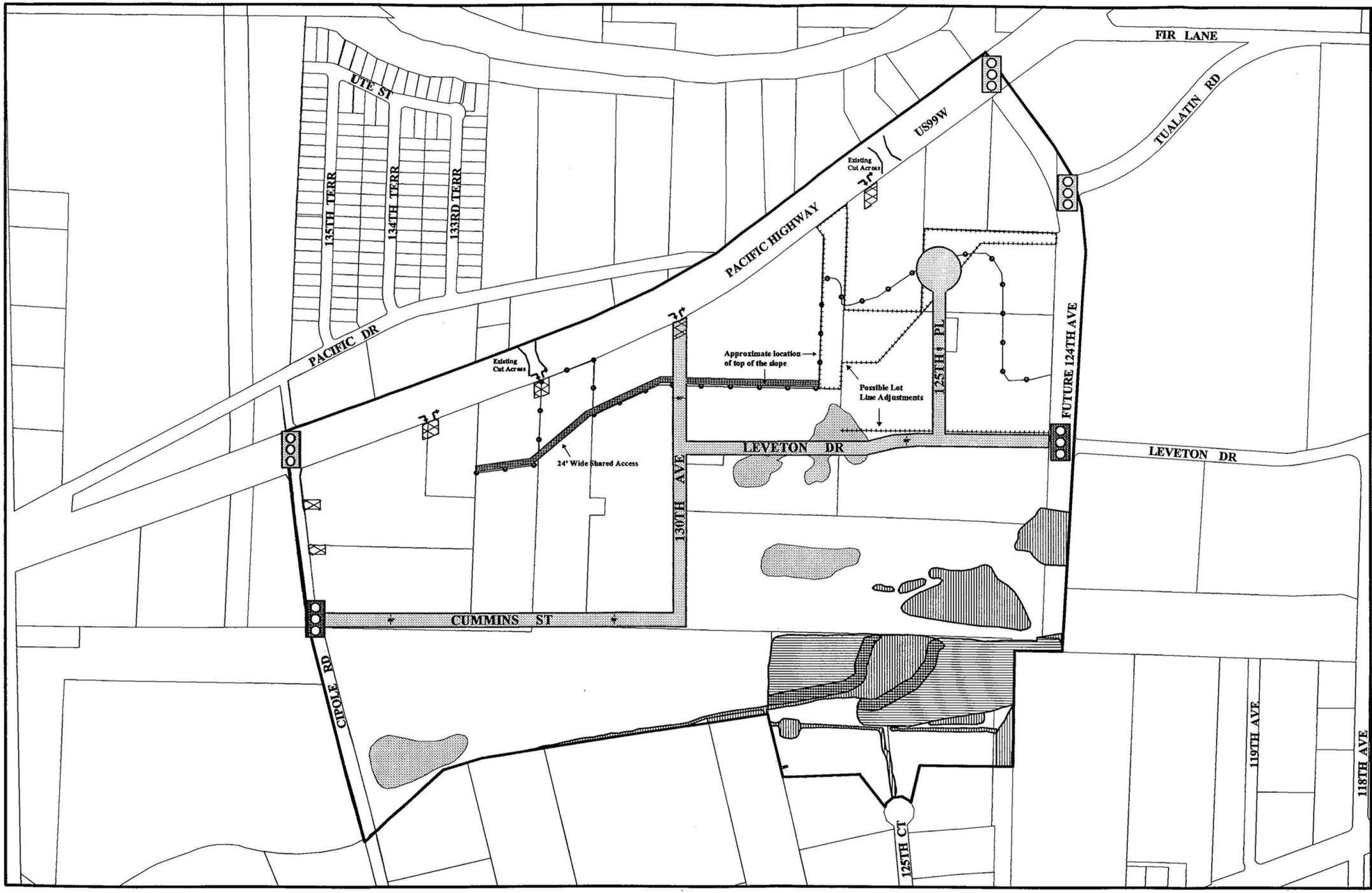
PACIFIC HIGHWAY
US99W
PACIFIC DR
UTE ST
135TH TERR
134TH TERR
133RD TERR
FIR LANE
TUALATIN RD
ASPEN CT
FUTURE 124TH AVE
LEVETON DR
LEVETON DR
130TH AVE
CUMMINS ST
CIPOLE RD
125TH CT
119TH AVE
118TH AVE
Existing Cut Across
Existing Cut Across
Approximate location of top of the slope
Possible Lot Line Adjustments
24' Wide Shared Access



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Quarry Sector Subarea Technical Report Map 13: Alternative 1 (Modified)

- Study Area Boundary
- Proposed Public ROW
- 24' Wide Shared Access
- Proposed Driveway Access
- Signalized Intersection
- Future Signalized Intersection
- Approximate location of top of slope
- Possible Lot Line Adjustments
- Wetland Conservation District
- Open Space Preservation District
- Other Natural Areas
- Nonsignificant Wetlands

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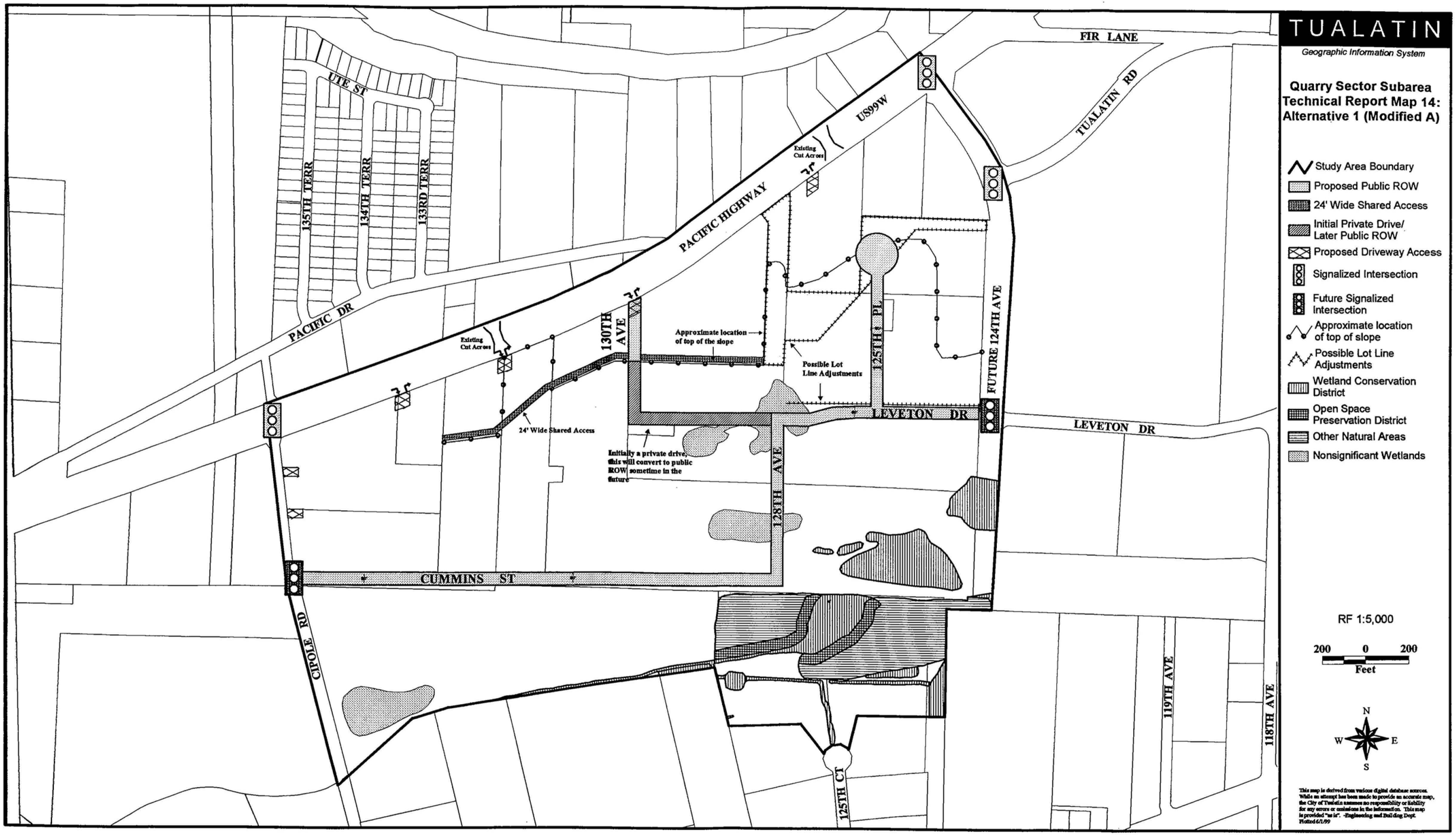

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Quarry Sector Subarea Technical Report Map 14: Alternative 1 (Modified A)

- Study Area Boundary
- Proposed Public ROW
- 24' Wide Shared Access
- Initial Private Drive/ Later Public ROW
- Proposed Driveway Access
- Signalized Intersection
- Future Signalized Intersection
- Approximate location of top of slope
- Possible Lot Line Adjustments
- Wetland Conservation District
- Open Space Preservation District
- Other Natural Areas
- Nonsignificant Wetlands

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Quarry Sector Subarea Technical Report Map 15: Alternative 2

- Study Area Boundary
- Proposed Public ROW
- 24' Wide Shared Access
- Proposed Driveway Access
- Signalized Intersection
- Future Signalized Intersection
- Approximate location of top of slope
- Possible Lot Line Adjustments
- Wetland Conservation District
- Open Space Preservation District
- Other Natural Areas
- Nonsignificant Wetlands

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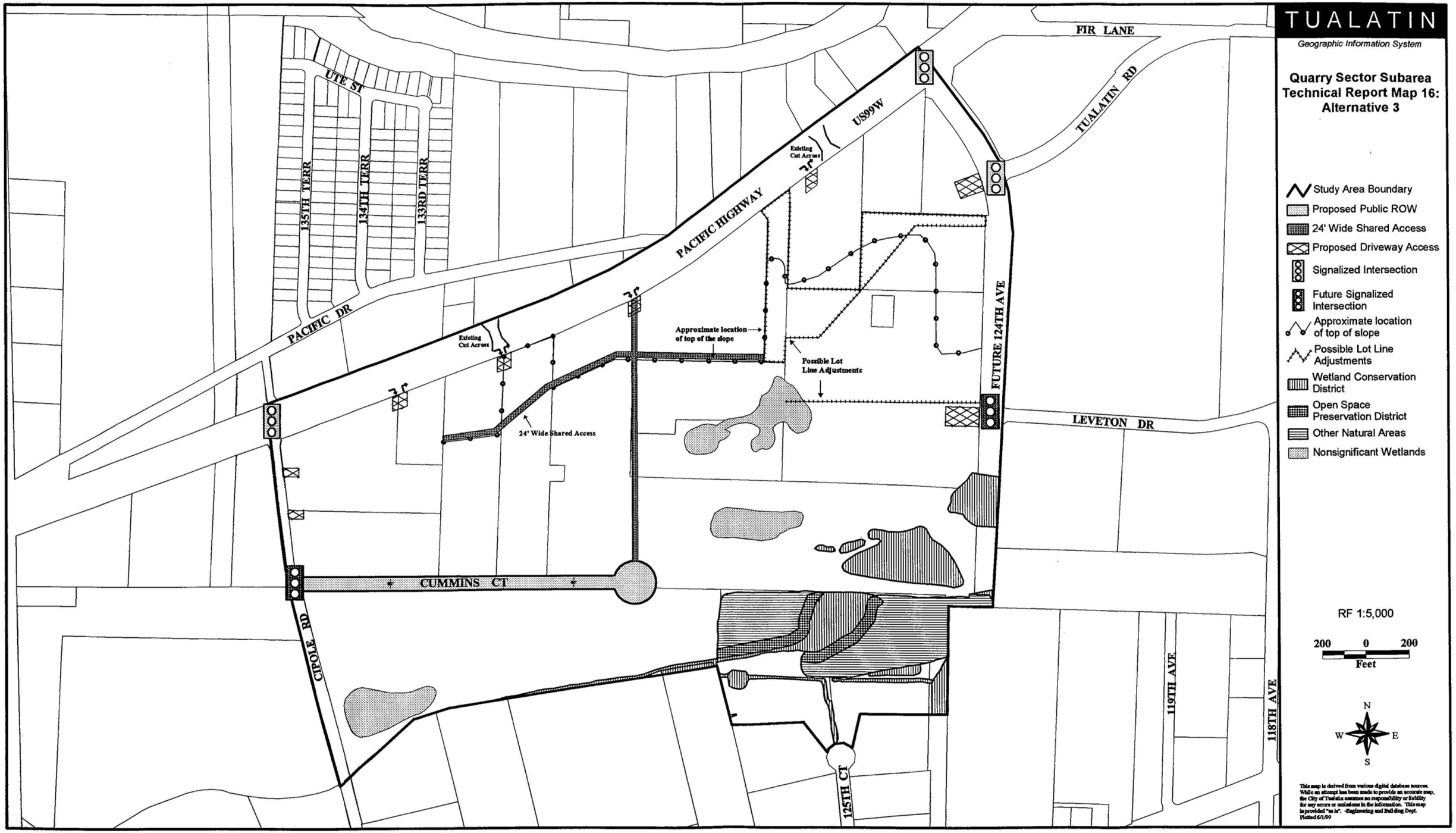

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Quarry Sector Subarea Technical Report Map 16: Alternative 3

- Study Area Boundary
- Proposed Public ROW
- 24' Wide Shared Access
- Proposed Driveway Access
- Signalized Intersection
- Future Signalized Intersection
- Approximate location of top of slope
- Possible Lot Line Adjustments
- Wetland Conservation District
- Open Space Preservation District
- Other Natural Areas
- Nonsignificant Wetlands

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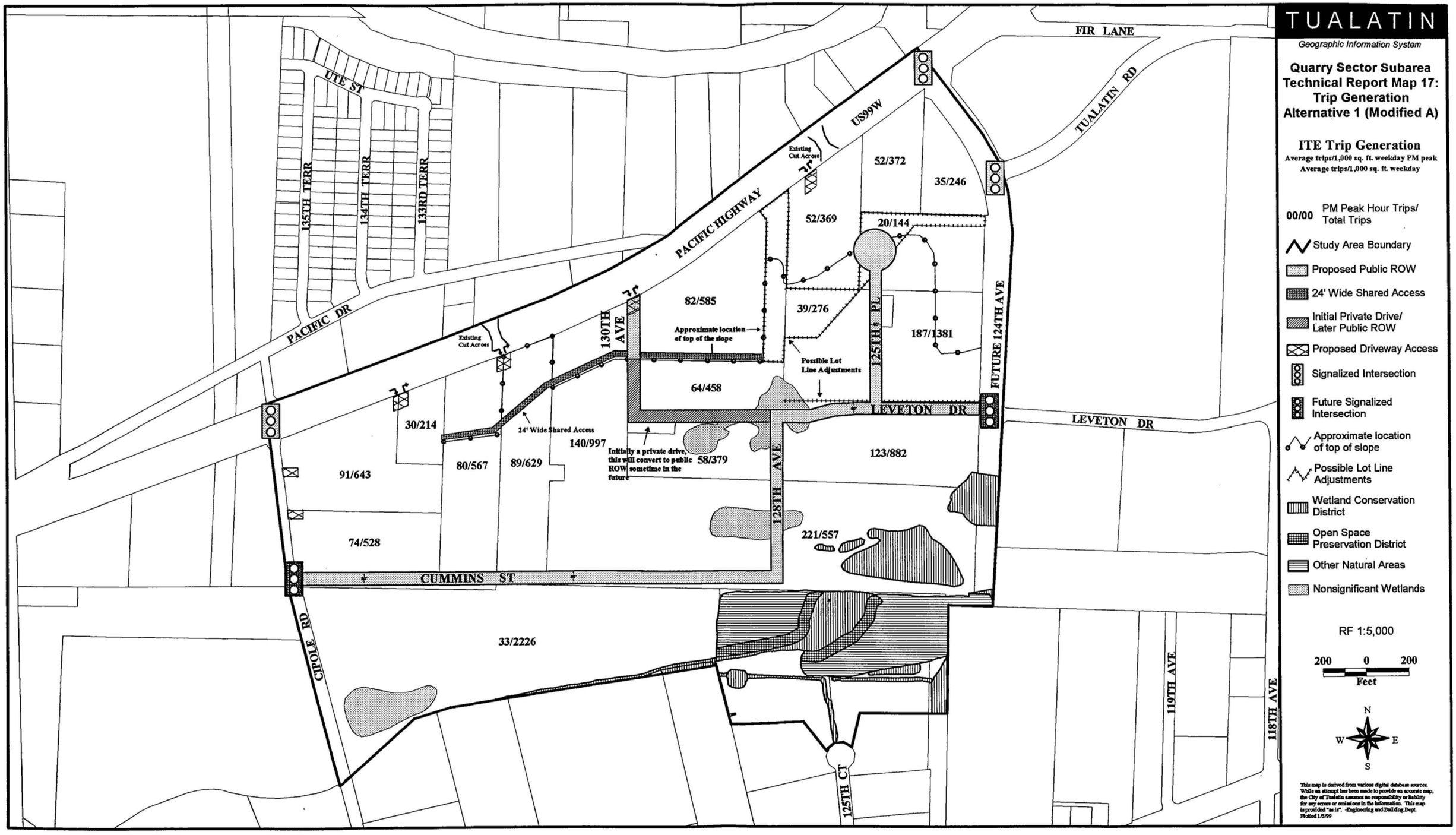

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Quarry Sector Subarea Technical Report Map 17: Trip Generation Alternative 1 (Modified A)

ITE Trip Generation

Average trips/1,000 sq. ft. weekday PM peak
Average trips/1,000 sq. ft. weekday

00/00 PM Peak Hour Trips/ Total Trips

- Study Area Boundary
- Proposed Public ROW
- 24' Wide Shared Access
- Initial Private Drive/ Later Public ROW
- Proposed Driveway Access
- Signalized Intersection
- Future Signalized Intersection
- Approximate location of top of slope
- Possible Lot Line Adjustments
- Wetland Conservation District
- Open Space Preservation District
- Other Natural Areas
- Nonsignificant Wetlands

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CHAPTER 8: ACCESS MANAGEMENT

Background

Oregon Department of Transportation

ODOT's first implementation of access management provisions for SW Pacific Highway began in 1954 when the State Highway Commission began purchasing right-of-way for widening. It was during these land purchases that property owners south of SW Pacific Highway, within the study area, were granted access to the highway. These access were fixed at specific mile markers, were set by width of driveway, and allowed for either restricted or unrestricted uses. Restricted accesses were commonly for farm use and residential use. Contained in the legal documentation which provided the access is language indicating that the accesses would be eliminated when a frontage road was developed. Since the first granting of access to SW Pacific Highway, the number, location of accesses, and driveway widths have been modified as requested by individual property owners. Appendix 7 contains a summary and map of access granted by the State. Presently there are eight (8) access driveways located between SW Cipole Road and SW 124th Avenue with another three driveways having permits which are not developed.

Based on this information, City staff inquired to ODOT about the viability of eliminating the Frontage Road and how that would affect the original deeds. A response was received from ODOT via the State Attorney Generals Office, which is contained in Appendix 8. In summary, the letter indicates that elimination of the Frontage Road and substitution of a alternative public access would be acceptable.

City of Tualatin Access Management (1984)

In 1984 access management provisions were incorporated into the Tualatin Development Code under ORD. NO. 635-84 (PTA-84-27). These provisions limited access locations along SW Pacific Highway and SW 124th Avenue bordering the Quarry Sector on the north and east. The access management provisions were implemented only for arterial streets identified within the TDC. The specifics of Tualatin's Access Management standards as it pertains to the Quarry Sector are contained in Chapter 75 of the TDC. These provision are included in Appendix 9. A brief summary of the provision are contained in the two following paragraphs.

For SW Pacific Highway, access provisions address the future development of a frontage road similar to the roadway envisioned by the State Highway Commission in 1954. At the time of development of the frontage road, existing

access to SW Pacific Highway would have been eliminated and access will be taken via the Frontage Road. In the interim, access is governed by ODOT by the use of access permits and by the City utilizing interim access approvals.

On SW 124th Avenue, access is limited to the Frontage Road intersection with SW 124th Avenue and the intersection of the east/west (Quarry Road) with SW 124th Avenue. Interim access can be approved by the City. ODOT has no access authority for SW 124th Avenue.

Based on the history of SW Pacific Highway, accesses there were numerous options discussed by the QSWG over the four and one-half year planning period. These ranged from allowing each property with SW Pacific Highway frontage direct access to allowing no access onto the highway between SW Cipole and SW 124th Avenue.

Initially all nine of the property owners with frontage on SW Pacific Highway wanted to retain the right to have direct access to the highway. This was in conflict with ODOT's position of reducing as many of the accesses as possible to maintain traffic flows on the highway and providing alternative access other than directly to the highway.

These divergent views lead to the Trip Distribution and Traffic Operations Summary discussed in Chapter 7 to determine the impacts of the various alternatives. Before this could occur, though, some baseline assumptions needed to be made. The first was that all properties having permanent direct access to the highway was not realistic in the long term. Second, properties only with frontage onto the highway would need access to the highway because of the lack of alternative access. Third was that topographic constraints may not allow for the elimination of all highway access.

Based on these assumptions, it was proposed that there be three or four driveway accesses onto SW Pacific Highway in addition to SW Cipole Road, SW 124th Avenue and the new SW 130th Avenue, which are reflected in the six transportation alternative scenarios.

Objectives

1. Limit the number of access onto SW Pacific Highway to maintain the north/south flow of traffic on the highway with limited interruptions.

2. Provide for interim access onto SW Pacific Highway until alternative accesses are provided.

3. Limit the number of access onto SW 124th Avenue to maintain the north/south flow of traffic on the arterial street with limited interruptions.

4. Provide for interim access onto SW 124th Avenue until alternative accesses are provided.

Access Management Options

Base Scenario (Current Plan)

The Base Scenario (Map 11, Page 63) provides for no direct access to SW Pacific Highway. Access is provided by the Frontage Road which connects at its east end at the SW 124th Avenue/SW Tualatin Road intersection and on the west end at SW Cipole Road approximately 450 feet south of the SW Cipole Road/SW Pacific Highway intersection. The existing driveways are interim only in nature subject to removal when the Frontage Road is developed. Presently all driveways are permissible through ODOT access permits. The City has no interim access permits on file.

Development of the Frontage Road for access purposes impacts several properties with existing development. This includes Tax Lots 1800 and 1900, Tax Map 2S121A (Grimm) cutting through the middle of this industrial recycling operation. For Tax Lot 1801, Tax Map 2S121A (CEC) the roadway cuts off a corner of the existing building. On Tax Lot 2400, Tax Map 2S121A (McCulloch) the roadway removes the existing building.

This alternative rates above average for managing access onto arterials.

Alternative 1

Alternative 1 identifies four access locations on SW Pacific Highway. Three of these accesses are right-in/right-out driveways. The fourth access would be a public street connection (SW 130th Avenue) limited to right-in/right-out. The general location of the accesses are identified on Map 12, Page 65. Shared access easements are also identified as a potential option for four properties to reduce individual access to the highway.

Specifically, accesses are identified as shared for Tax Lots 1800 (Grimm) and 1801 (CEC). This is due to the existing driveway location and the limited right-of-way frontage of the CEC site. The next access is also shared between Tax Lots 2000 (Macaulay) and 2101 (Anderson). The third access is the public street connection located between Tax Lots 2100 (Grimm) and 2200 (Hock). The fourth access would be located between SW 130th Avenue and SW 124th Avenue. The specific location would be determined at the time of development giving consideration to the existing crossover location and separation distance necessary from this access to SW 124th Avenue.

For SW 124th Avenue, access for parcels in the northeast quadrant of the study area is provided by a cul-de-sac connection at the intersection of SW 124th Avenue/SW Tualatin Road. The right-in/right-out previously discussed between SW 130th Avenue and SW 124th Avenue would act as a relief valve for this area to reduce traffic volumes at the SW Pacific Highway/SW 124th Avenue and SW 124th Avenue/SW Tualatin Road intersections.

Based on this access scenario, properties which only have frontage on SW Pacific Highway and no frontage on an internal street could share access to a roadway. Furthermore, properties which are located on the upper terrace area with limited interior street access are provided alternative shared right-in/right-out access opportunities.

This alternative rates below average for managing access onto arterials.

Alternative 1 (Modified)

Alternative 1 (Modified) has the same access location issues as Alternative 1, with the exception that no access is provided at the SW 124th Avenue/SW Tualatin Road intersection for the northeast quadrant area. Access for this area is identified as a cul-de-sac off of SW Leveton Drive. Map 13, Page 67, identifies the general access locations.

This alternative rates average for managing access onto arterials.

Alternative 1 (Modified A)

Alternative 1 (Modified A) has the same access location issues as Alternative 1, with the exception that no access is provided at the SW 124th Avenue/SW Tualatin Road intersection for the northeast quadrant area. Access for this area is identified as a cul-de-sac off of SW Leveton Drive. Map 14, Page 69, identifies the general access locations.

This alternative rates average for managing access onto arterials.

Alternative 2

Alternative 2 (Map 15, Page 71) is similar to Alternative 1 except for the types of access onto SW Pacific Highway. Instead of a public street access in the alignment of SW 130th Avenue this access is a private right-in/right-out shared driveway. This driveway would serve a minimum of five parcels.

This alternative rates below average for managing access onto arterials.

Alternative 3

Alternative 3 again is similar to Alternative 1. The access point are all the same onto SW Pacific Highway and SW 124th Avenue except that the access points are all private driveways. Map 16, Page 73, identifies the access locations.

This alternative rates below average for managing access onto arterials.

Conclusion

Various alternatives were evaluated for access onto SW Pacific Highway and SW 124th Avenue. Based on early assumptions, it was determined that 3-4 driveway accesses onto SW Pacific Highway would be viable and meet ODOT's desire to reduce the number of existing accesses which total eight (8). The Base Scenario alternative was rejected by the property owners as having too many negative impacts. The City and ODOT also found this alternative problematic due to the access location on SW 124th Avenue at SW Tualatin Road and traffic impacts on the roadway system and rate the alternative as above average.

The remaining alternatives focusing on SW Pacific Highway met the objective to keep traffic moving on the highway. Deceleration and acceleration lanes were identified as necessary for access to the highway and rate average or below average.

For SW 124th Avenue the Base Scenario, Alternatives 1, 2 and 3 were concluded to be problematic due to the access location at the SW 124th Avenue/SW Tualatin Road intersection discussed in detail in Chapter 7. This left Alternative 1 (Modified) and Alternative 1 (Modified A) as the preferred solutions for access onto arterial roadways.

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CHAPTER 9: SANITARY SEWER SYSTEM

Background

Unified Sewerage Agency (1977-78)

The initial sanitary sewer service for the Quarry Sector was provided in 1977-78 with the installation of the Sherwood Interceptor line by the Unified Sewerage Agency of Washington County (USA). This line extends from Fir Lane (formally Tualatin Road intersection with SW Pacific Highway) to the intersection of SW Pacific Drive with SW Pacific Highway. The line is located within the grassy median of the highway.

Comprehensive Plan Amendment (1983)

PA-83-05 (ORD. NO. 592-83) addressed sanitary sewer and water provisions for the Quarry Sector area. Primarily the amendment dealt with the extension of existing infrastructure into the area. In general terms this included identifying sewer lines in SW Cipole Road, SW Pacific Highway and SW 124th Avenue and along the southern boundary of the Quarry Sector area.

Sanitary Sewer Local Improvement District (1983)

LID No. 33-83-SS initiated sanitary sewer service to the Quarry Sector area. This sewer improvement project included gravity lines, pressurized lines and a pump station. Gravity line improvements flowing east extend 1000 feet west of the alignment of the future SW 124th Avenue. A gravity line flowing west to a pump station also was provided commencing 600 feet east of the west property line for Tax Lot 2101, Tax Map 2S121A (Anderson) extending south across Tax Lot 100, Tax Map 2S121D (Martin) to Cummins Creek and follows Cummins Creek to SW Cipole Road. At SW Cipole Road, a pump station is provided with a force main line which parallels the gravity line connecting back into the gravity line 1000 feet west of the SW 124th Avenue alignment.

Anderson Public Works Permit

Tax Lot 2101, Tax Map 2S121A (Anderson) has been approved for a public works permit to extend a sewer line from the public 8-inch gravity line along the south property line onto the site. This line will stub at the adjoining property to the west Tax Lot 2000, Tax Map 2S121A (Macaulay).

SW 124th Avenue Proposed Improvements

A sanitary sewer line is proposed in the right-of-way of SW 124th Avenue as part of the SW 124th Avenue extension from SW Tualatin Road to SW Leveton Drive. This line will stub at the intersection of SW 124th Avenue/SW Leveton Drive.

Objectives

1. Provide sanitary sewer service to the Quarry Sector, building on the existing sanitary sewer system.

2. Ensure that all properties within the Quarry Sector can be served by gravity sanitary sewer lines.

3. Provide sanitary sewer lines within public rights-of-way for ease of maintenance and only utilize sanitary sewer lines within easements when necessary.

Sanitary Sewer System Options

Based on the existing and proposed sanitary sewer lines within the study area, the Quarry Sector was evaluated for future sanitary sewer service opportunities in conjunction with transportation system alternatives based on TDC and QSWG objectives. The area was broken into subset areas (A -E) for sewer service analysis purposes which are shown on Map 19, Page 91.

Base Scenario (Current Plan)

Area A sewer service can be provided as described below:

a. Individual parcels can connect to the existing 8-inch public sanitary sewer line located within the eastern half of the proposed SW Cummins Street alignment.

Area B sewer service can be provided by the existing 8-inch gravity line located on this parcel.

In Area C and D on the terrace between 130th Avenue and 124th Avenue with frontage on SW Pacific Highway (Map 11, Page 63 and Map 19, Page 91) there are two options for service which are described below:

a. Sewer service can be provided by connecting into the 27-inch public line located in the median of SW Pacific Highway. Connection with this line will require coordination with USA, or

b. Sewer service can be provided by constructing public lines within easements to the existing 8-inch or 10-inch public gravity lines located along the south property line of Tax Lot 2100 (Grimm) or to a public line at the proposed intersection of SW Leveton Drive and SW 124th Avenue.

For Area D, Tax Lot 400 (Leveton), Tax Map 2S1 22B, a public sewer line was provided which connects to the 27" USA line in SW Pacific Highway.

In Areas C and D south of the upper terrace, sewer service can be provided as described below:

a. Sewer service can be provided by constructing public lines within easements to the existing 8-inch or 10-inch public gravity lines located along the south property line of Tax Lot 2100 (Grimm) or where grades work to a public line at the proposed intersection of SW Leveton Drive and SW 124th Avenue.

Area C is serviced by a 10-inch line along its north boundary, 8-inch line in SW 125th Court and 10-inch line in the alignment of SW 124th Avenue.

Overall this alternative rates average for sewer service provisions.

Alternative 1

Area A provides the same options as identified in the Base Scenario.

Area B sewer service can be provided as described in the Base Scenario.

For Area C on the upper terrace (Map 12, Page 65 and Map 19, Page 91), there are three options for service which are described below:

a. Sewer service can be provided by connecting into the 27-inch public line located in the median of SW Pacific Highway. Connection with this line will require coordination with USA, or

b. Sewer service can be provided by constructing public lines within the proposed 130th Avenue alignment to the existing 8-inch public gravity line in the proposed SW Cummins Street alignment or to the proposed SW Leveton Drive alignment, or

c. Sewer service can be provided by constructing public lines within easements to the existing 8-inch or 10-inch public gravity lines located along the south property line of Tax Lot 2100 and 2101 or to a public line in the proposed SW Leveton Drive alignment.

For Area D, Tax Lot 400, Tax Map 2S1 22B, a public sewer line was provided which connects to the 27-inch USA line in SW Pacific Highway.

For Area C and D south of the upper terrace (Map 12, Page 65 and Map 19 Page 91), there are two options for service which are described below:

a. Sewer service can be provided by constructing a public line within the proposed SW Leveton Drive alignment which connects to the 8-inch public line in SW 124th Avenue or to a line in SW 130th Avenue, or

b. Sewer service can be provided by constructing a public line(s) within easements connecting to the 8-inch or 10-inch public lines located along the south property line of Tax Lot 2100 (Grimm), Tax Map 2S1 21A.

Area E is serviced as discussed in the Base Scenario.

Overall this alternative rates above average for sewer service provisions.

Alternative 1 (Modified)

Sanitary sewer service for this alternative is as described in Alternative 1.

Overall, this alternative rates above average for sewer service provisions.

Alternative 1 (Modified A)

Sanitary sewer service for this alternative is as described in Alternative 1.

Overall, this alternative rates above average for sewer service provisions.

Alternative 2

Sanitary sewer service for this alternative is as described in Alternatives 1 and 1 (Modified).

Overall, this alternative rates average for sewer service provisions.

Alternative 3

Sanitary sewer service for this alternative is as described in Alternatives 1, 1 (Modified) and 2 except that numerous public easements are necessary.

Overall this alternative rates below average for sewer service provisions.

Conclusion

Based on the existing sanitary sewer system and the various alternatives described, sewer service can be provided to all parcels within the study area. In Alternative 1 (Modified A) there are various alternatives to provide sewer service. The system, as it develops, can meet the objective to provide a system located within proposed street alignments and where necessary due to topography considerations and costs constraints within easements.

A certain level of collaboration must occur among the various owners to in developing the system to ensure that the system is developed in an efficient manner which is cost effective to all property owners.

For the area east of SW Cipole Road, south of SW Pacific Highway, west of the proposed alignment of SW 130th Avenue and north of the alignment for SW Cummins Street, the pump station located on SW Cipole Road needs to be evaluated to ensure that adequate capacity exists to service the area.

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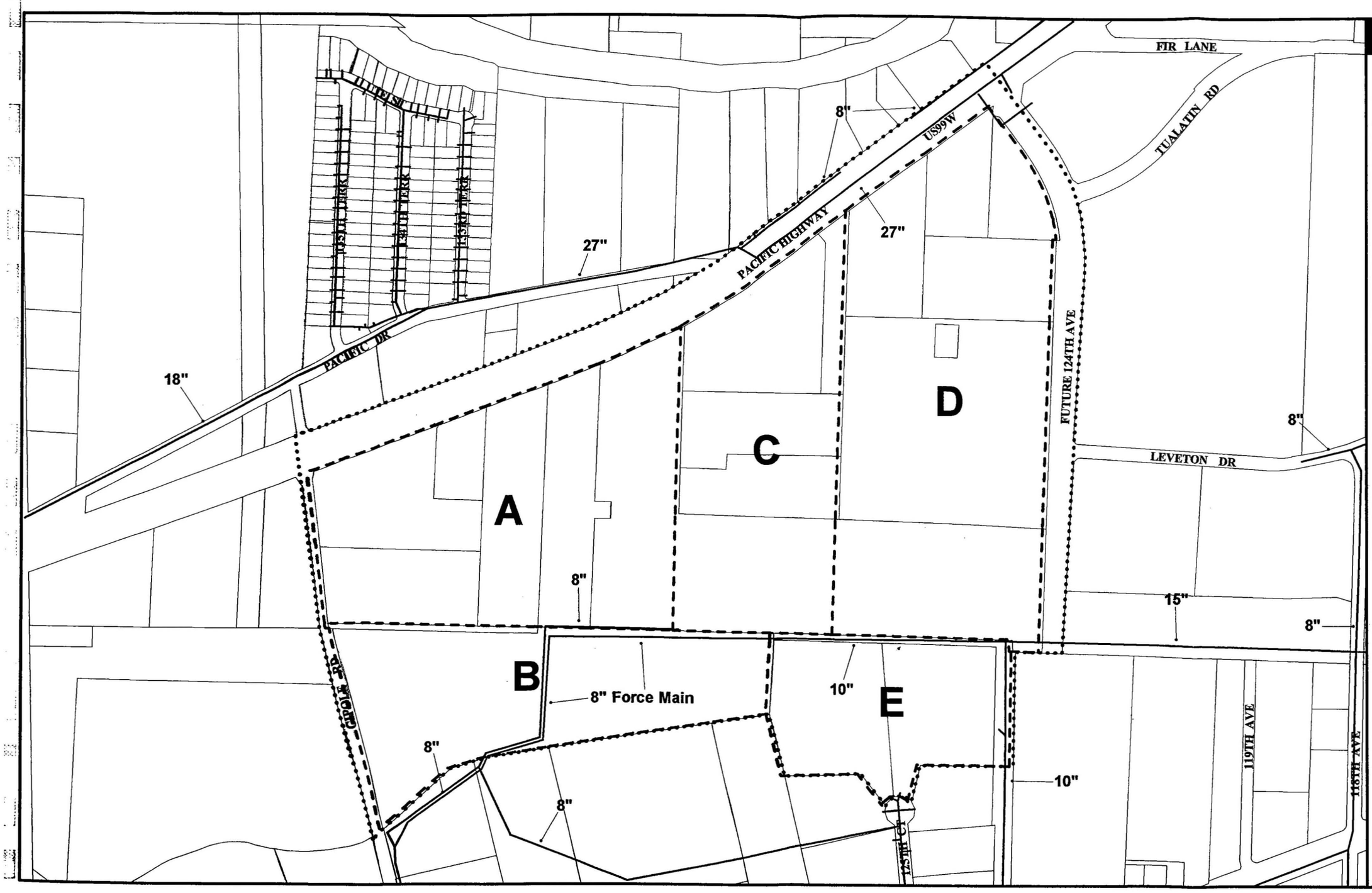

TUALATIN

Geographic Information System

Quarry Sector Subarea Technical Report Map 19: Sanitary Sewer System

- Study Area Boundary
- Sanitary Sewer Lines
- Sanitary Sewer Area Boundaries

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This map is derived from various digital database sources. While an attempt has been made to provide an accurate map, the City of Tualatin assumes no responsibility or liability for any errors or omissions in the information. This map is provided "as is". -Engineering and Building Dept. Plotted 6/1/99

CHAPTER 10: WATER SYSTEM

Background

Comprehensive Plan Amendment (1983)

PA-83-05 (ORD NO. 592-83) addressed sanitary sewer and water provisions for the Quarry Sector area. Primarily the amendment dealt with the extension of existing infrastructure into the area. In general terms, this included identifying water lines in SW Cipole Road, SW Pacific Highway and SW 124th Avenue and along the southern boundary of the Quarry Sector area.

The water service supply system for the Quarry Sector is identified as Service Level A according to the TDC Chapter 12. Contained in Chapter 12 are provisions for a water system master plan. One of the elements identified in the master plan is a future 12-inch water line connecting between the general alignment of SW 124th Avenue and SW Cipole Road.

Water Service Local Improvement District (1983)

Water service for the Quarry Sector was initially provided in 1983. LID 32-83-WA provided water lines in SW Cipole Road and SW Pacific Highway.

SW 124th Avenue Improvements and Future Improvements

In 1998 SW 124th Avenue located on the east boundary of the study area was improved from SW Pacific Highway to SW Tualatin Road. A 16-inch water line was provided within the right-of-way.

Preliminary construction plans for the extension of SW 124th Avenue from SW Tualatin Road to SW Leveton Drive indicate a water line extension within SW 124th Avenue. A water line stub is identified to occur at the intersection of SW 124th Avenue/SW Leveton Drive.

Preliminary concept plans for extension of SW 124th Avenue south of SW Leveton Drive indicate continuation of the water line to SW Herman Road.

Objectives

1. Provide a water system to the Quarry Sector building on the existing water system.

2. Provide water lines within public rights-of-way for ease of maintenance and only utilize water lines within easements when necessary.

3. Ensure adequate water pressure and fire flows are provided by looping the water system.

4. Determine if the future 12-inch water line connection between the general alignment of SW 124th Avenue and SW Cipole Road located within the corridor for the East/West Road (Quarry Road) should remain as identified or have the alignment adjusted.

Water System Options

Based on the existing and proposed water lines (Map 20, Page 97) within the study area, the Quarry Sector was evaluated for future water service capability in conjunction with transportation system alternatives based on TDC and QSWG objectives.

Base Scenario (Current Plan)

Under the Base Scenario water service can be provided using the existing lines along SW Pacific Highway, SW Cipole Road and SW 124th Avenue (existing and proposed). Construction of a 12-inch line in Quarry Road would provide additional service. Internal parcels which do not abut a water line or proposed water line corridor would need to obtain easements.

This alternative rates average.

Alternative 1

In Alternative 1 existing water lines and new water lines located within the proposed street corridors provide access. The 12-inch line between SW 124th Avenue and SW Cipole Road can be located in SW Leveton Drive, SW 130th Avenue and SW Cummins Street to provide the necessary loop for pressure and volume.

This alternative rates above average.

Alternative 1 (Modified)

Alternative 1 (Modified) provides the same water service accessibility and looping system described in Alternative 1.

This alternative rates above average.

Alternative 1 (Modified A)

Alternative 1 (Modified A) provides the same water service accessibility and looping system described in Alternative 1.

This alternative rates above average.

Alternative 2

Alternative 2 provides similar water service accessibility as Alternatives 1 and 1 (Modified) to all the parcels. The issue of the 12-inch line between SW 124th Avenue and SW Cipole Road has two options. Option 1 is to retain the alignment as described in the Base Scenario or Option 2 is to use the alignment in Alternatives 1 and 1 (Modified). Option 1 has wetland issues whereas Option 2 affects non-significant wetlands. Option 2 also would require public easements as part of the line would not be located within a public street.

This alternative rates average.

Alternative 3

This Alternative is similar to the Base Scenario. A new 12-inch line would be located in SW Cummins Court and extend to SW 124th Avenue. Easements would be necessary for any portion of the line not within a roadway. Internal parcels would also need easements for access to water lines.

This alternative rates below average.

Conclusion

Development of a water system is viable under all six alternatives. The critical issue will be the location of the 12-inch water line connection between SW 124th Avenue and SW Cipole Road. Locating the line within the roadway alignments is viable which would require a modification to the Water System Master Plan.

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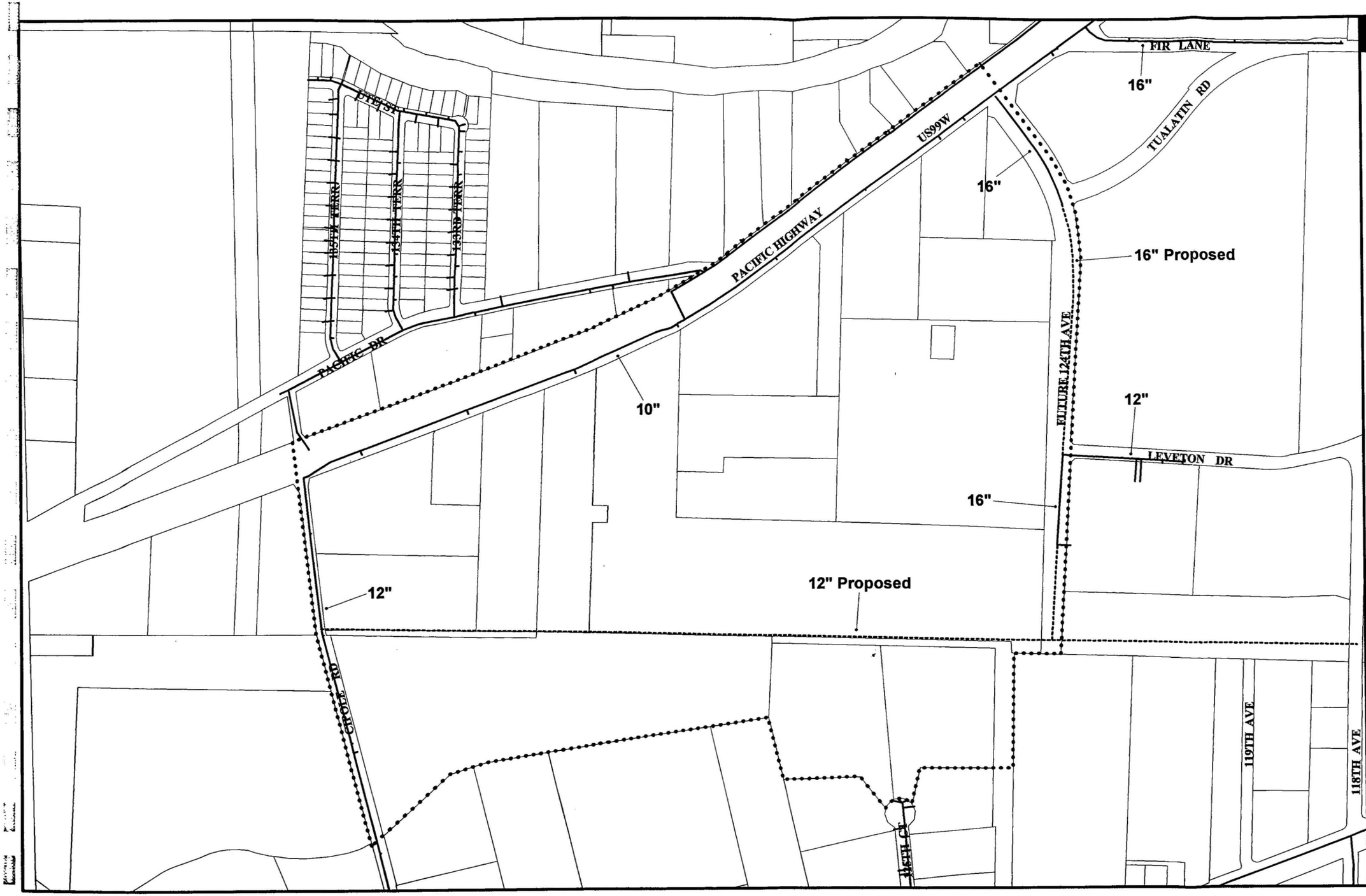

TUALATIN

Geographic Information System

Quarry Sector Subarea Technical Report Map 20: Water System

Study Area Boundary
Existing Water Lines
Proposed Water Lines

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This map is derived from various digital database sources. While an attempt has been made to provide an accurate map, the City of Tualatin assumes no responsibility or liability for any errors or omissions in the information. This map is provided "as is". -Engineering and Building Dept. Plotted 6/1/99

CHAPTER 11: STORM SEWER SYSTEM AND SURFACE WATER MANAGEMENT

Background

City Storm Drainage Plan

The City's Storm Drainage Plan was initially adopted in September 1972 as a reference to the TDC. Storm drainage is currently located in Chapter 14, Drainage Plan and Surface Water Management of the TDC.

Leveton Tax Increment Plan (1985)

The LTIP was amended in 1988 (Resolution 144-88) and identified storm drainage improvements in the alignment of Quarry Road.

Surface Water Management

The City's water quality requirements were established in 1991 to treat impervious surface runoff for all new development including new public streets.

Draft Hydrologic Study of Leveton Drainage Basin

Kampe Associates, Inc. prepared a draft hydrologic study of the drainage basin within which the Quarry Sector is located. The overall basin is approximately 450 acres of which the Quarry Sector comprises 140 +/- acres. The purpose of the study was to determine storm water detention requirements for storm events with a ten-year or greater frequency which overtops SW Cipole Road. Map 21, Page 103 identifies the basin Boundary. The main drainage channel is generally known as Cummins Creek which is generally located along the south boundary of the study area.

The critical importance of the draft study concerning the Quarry Sector was the impacts of development on the drainage system (Cummins Creek) in relationship to the alignment of Quarry Road. Information presented indicated that a 25-year storm event would cause flooding in the eastern portion of Quarry Road near its connection with SW 124th Avenue without some type of detention requirements within the basin. Furthermore, development in the basin affects the crossing of SW Cipole Road over Cummins Creek. Without detention storm water over tops SW Cipole Road.

Objectives

1. Provide a storm sewer system to the Quarry Sector building on the existing storm sewer system.

2. Provide storm drainage within public rights-of-way for ease of maintenance and only utilize storm drainage within easements when necessary.

3. Develop a storm system which minimizes storm water backing onto the street system.

Storm Sewer System Options

Base Scenario (Current Plan)

Under the Base Scenario, storm water collection would be developed in conjunction with the transportation system. Given the topography of the area storm water would flow either to SW Cipole Road or into SW Cummins Street. The ultimate discharge would be into Cummins Creek. As noted in the background section, flooding issues could occur in SW Cummins Street at the Cummins Creek crossing. There is no additional capacity in SW 124th Avenue to take additional storm water runoff. Public storm water easements are necessary to discharge the collected water (public and private) to Cummins Creek.

Water quality facilities will need to be developed for treatment of public streets and private development. These facilities can be public, private or a combination of public/private. The location of these facilities will need to be determined as the street system and private development occurs.

This alternative rates average.

Alternative 1

The ultimate discharge location for storm water will be Cummins Creek. Storm water can be collected in lines located in SW Cummins Street, SW 130th Avenue, and SW Leveton Drive. Storm water can also be collected in SW Aspen Court. Public storm water easements are necessary to discharge the collected water (public and private) to Cummins Creek. SW 124th Avenue does not have capacity for additional storm water. Alternative 1 removes the issue of possible flooding of a public street because there is no street crossing the main storm water discharge channel.

This alternative rates above average.

Alternative 1 (Modified)

This Alternative has the same issues as the Base Scenario and Alternative 1 discussed above.

This alternative rates above average.

Alternative 1 (Modified)

This Alternative has the same issues as the Base Scenario and Alternative 1 discussed above.

This alternative rates above average.

Alternative 2

This Alternative has the same issues as the Base Scenario and Alternative 1 discussed above.

This alternative rates average.

Alternative 3

This Alternative has the same issues as the Base Scenario and Alternative 1 discussed above.

This alternative rates below average.

Conclusion

Storm water and water quality can be provided in all six of the alternatives. Private and public storm water easements may be necessary to have the water reach Cummins Creek. Storm water detention up to and including the difference between pre and post development flows for storms through a 25-year storm event will be necessary for all street and private development so that the capacity of Cummins Creek is not exceeded.

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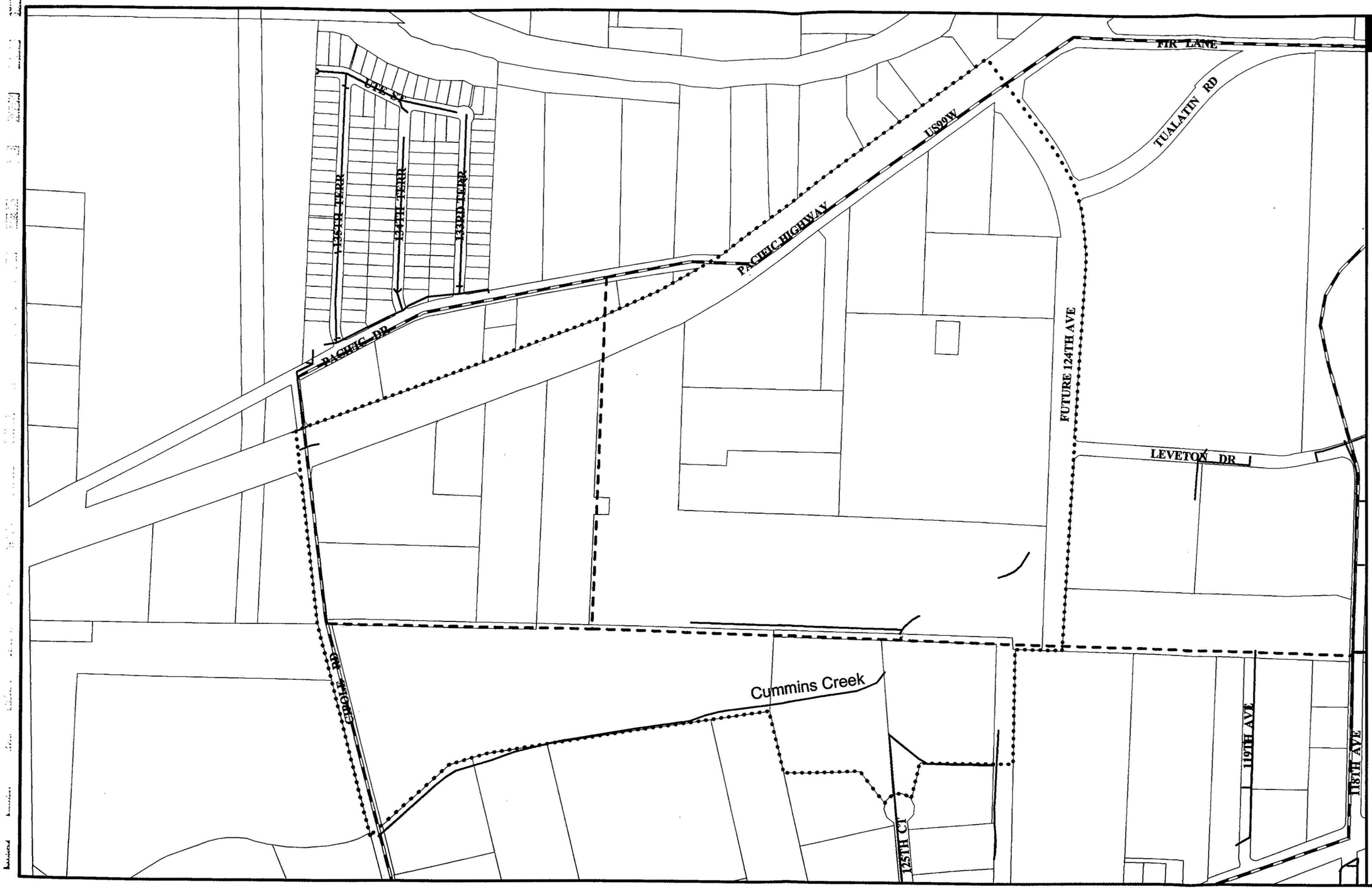
TUALATIN
Geographic Information System
Quarry Sector Subarea Technical Report Map 21: Drainage Basin
Study Area Boundary
Drainage Basin Boundary
Subasin Boundary
Storm Sewer Lines
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This map is derived from various digital database sources. While an attempt has been made to provide an accurate map, the City of Tualatin assumes no responsibility or liability for any errors or omissions in the information. This map is provided "as is". -Engineering and Building Dept.
Plotted 6/1/99
PACIFIC HIGHWAY
US99W
TUALATIN RD
FIR LANE
FUTURE 124TH AVE
LEVETON DR
PACIFIC DR
124TH TERR
Cummins Creek
125TH CT
119TH AVE
116TH AVE

APPENDIX 2

QUARRY SECTOR TRIP DISTRIBUTION STUDY

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION PLANNING/TRAFFIC ENGINEERING
610 SW ALDER, SUITE 700 • PORTLAND, OR 97205 • (503) 228-5230 • FAX (503) 273-8169

MEMORANDUM

Date: August 7, 1998 **Project #:** 3170

To: Doug Rux, Program Coordinator - Economic Development
City of Tualatin
PO Box 369
Tualatin, Oregon 97062-0369

From: Elizabeth A. Wemple, P.E.

Project: Tualatin Quarry Sector Subarea Plan
Subject: Analysis Findings

Introduction

The City of Tualatin is evaluating the planned transportation system contained in the Tualatin Comprehensive Plan in the area bounded by SW Pacific Highway (Highway 99W), SW 124th Avenue, SW Cipole Road and Cummins Creek. The area contains approximately 140 acres. Assuming full buildout of the study area, this analysis evaluates transportation system advantages and disadvantages of the system contained in the Comprehensive Plan and three other roadway systems identified by the City of Tualatin. In summary we:

- analyzed existing transportation conditions,
- identified future (2015) background traffic volumes and traffic level of service,
- identified future conditions site trip generation,
- assigned future trips to the four identified site circulation systems, and
- evaluated future roadway conditions for each scenario, identifying improvements as appropriate.

Existing Transportation System

The study area is located in Tualatin south of Highway 99W between SW Cipole Road and SW 124th Avenue. The City's roadway functional classification system identifies Highway 99W and SW 124th Avenue as arterial streets, and SW Cipole Road and the proposed future Quarry Road as collector streets in the vicinity of the site. Today the site supports relatively low intensity industrial uses with access off of Highway 99W and SW Cipole Road. The existing roadway lane configurations and traffic control in the immediate site vicinity are summarized in Figure 1. Existing p.m. peak hour traffic volumes are shown in Figure 2. The traffic operations analyses on these volumes and configurations were performed according to 1994 Highway Capacity Manual Procedures.

The results of the existing conditions p.m. peak hour traffic operations analysis are shown in Table 1. The City of Tualatin has established level of service (LOS) D at signalized intersections and LOS E at unsignalized intersections to be the minimum acceptable level of service. As shown in Table 1, under existing p.m. peak hour conditions both intersections operate at acceptable levels of service. However, the intersection of Tualatin Road/Highway 99W is currently operating at capacity conditions.

Table 1: Existing PM Peak Hour Level of Service

Intersection	Signalized			Unsignalized			
	V/C Ratio	Average Delay (sec/veh)	LOS	Critical Movement	V/C Ratio	Average Delay (sec/veh)	LOS
PM Peak Hour							
SW Tualatin Road/Highway 99W	1.03	34.1	D				
SW Cipole Road/Highway 99W	0.88	18.1	C				

Background Future Transportation System and Traffic Volumes

In the near future, the intersection of SW Tualatin Road/Highway 99W will be eliminated and Tualatin Road will be re-aligned to intersect with SW 124th Avenue approximately 450 feet south of the new intersection of Highway 99W/SW 124th Avenue. In addition to this re-alignment, the lane configurations and traffic control shown in Figure 3 were assumed to be in place by the year 2015. The most noteworthy assumption is that SW 124th Avenue will connect Highway 99W and SW Tualatin-Sherwood Road, and that the northbound approach to the intersection of SW 124th Avenue/Highway 99W will have two left turn lanes and two right turn lanes.

The year 2015 background p.m. peak hour traffic volumes are shown in Figure 4. These were developed based on travel demand forecasts provided by Metro and developed to be consistent with Highway 99W/Tualatin Road Rezone report completed by Kittelson & Associates in July of 1998. These forecasts assume a commercial zone designation for a 10.23 acre parcel (of which 7.2 acres are developable) in the SE quadrant of the intersection of Highway 99W/SW 124th Avenue. To develop the forecasts, the industrial development trip generation developed for the study area in the Metro 2015 forecast was subtracted from the total forecasts, and replaced with industrial development trip generation (specific to each development scenario) based on the Institute of Transportation Engineers Trip Generation Manual, 6th Edition.

Based on the forecast p.m. peak hour traffic volumes shown in Figure 4, and prior to future development at the study area, the 2015 p.m. peak hour operations at the study intersections would be as shown in Table 2. As shown, it is forecast that by the year 2015 the intersection of SW Cipole Road/Highway 99W will operate at or near capacity during the weekday p.m. peak period. Further, the close proximity of SW Tualatin Road/SW 124th Avenue to SW 124th Avenue/Highway 99W intersections may cause congestion problems unless appropriate storage capacity is available for the

southbound left-turning motorists. As specific development in the study area is developed, this should be evaluated in further detail.

Table 2: Year 2015 PM Peak Hour Level of Service - Background

Intersection	Signalized			Unsignalized			
	V/C Ratio	Average Delay (sec/veh)	LOS	Critical Movement	V/C Ratio	Average Delay (sec/veh)	LOS
PM Peak Hour							
SW 124th Avenue/Highway 99W	0.87	20.9	C				
SW Tualatin Road/124th Avenue	0.88	32.9	D				
SW Cipole Road/Highway 99W	0.94	35.2	D				

Future Site Transportation System

The City of Tualatin has identified four alternative circulation scenarios for the site under consideration. Each of these scenarios is shown schematically in Figures 5 through 8. The Base Alternative (shown in Figure 5) is currently included in the Tualatin Development Code. The City of Tualatin has conducted preliminary environmental and topographic studies in the area. Further detailed review is required as planning in the area proceeds.

Year 2015 Site Trip Generation and Trip Distribution

There are approximately 140 acres available for development within the study area boundaries. Accounting for wetlands and roadways each of the four alternative site circulation scenarios yields slightly different amounts of land available for development. Table 4 summarizes the land available and resulting daily and p.m. peak hour trip generation for each of the analysis scenarios. The analysis assumes that for all scenarios the building coverage would be 35% of the developable land. In all cases it was assumed that the study area would develop with General Light Industrial development. Trip generation rates for this type of development were taken from the standard reference manual, *Trip Generation*, 6th Edition, published by the Institute of Transportation Engineers

Table 4: Site Trip Generation

Alternative	Developable Land (KSF)	Building Coverage (KSF)	Daily Trips	Total PM Peak Trips	Inbound PM Peak trips	Outbound PM Peak Trips
Base Alternative	5,425,400	1,900	13,325	1,865	225	1,640
Alternative 1	5,553,465	1,945	13,550	1,905	230	1,675
Alternative 2	5,677,385	1,990	13,850	1,950	235	1,715
Alternative 3	5,762,550	2,015	14,060	1,975	240	1,735

As shown in Table 4, under full buildout of the study area with General Light Industrial development, on a daily basis, the site would generate between 13,325 and 14,060 daily trips. During the p.m. peak hour the study area would generate between 1,865 and 1,975 trips. This intensity of trip generation assumes re-development of the entire study area, with each parcel being fully developed. For the purposes of this analysis, it has been assumed that this redevelopment would occur by the year 2015. However it is more likely that this magnitude of redevelopment would occur over a longer period of time.

The study area trip distribution assumptions are shown in Figure 9 and were developed based on a review of forecast traffic volumes, and general development in the study area. To develop this distribution, it was assumed that by the year 2015:

- SW Tualatin Road would be re-aligned to intersect with SW 124th Avenue,
- SW 124th Avenue would be extended from Highway 99W to SW Tualatin-Sherwood Road,
- SW Leveton Drive would be extended from SW Tualatin Road to SW 124th Avenue, and
- South of the site, SW Herman Road would be developed as (at a minimum) a collector road.

As shown in Figure 9, 55% of the p.m. peak period trips will be traveling eastbound or westbound on Highway 99W and an additional 20% of the p.m. peak period trips will be traveling to and from the south on SW 124th Avenue. The remaining 25% of the trips would distribute themselves to SW Cipole Road, SW Tualatin Road, and SW Leveton Drive.

Year 2015 Operations Analysis - Base Alternative

The Base Alternative shown in Figure 10 is currently contained in the Tualatin Development Code. In this alternative, a frontage road would be developed along Highway 99W and all access points to and from Highway 99W would be closed. It is assumed that the intersection of the Frontage Road with SW 124th Avenue aligns with SW Tualatin Road and is signalized. It is further assumed that the intersection of the Frontage Road with SW Cipole Road is stop controlled. Quarry Road would cross the study area from east to west at the southern edge of the study area.

In this scenario 1,860 p.m. peak hour trips would be generated, with 225 trips inbound and 1,640 outbound. With this type of site circulation, all of the site generated trips would travel along either the frontage road or Quarry Road. All trips traveling to or from the study area via eastbound or westbound Highway 99W would travel through the intersections of SW Cipole Road/Highway 99W and SW 124th Avenue/Highway 99W. Further, (depending on internal site circulation) a large number of trips traveling to or from SW 124th Avenue and Highway 99W east of the site would travel through the intersection of SW Tualatin Road/SW 124th Avenue.

The advantages of this alternative include:

- This alternative allows motorists to avoid some Highway 99W congestion by traveling east/west across the study area between SW Cipole and SW 124th Avenue.

The disadvantages of this alternative include:

- All Highway 99W bound site generated trips travel will travel through one of the already congested intersections of SW 124th Avenue/Highway 99W, or SW Cipole Road/Highway 99W. Physical improvements would be required to maintain acceptable intersection operations.
- Most of the trips in the northeast corner of the site will travel through the future intersection of SW Tualatin Road/SW 124th Avenue. During the p.m. peak period these will be critical eastbound left turning movements, and would add to the already congested operations.
- Without internal site roadways, there will be limited access from the north end of the site to the south end of the site without traveling on Highway 99W, SW Cipole Road and/or SW 124th Avenue.
- Site generated trips would be concentrated at the intersections of SW Cipole Road/Frontage Road, and SW 124th Avenue/Frontage Road. These intersections would be in relatively close proximity to the intersections of SW Cipole Road/Highway 99W and SW 124th Avenue/Highway 99W. The close proximity of these intersections to already congested locations may exacerbate conditions.

Year 2015 Operation Analysis - Alternative 1

Alternative 1 and the assumed lane configurations are shown in Figure 11. This alternative eliminates the frontage road, and the direct east to west road at the south end of the site. Instead, a north/south road, with east/west roads connecting between this road and SW Cipole Road and SW 124th Avenue would be constructed. The north/south road would have right-in-right-out access to Highway 99W. In addition, two right-in-right-out access points would also be developed from Highway 99W directly onto adjacent properties close to the intersection of SW Cipole Road/Highway 99W and SW 124th Avenue/Highway 99W. Further a cul-de-sac would provide access for properties at the northeast corner of the site to/from 124th Avenue. The cul-de-sac would intersect SW 124th Avenue at SW Tualatin Road. In this scenario the site would generate 1,905 p.m. peak hour trips with 230 trips inbound and 1675 trips outbound.

The advantages of this alternative include:

- With relatively higher north/south and east/west connectivity within the site (compared to the Base Alternative), as secondary supportive services develop motorists can readily travel within the site to access these facilities.
- The right-in-right-outaccess to Highway 99W allows some motorists to access northbound Highway 99W without traveling through the intersections of SW Cipole Road/Highway 99W and SW 124th Avenue/Highway 99W as critical northbound right turn movements during the p.m. peak period and conversely critical southbound left turn movements during the a.m. peak period.

The disadvantages of this alternative include:

- The cul-de-sac access to the intersection of SW 124th Avenue/SW Tualatin Road limits the number of trips traveling through this intersection (relative to the Base Alternative) as critical p.m. peak northbound left turning movements. However the access still worsens the forecast congestion at this location.

Year 2015 Operation Analysis - Alternative 2

Alternative 2 (Figure 12 shows the lane configurations and traffic control) will have essentially the same internal site circulation and access points as Alternative 1 with the exception that the north/south road would be developed as a private roadway with limited access to the general public. The assignment of the site generated trips to the surrounding transportation system would be essentially the same as the assignment in Alternative 1. Because the private roadways would be narrower than the public roadways, there is slightly more land available for development, and thus the site would generate slightly more trips than Alternative 1. In this alternative, the site would generate 1,945 trips p.m. peak hour trips with 235 trips inbound and 1715 trips outbound.

This scenario will have traffic circulation advantages and disadvantages comparable to Alternative 1 with the exception that public access to and circulation within the site will be limited by the private internal site roadways.

Year 2015 Operation Analysis - Alternative 3

In this alternative, the shared private access north/south roadway remains in place; however connections from SW Leveton Drive to this roadway are eliminated. Figure 13 shows a schematic of the roadway system and proposed traffic control and lane configurations. As compared to Alternative 2, the cul-de-sac from SW Tualatin Road into the northeast portion of the property is eliminated and driveway access is provided only for the properties immediately adjacent to the intersection of SW Tualatin Road/SW 124th Avenue and SW Leveton Drive/SW 124th Avenue. It was also assumed that those properties abutting Highway 99W without access to the shared roadway system would have right-in-right-out access to Highway 99W via the north/south roadway. Further (similar to Alternatives 1 and 2), two right in right out access points would also be developed from Highway 99W directly onto adjacent properties close to the intersection of SW Cipole Road/Highway 99W and SW 124th Avenue/Highway 99W. Figure 13 depicts the lane configurations and traffic control applied in this analysis.

This alternative commits the least amount of land to roadways and therefore generates the most trips. During the p.m. peak, the site will generate 1,975 trips with 240 trips inbound and 1735 trips outbound.

This alternative also provides the least cross-site accessibility, and therefore in order for motorists to gain access to facilities on the opposite side of the site, they would have to exit the site and travel through the congested intersections of SW 124th Avenue/SW Tualatin Road, SW 124th Avenue/Highway 99W, and SW Cipole Road/Highway 99W. However, because the fourth leg of the intersection of SW 124th Avenue/SW Tualatin Road would be a driveway instead of a cul-de-sac, or street, fewer trips would be added to this intersection and operations would be better than Alternatives 1, or 2

.

The advantages of this scenario include:

- For Alternatives 1, 2 and 3, the right-in-right-out access to Highway 99W off of the internal north/south road should ease congestion slightly at the intersections of SW Cipole Road/Highway 99W and SW 124th Avenue/Highway 99W.

The disadvantages of this alternative include:

- Much like the Base Alternative, this scenario concentrates access to the site at the intersections of SW Cipole Road/Highway 99W, SW 124th Avenue/Highway 99W and SW Tualatin Road/SW 124th Avenue.
- There would be limited access across the site, forcing all users to travel around the site on Highway 99W to gain access to the south from the opposite side of the site.
- For those properties without frontage on the stub streets opposite SW Tualatin Road, and SW Leveton Drive, this alternative also concentrates trips onto the internal north/south private road, and the southern east/west circulation road to gain access to SW Cipole Road.
- At SW Cipole Road, the p.m. peak northbound right turn is a critical movement. For the a.m. peak period, this heavy northbound right turn would instead be a heavy eastbound left turn. Sufficient storage would have to be developed on Highway 99W for this movement.

Year 2015 Operations Analysis - Modified Alternative 1

Without development of the study area, the intersections of SW Cipole Road/Highway 99W, SW 124th Avenue/SW Tualatin Road, and SW 124th Avenue/Highway 99W are forecast to be operating at or near capacity in the year 2015 weekday p.m. peak hour. With between 1,865 and 1,975 additional p.m. peak hour trips added to the transportation system via the above circulation alternatives, congestion will worsen at each of these locations.

Alternately, providing an additional signalized intersection on Highway 99W with full access into the site will remove site access trips from the critical movements at SW Cipole Road/Highway 99W and from SW 124th Avenue/Highway 99W and along Highway 99W between these locations allowing these intersections to operate better as compared to the previously forecast conditions. Further, given the forecast congestion and queuing issues identified at the intersection of SW Tualatin Road/SW 124th Avenue, in the Highway 99W/SW Tualatin Road Proposed Re-zone analysis currently underway by Kittelson & Associates, Inc. it is not recommended that consideration be given to adding a fourth leg to this intersection. Instead trips from the northeast portion of the site should be allowed *full and/or* right-in-right-out access to Highway 99W, and be provided access to the internal site east/west roadway connecting to SW Cipole Road and SW 124th Avenue via a shared access roadway. In this manner, fewer trips would be added to the critical movements at the intersection of SW Tualatin Road/SW 124th Avenue.

Finally, an east/west connection from SW Cipole Road to SW 124th Avenue is recommended because, as demonstrated in Alternative 3 without access across the site, too many trips will be forced again through the forecasted congested intersections of SW Cipole Road/Highway 99W, SW 124th Avenue/SW Tualatin Road, and SW 124th Avenue/Highway 99W. Figure 14 depicts the alternate circulation system and assumed lane configurations and traffic control

The advantages of this alternative include:

- Allows motorists additional options for getting to and from the site, and thereby decreases critical turning movements at the forecasted congested intersections of SW Cipole Road/Highway 99W and SW 124th Avenue/Highway 99W.
- Eliminates a fourth leg at the intersection of SW Tualatin Road/124th Avenue, thus decreasing forecast congestion at this location

- Internal site circulation is relatively high (as in Alternatives 1 and 2) making it possible for motorists to travel within and/or across the site without having to travel on Highway 99W.

The disadvantages of this alternative include:

- Most likely requires that the intersection of SW Leveton Drive/SW 124th Avenue be signalized. Vehicle storage needs would have to be evaluated to ensure that this intersection and the intersection of SW 124th Avenue/SW Tualatin Road could both operate efficiently.
- Installing an additional traffic signal on Highway 99W between Cipole Road and 124th Avenue would not meet current ODOT traffic signal spacing standards for Statewide facilities. At a minimum a right-in-right-out access could be constructed at this location to improve study area circulation.

Findings and Recommendations

Assuming full buildout and redevelopment of the site, depending on the specific circulation system, the site will generate between 1,865 and 1,975 p.m. peak hour trips. Of these trips approximately 12% will be inbound and approximately 88% will be outbound from the site. This trip distribution will be reversed during the a.m. peak period. Quite clearly, this is significantly more trips than generated by the site today.

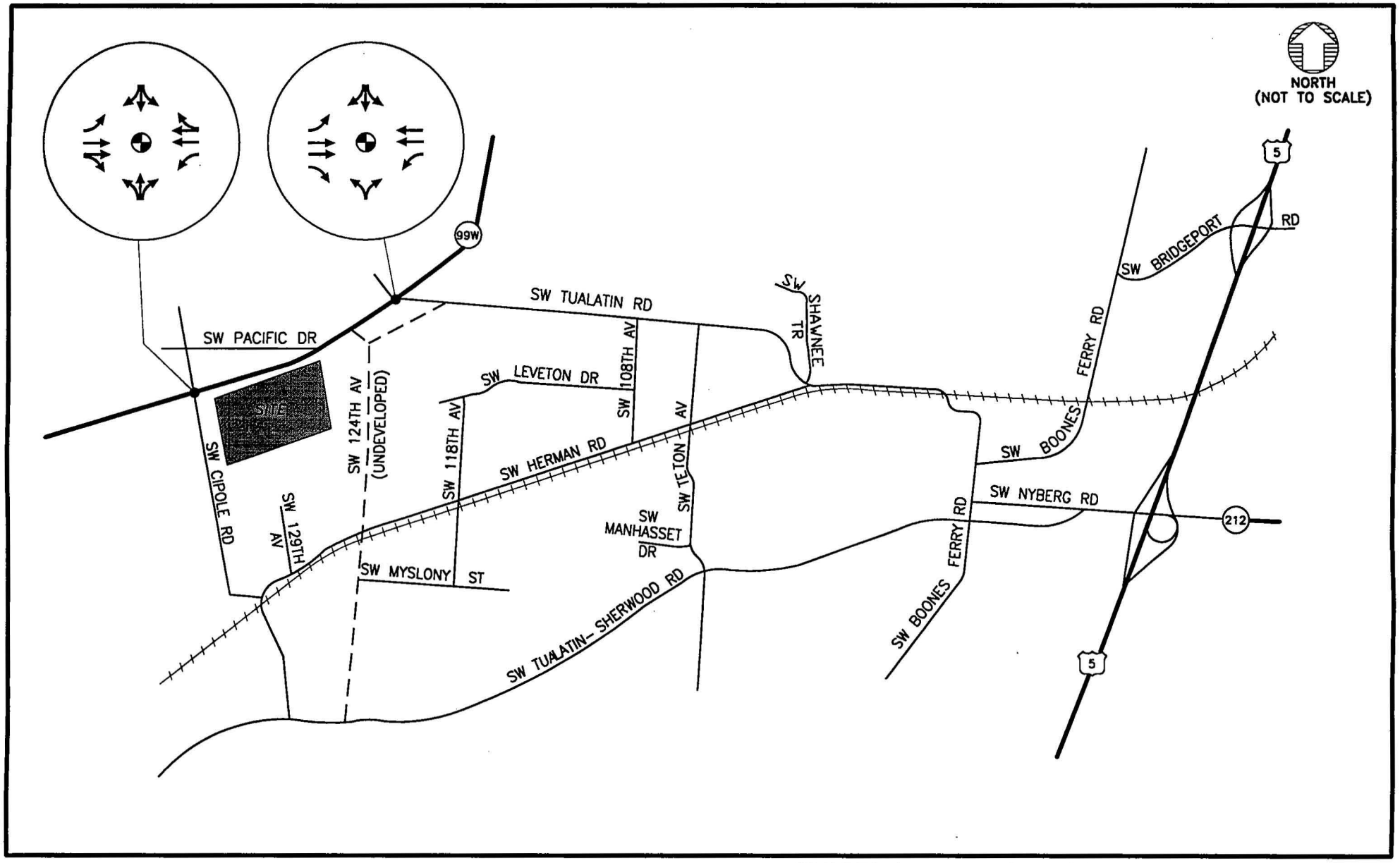
Under future (2015) background p.m. peak period conditions, the intersections of SW Cipole Road/Highway 99W, SW 124th Avenue/Highway 99W, and SW Tualatin Road/124th Avenue are forecast to operate at or near capacity. Thus the transportation system for the Quarry Sector should be designed to minimize impacts at these locations. To accomplish this, it is recommended that the City consider:

- Accessibility and connectivity within the site should be developed so that users can access facilities within the site without necessarily having to travel around the study area using SW 124th Avenue, Highway 99W and/or SW Cipole Road.
- Minimizing the number of trips added to critical movements at the intersections of SW Cipole Road/Highway 99W, and SW 124th Avenue/Highway 99W. To accomplish this a full access signalized intersection should be developed mid-way between these two locations directly onto Highway 99W. This access could provide users with another option for entering/exiting the site, and would be located approximately mid-way (approximately 1,800 feet) between the critical intersections. This would not meet current ODOT traffic signal spacing standards for Statewide facilities.
- The close proximity of and heavy travel demand at the intersections of SW Tualatin Road/SW 124th Avenue and SW 124th Avenue/Highway 99W will require that detailed analysis and planning be performed to ensure that the two intersections operate efficiently. The site circulation system should be developed to minimize impacts to the critical movements at this intersection. It is recommended that the study area circulation system be developed to avoid adding a western leg to the intersection of SW 124th Avenue/SW Tualatin Road.
- This analysis has largely focussed on the 2015 weekday p.m. peak period, when most (88%) of the site generated trips are departing the site. The a.m. peak period should be considered to ensure that the reverse movements do not have significant unanticipated traffic impacts.

- This analysis has assumed lane configurations different from existing conditions, to the extent possible, these transportation system improvements be considered in the City's future plans for transportation improvements within the study area.

Our analysis shows that a circulation plan comparable to Alternative 1-Modified would meet the above criteria. As previously described, this alternative provides a full access intersection directly onto Highway 99W, provides accessibility and connectivity across the site in both the north/south and east/west directions, and limits the impacts to the critical movements at the intersection of SW 124th Avenue/SW Tualatin Road.

I hope that this analysis provides you with sufficient information to continue your preliminary planning process. Should you have any additional questions or comments please feel free to call us at 228-5230. Thank you for the opportunity to assist the City in their planning efforts. We look forward to your comments.

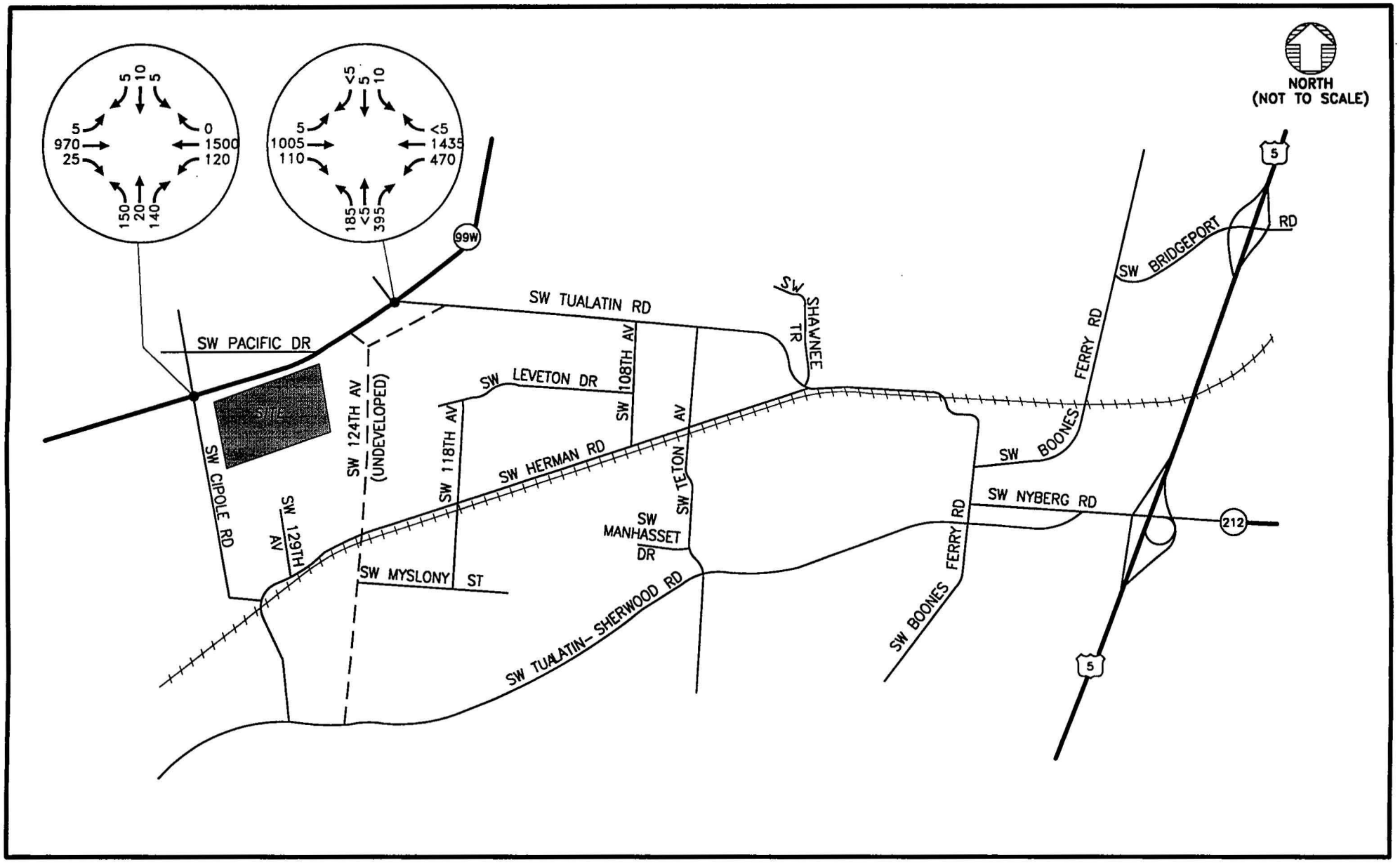


LEGEND

TRAFFIC SIGNAL

EXISTING ROADWAY SYSTEM LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES

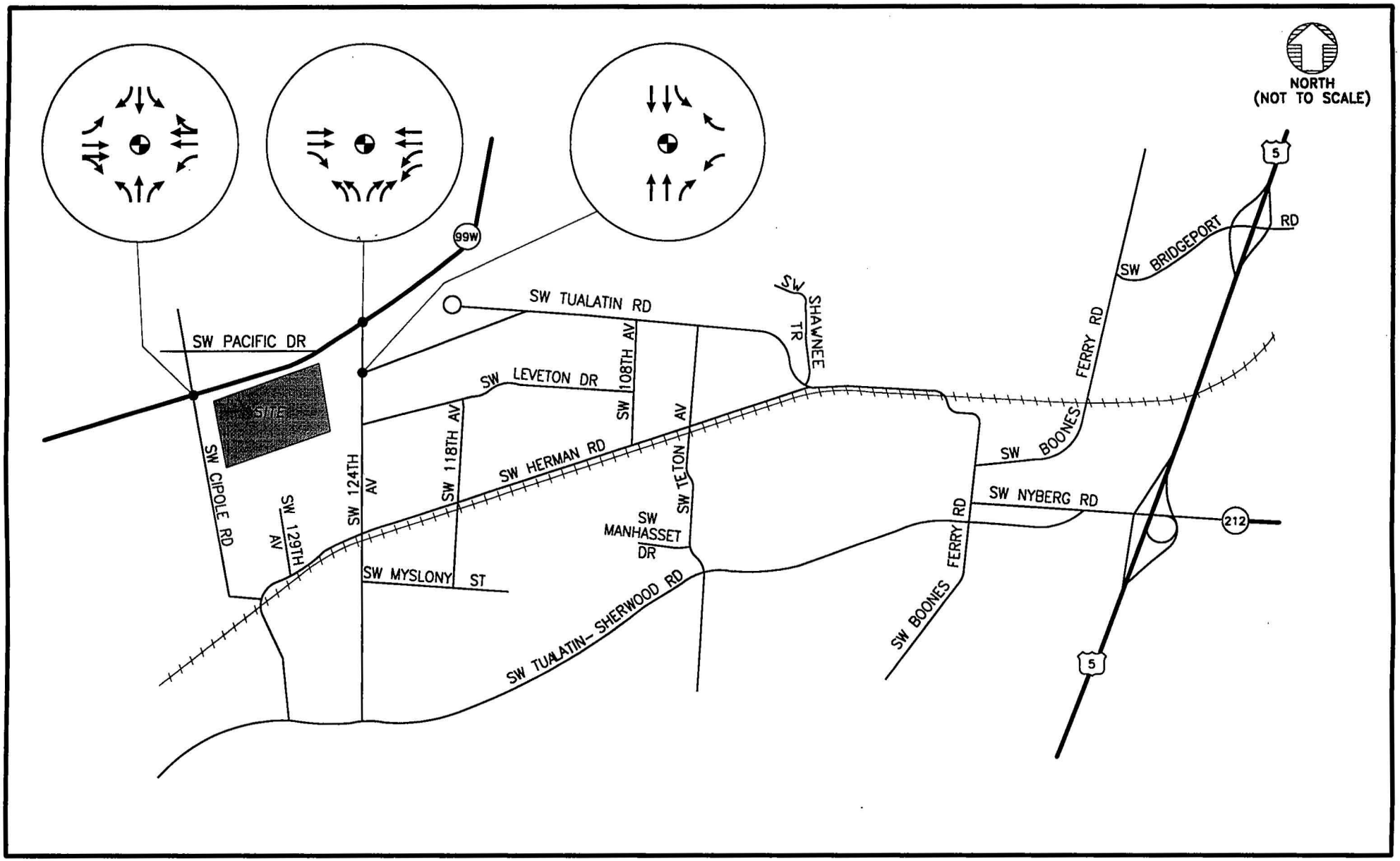
QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON AUGUST 1998	FIGURE 1	K



EXISTING PM PEAK TRAFFIC VOLUMES

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON AUGUST 1998	FIGURE 2	

3170F002

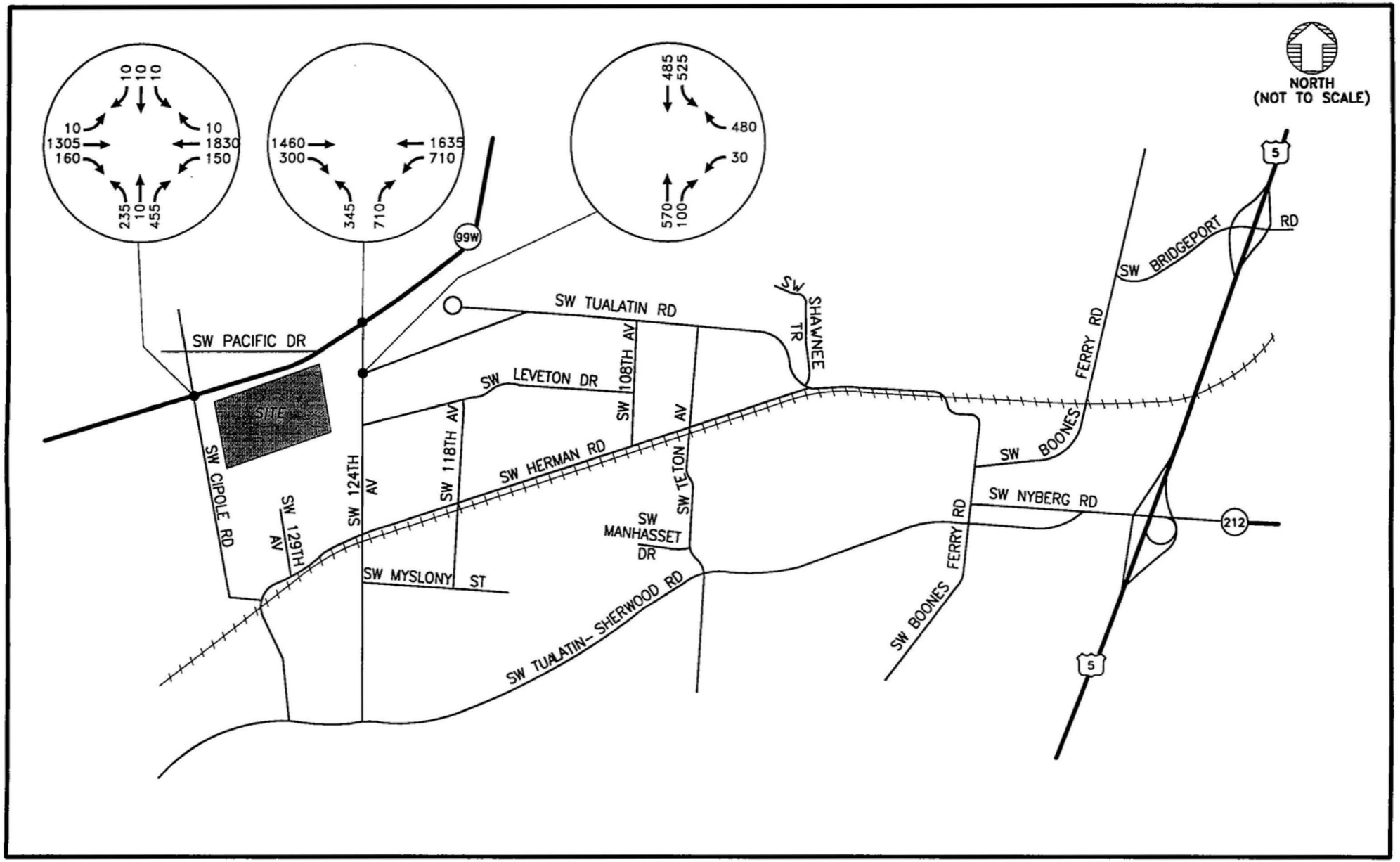


LEGEND

- ○ CUL-DE-SAC
- ⊕ TRAFFIC SIGNAL

YEAR 2015 BACKGROUND LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON AUGUST 1998	FIGURE 3



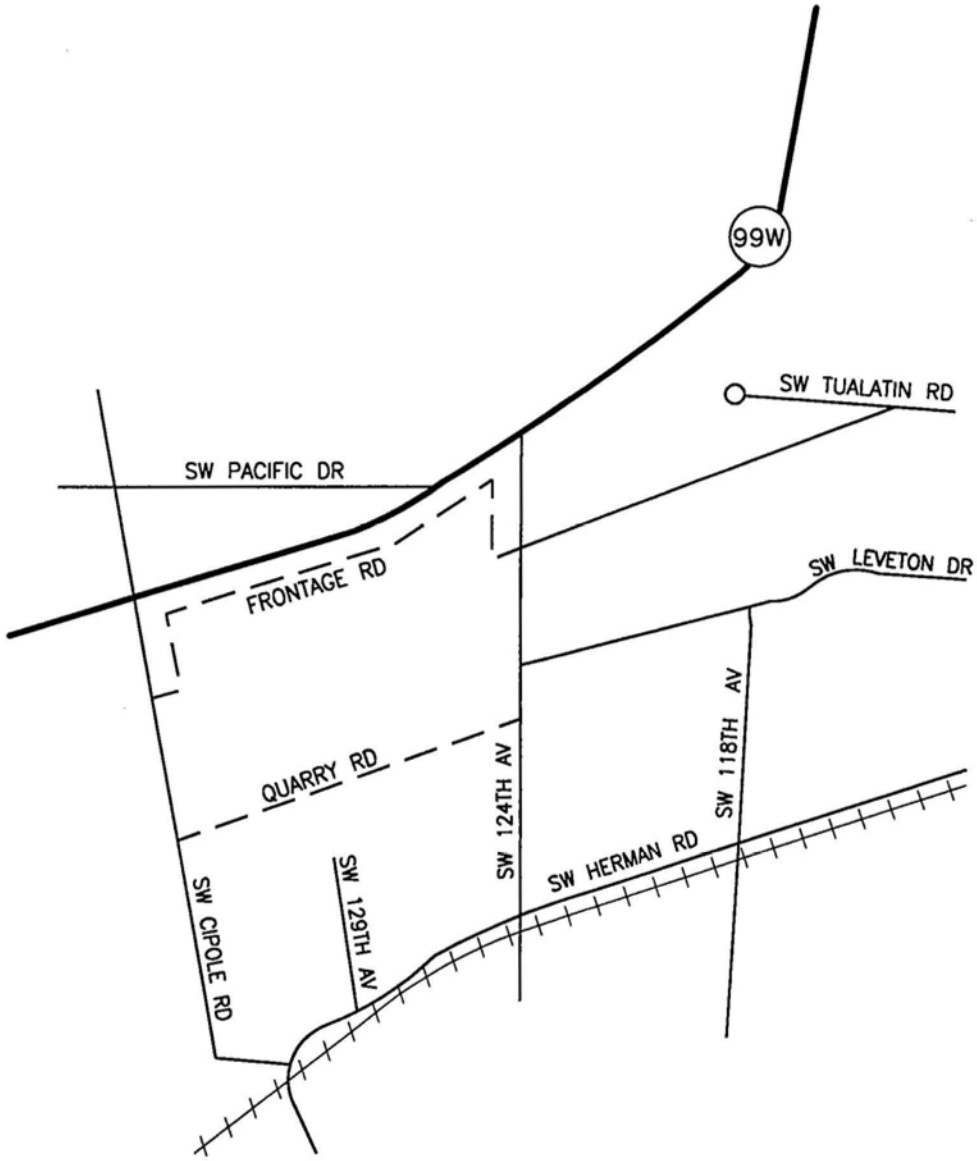
LEGEND

○ CUL-DE-SAC

YEAR 2015 BACKGROUND PM PEAK TRAFFIC VOLUMES

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON AUGUST 1998	FIGURE 4

3170F004

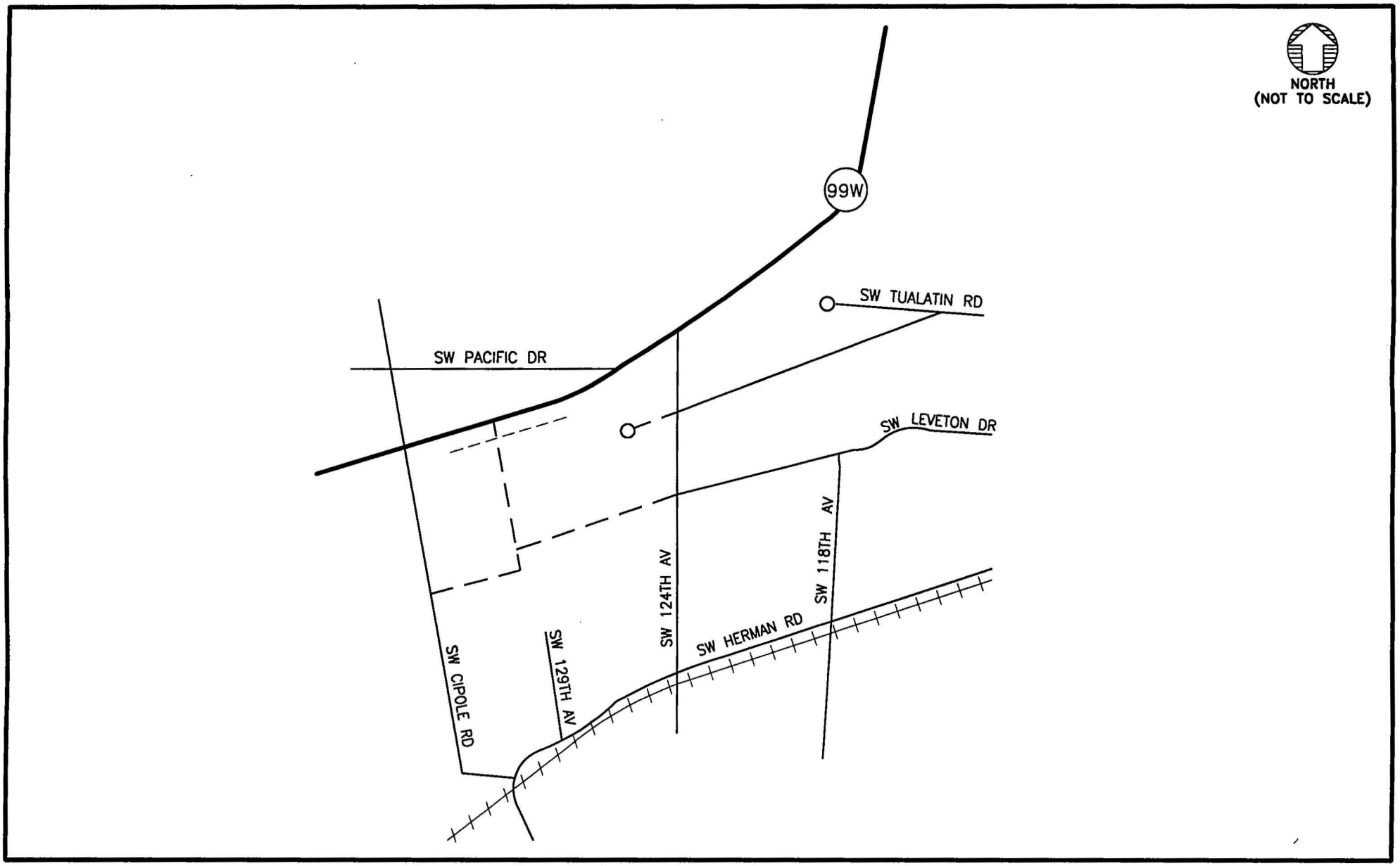


LEGEND

- CUL-DE-SAC
- PUBLIC ACCESS

2015 BASE ALTERNATIVE CONCEPTUAL ROADWAY SYSTEM

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON AUGUST 1998	FIGURE 5



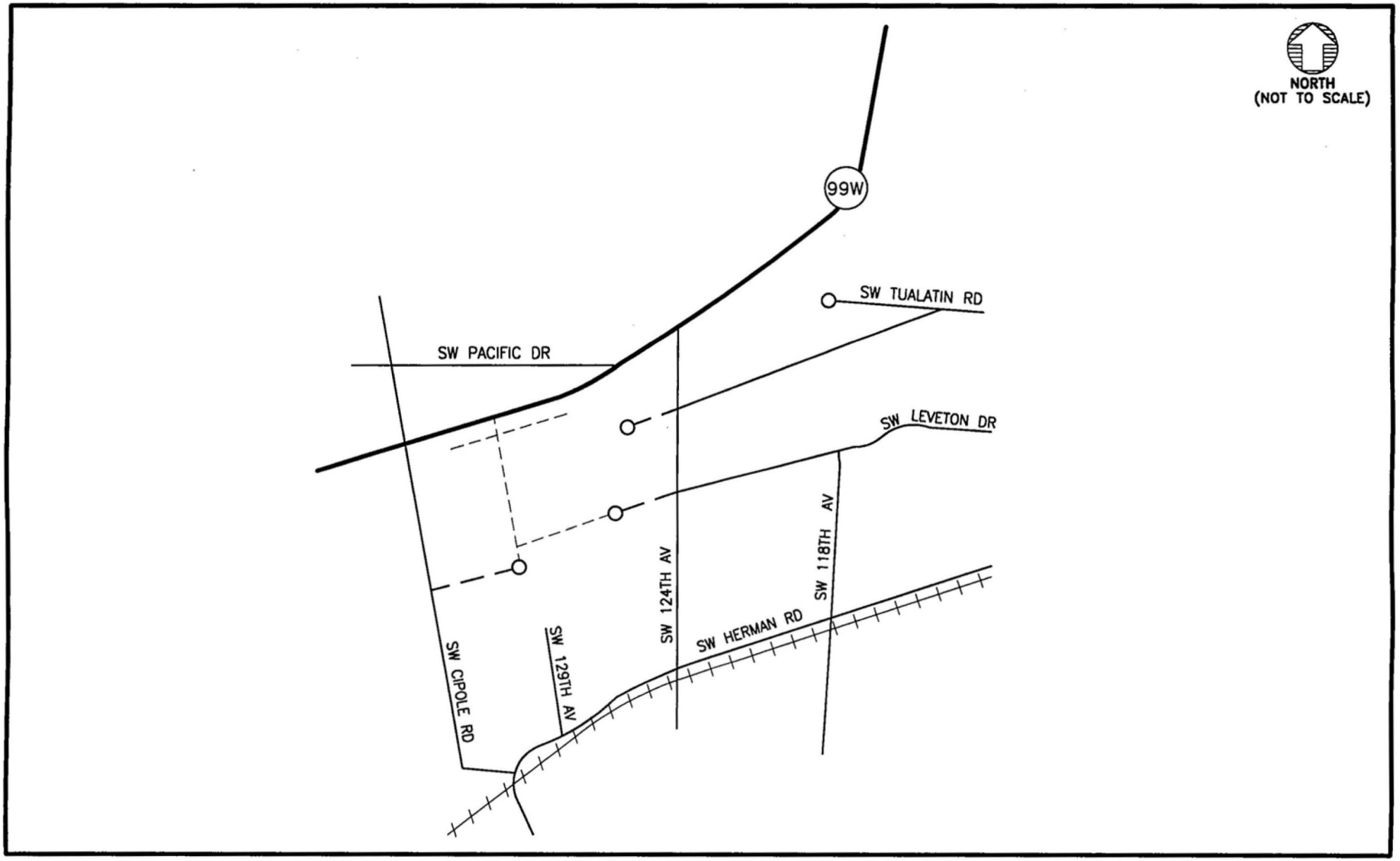
LEGEND

- CUL-DE-SAC
- PUBLIC ACCESS
- PRIVATE ACCESS

2015 ALTERNATIVE 1
CONCEPTUAL ROADWAY SYSTEM

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON AUGUST 1998	FIGURE 6

3170F006

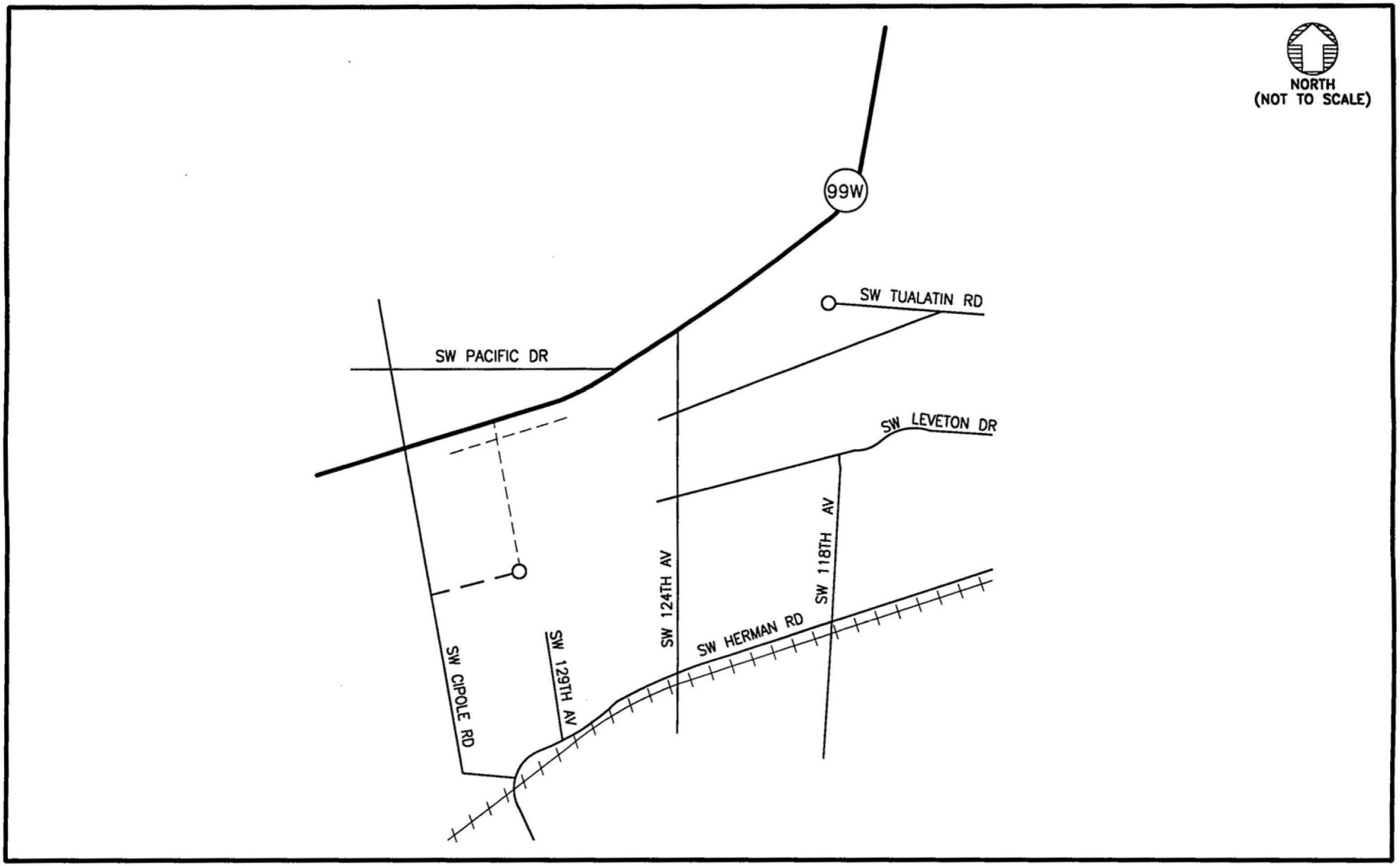


LEGEND

- CUL-DE-SAC
- PUBLIC ACCESS
- PRIVATE ACCESS

2015 ALTERNATIVE 2
CONCEPTUAL ROADWAY SYSTEM

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON AUGUST 1998	FIGURE 7



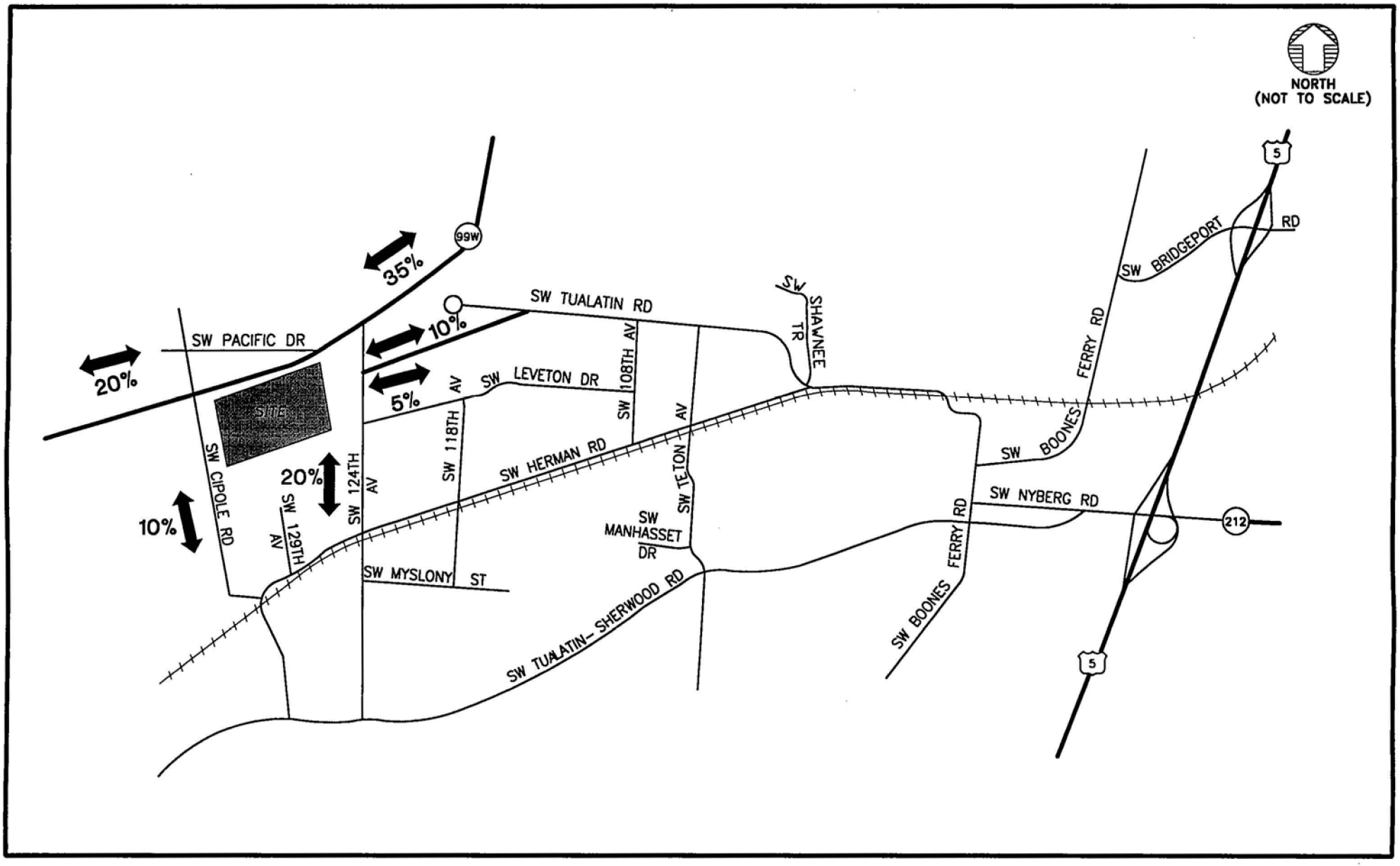
LEGEND

- CUL-DE-SAC
- PUBLIC ACCESS
- PRIVATE ACCESS

2015 ALTERNATIVE 3
CONCEPTUAL ROADWAY SYSTEM

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON AUGUST 1998	FIGURE 8

3170F008

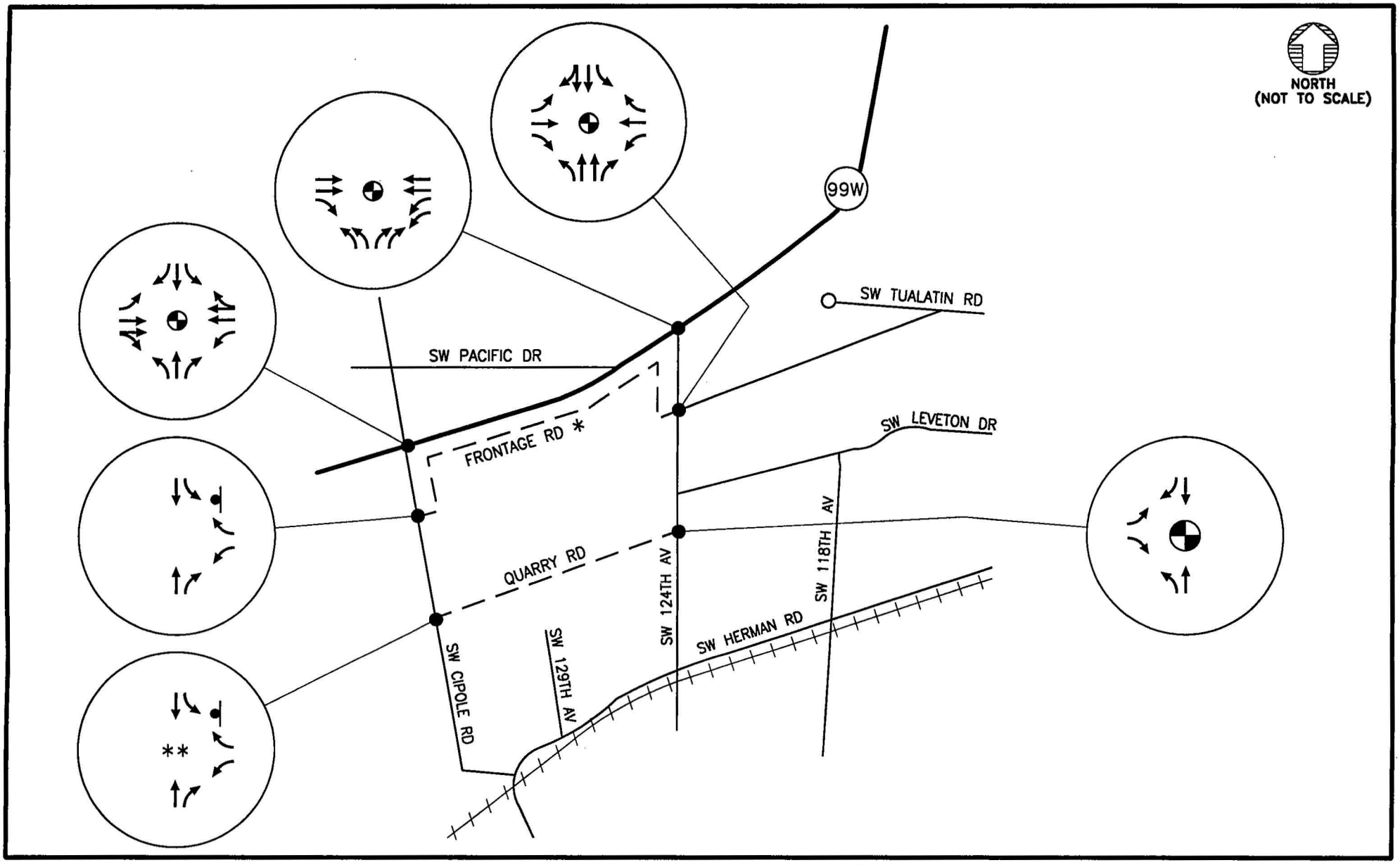


LEGEND

○ CUL-DE-SAC

YEAR 2015 SITE TRIP DISTRIBUTION

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON AUGUST 1998	FIGURE 9



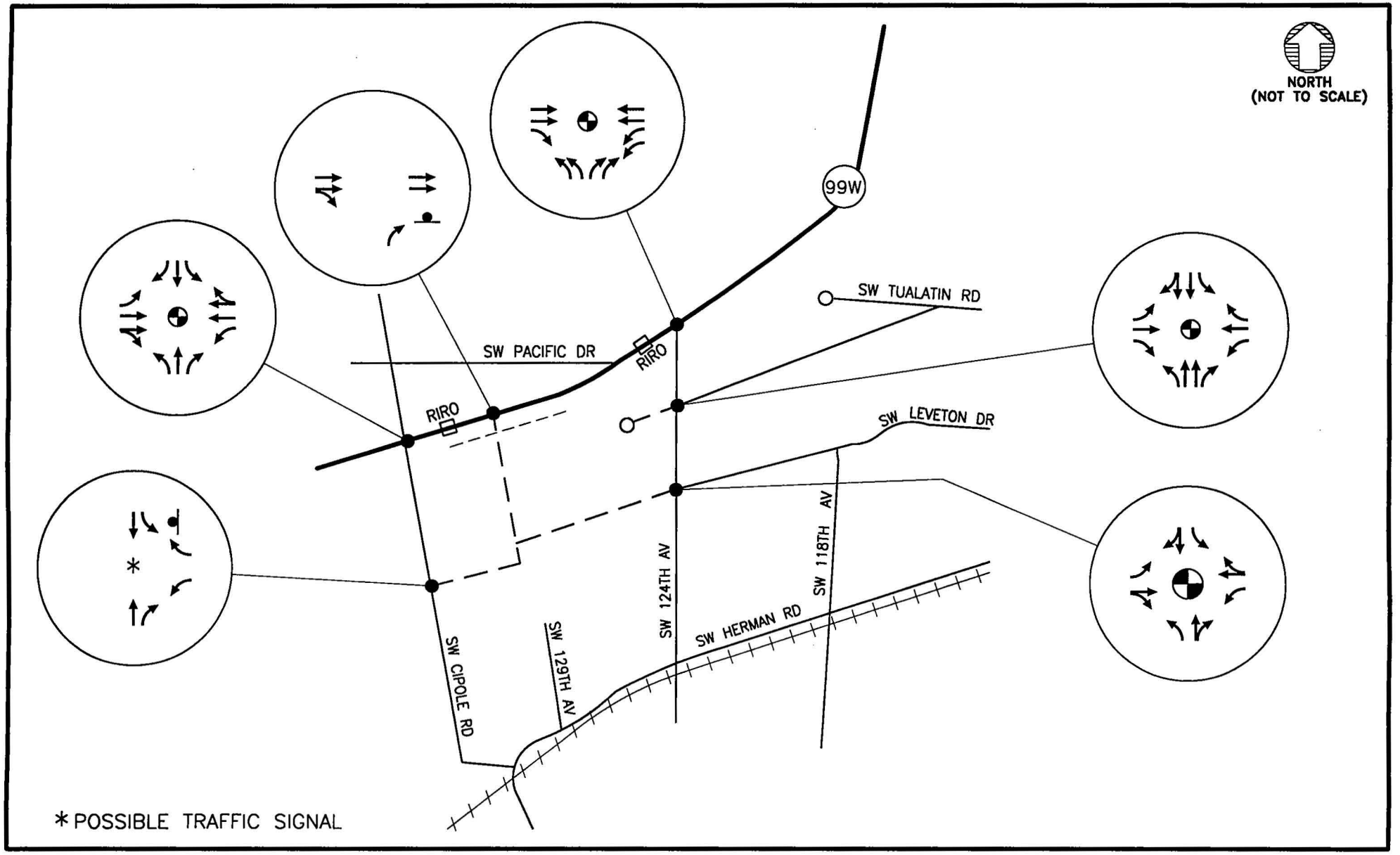
LEGEND

O	CUL-DE-SAC	*	DIRECT ACCESS TO HIGHWAY 99W ELIMINATED
- - -	PUBLIC ACCESS	**	POSSIBLE TRAFFIC SIGNAL
	TRAFFIC SIGNAL		
	STOP SIGN		

2015 BASE ALTERNATIVE CONCEPTUAL ROADWAY SYSTEM LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON AUGUST 1998	FIGURE 10

3170F010



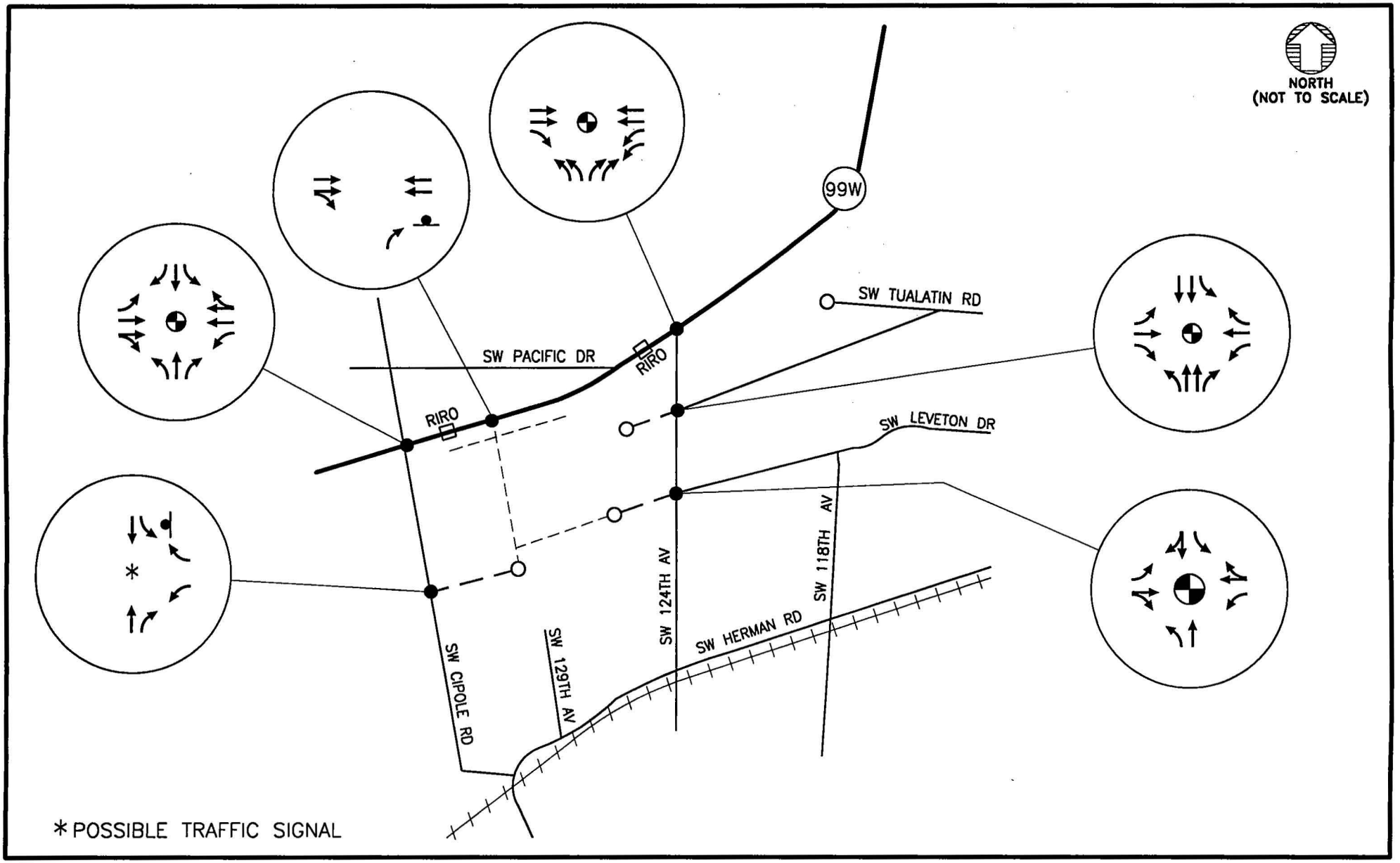
LEGEND

o	CUL-DE-SAC		TRAFFIC SIGNAL
– — –	PUBLIC ACCESS		STOP SIGN
-----	PRIVATE ACCESS	□	RIGHT-IN-RIGHT-OUT (RIRO) ACCESS DRIVEWAY

2015 ALTERNATIVE 1 CONCEPTUAL ROADWAY SYSTEM LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON AUGUST 1998	FIGURE 11

70F01



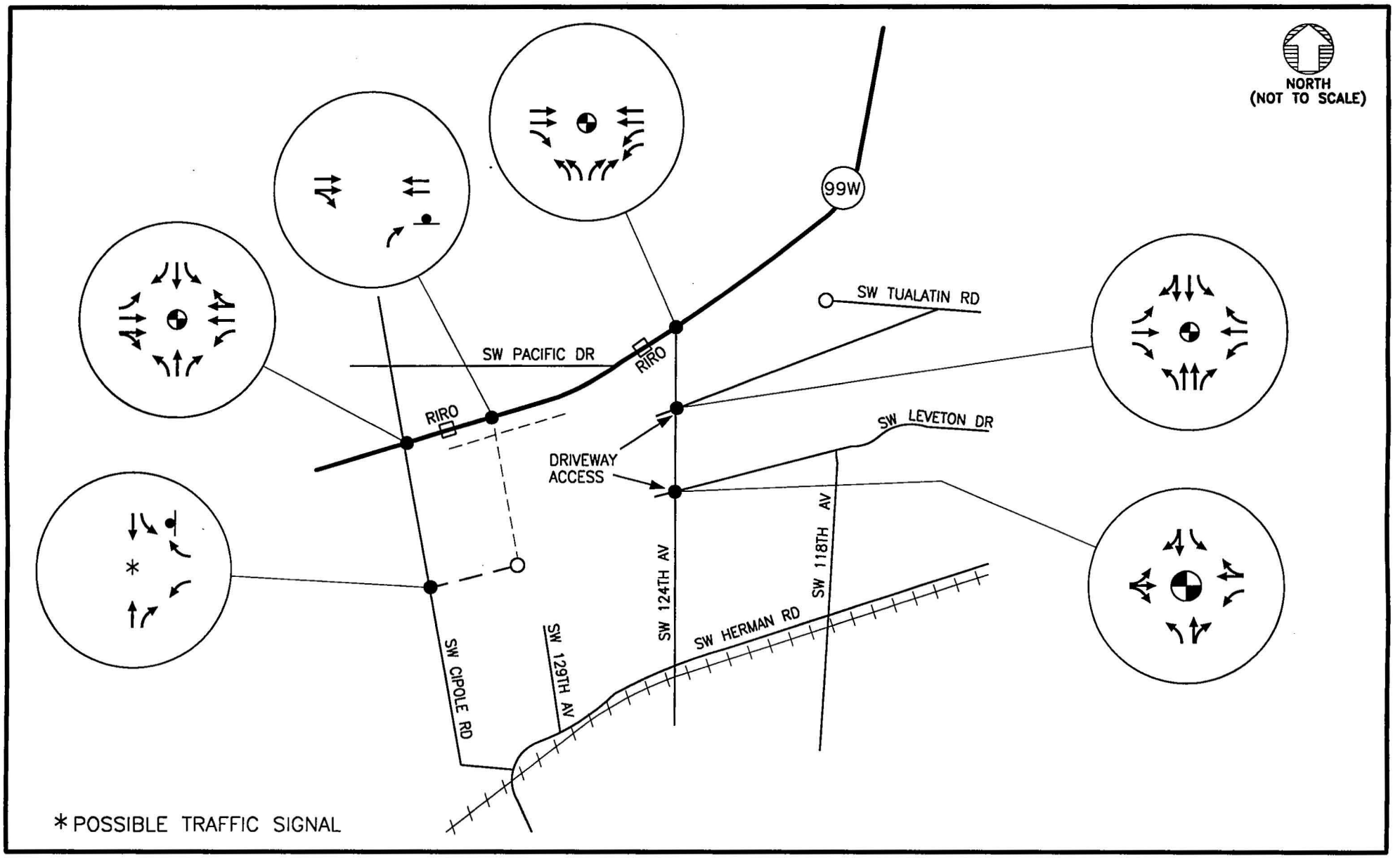
LEGEND

o	CUL-DE-SAC	⊕	TRAFFIC SIGNAL
– — –	PUBLIC ACCESS	●	STOP SIGN
-----	PRIVATE ACCESS	□	RIGHT-IN-RIGHT-OUT (RIRO) ACCESS DRIVEWAY

2015 ALTERNATIVE 2 CONCEPTUAL ROADWAY SYSTEM LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON AUGUST 1998	FIGURE 12

3170F012

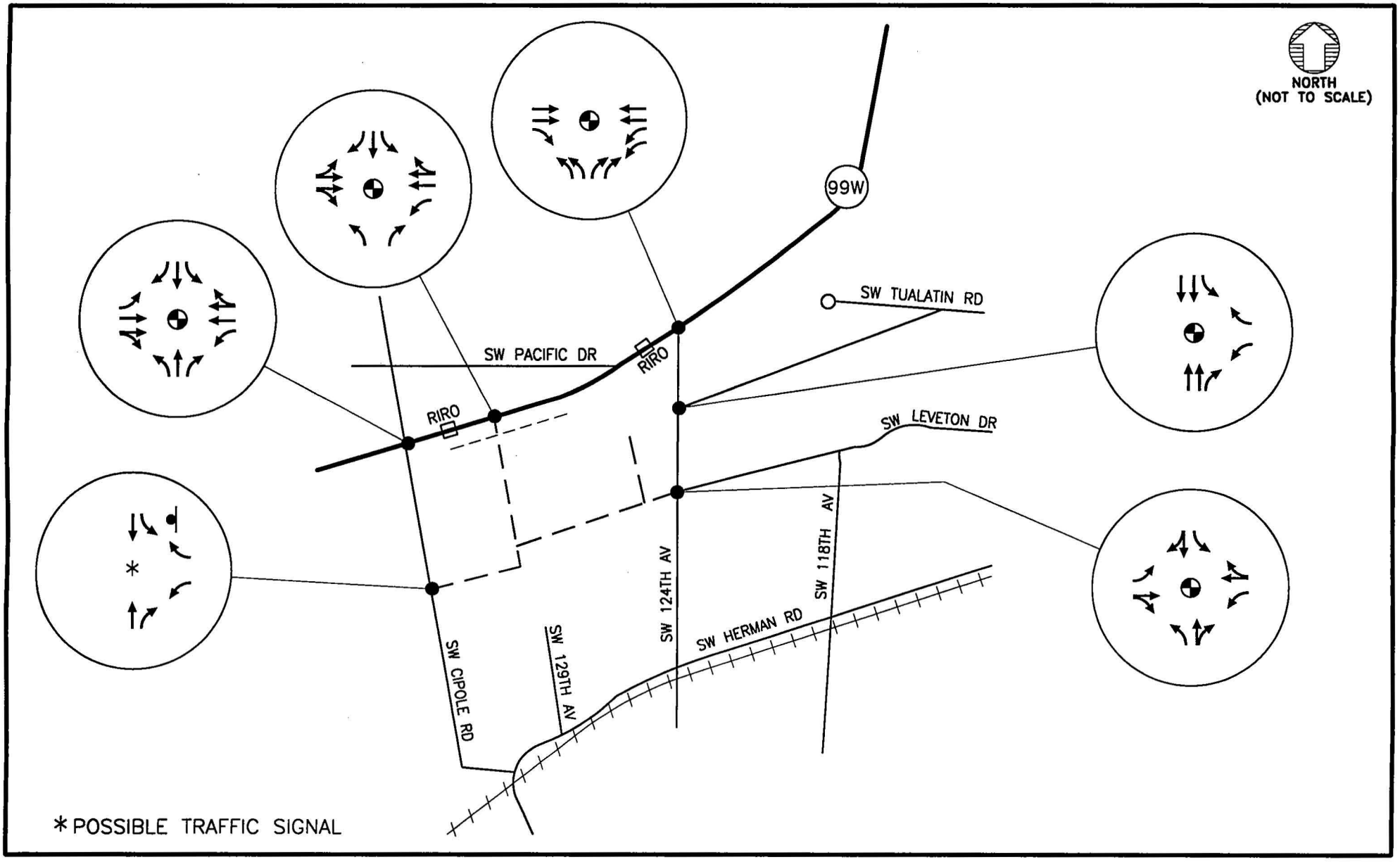


LEGEND

o	CUL-DE-SAC		TRAFFIC SIGNAL
– — –	PUBLIC ACCESS		STOP SIGN
-----	PRIVATE ACCESS	□	RIGHT-IN-RIGHT-OUT (RIRO) ACCESS DRIVEWAY

2015 ALTERNATIVE 3 CONCEPTUAL ROADWAY, SYSTEM LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON AUGUST 1998	FIGURE 13



LEGEND

O	CUL-DE-SAC	⊕	TRAFFIC SIGNAL
– – –	PUBLIC ACCESS	●	STOP SIGN
-----	PRIVATE ACCESS	□	RIGHT-IN-RIGHT-OUT (RIRO) ACCESS DRIVEWAY

2015 ALTERNATIVE 1 MODIFIED CONCEPTUAL ROADWAY SYSTEM LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON AUGUST 1998	FIGURE 14

3170F014

and service uses shall follow or be concurrent with Architectural Review approval, Building Permit issuance and Final Occupancy sign-off for industrial uses.

69.050 Site Size. The minimum site size for the application of the Industrial Business Park Overlay District shall not be less than 10 acres or 20 acres for retail and service uses.

69.055 Lot Size. As per the underlying ML District or MG District.

69.060 Urban Renewal Area - Lot Size. As per block area requirements in the underlying ML District or MG District.

69.065 Mixed Use Percentage.

(1) When the site size is 10.00 to 19.99 acres, the gross floor area of office uses shall not be greater than 50 percent of the total gross floor area of buildings on the site.

(2) When the site size is 20.00 acres or greater, the following shall apply:

(a) The gross floor area of office, service and retail buildings combined shall not be greater than 50 percent of the total gross floor area of buildings on the site.

(b) The gross floor area of office uses listed in 69.020(1) may occupy up to 50 percent of the total gross floor area of buildings on the site, except as provided in 69.065(2)(a).

(c) The gross floor area of retail uses listed in 69.020(2)(a) may occupy up to 10 percent of the total gross floor area of buildings on the site, except as provided in 69.065(2)(a).

(d) The gross floor area of service uses listed in 69.020(2)(b) may occupy up to 10 percent of the total gross floor area of buildings on the site, except as provided in 69.065(2)(a).

(3) The percentages in (1) and (2) of this section shall not be exceeded at any time.

69.070 Setback Requirements. As per the underlying ML or MG District, except that retail and service uses be set back from any designated arterial or collector street right-of-way and any Residential District not less than 80 feet.

69.080 [Repealed by Ord. 862-92, Sec. 49, passed March 23, 1992.]

69.090 Structure Height.

(1) No structure which is within the ML District and is overlain by the Industrial Business Park Overlay District shall exceed a height of 70 feet, except as provided pursuant to Chapter 32 of the Planning District Standards, in which case the maximum permitted structure height may be increased to 85 feet, provided that all yards adjacent to the structure are not less than a distance equal to 1-1/2 times the height of said structure.

(2) No structure which is within the MG District and is overlain by the Industrial Business Park Overlay District shall exceed a height of 70 feet, except as provided pursuant to Chapter 32 of the Planning District Standards, in which case the maximum permitted structure height may be increased to 100 feet, provided that all yards adjacent to the structure are not less than a distance equal to the height of the structure.

(3) Height Adjacent to a Residential District. Where a property line or alley separates ML and MG land from land in a residential district, a building shall not be greater than 28 feet in height at the setback line. No building or structure shall extend above a plane beginning at 28 feet in height above the setback line and extending inward and upward at a slope of 45 degrees, subject always to the maximum height limitation set in subsection (1) and (2) above.

69.100 Access. As per the Access Management Standards (Chapter 75) and the underlying ML or MG District, except that retail and service uses shall not have access directly onto an arterial or collector street, but shall have access through the internal circulation pattern on the site.

69.110 Off-Street Parking and Loading. Refer to Chapter 73.

69.120 Environmental Standards. Refer to Chapter 63.

69.130 Floodplain District. Refer to Chapter 70.

69.140 Wetlands Protection District. Refer to Chapter 71.

69.150 Greenway and Riverbank Protection District. Refer to Chapter 72.

69.160 Community Design Standards. Refer to Chapter 73.

69.170 Landscaping. Refer to Chapter 73. [Sec. 69.170 added by Ord. 862-92, Sec. 50, passed March 23, 1992.]

APPENDIX 3

QUARRY SECTOR TRAFFIC OPERATIONS SUMMARY

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TRANSPORTATION PLANNING/TRAFFIC ENGINEERING
610 SW ALDER, SUITE 700 • PORTLAND, OR 97205 • (503) 228-5230 • FAX (503) 273-8169

MEMORANDUM

Date: January 8, 1999

Project #: 3365

To: Doug Rux, Program Coordinator - Economic Development
City of Tualatin
PO Box 369
Tualatin, Oregon 97062-0369

From: Elizabeth A. Wemple, P.E.

Project: Tualatin Quarry Sector Subarea Plan
Subject: Detailed Traffic Operations Summary

Introduction

The purpose of this memorandum is to summarize the detailed traffic operations analysis that has been performed for the Tualatin Quarry Subarea and identify the mitigation measures that are needed to maintain acceptable operations under 2015 forecast traffic conditions. This memorandum is a supplement to the August 7, 1998 memorandum that summarized existing and future background traffic conditions, identified the trip generation potential for each alternative, and provided a general summary of the traffic operating conditions for each alternative under future conditions. The data and assumptions used in the analysis and summarized in this memorandum are consistent with the previous analysis that has been conducted for the subject property.

Site-Traffic Volume Assignment

Based on the trip generation and distribution estimates for each alternative that were summarized in the August 7th memorandum, the site-generated traffic volumes were assigned to the adjacent roadway system. In order to determine the turning movement volumes at each site-access location, assumptions were made regarding the number of lots within the study area that each access would serve. Trip generation estimates for each lot were then derived based on the proportion of the lot size relative to the entire site. The assignment process also took into account the effect of public and private internal roadway connections.

Year 2015 Operations Analysis - Base Alternative

Under the base alternative, two access locations would be provided on SW Cipole Road and SW 124th Avenue. No access would be provided along Highway 99W, and two internal public roadways would provide access between SW Cipole Road and SW 124th Avenue. Figure 1 identifies the base and mitigated lane configurations, Figure 2 provides the site-generated traffic volumes, and Figure 3 identifies the 2015 total traffic volumes and levels of service for this alternative.

As shown in Figure 1, two additional lanes are needed on the northbound approach at the SW Cipole Road/Highway 99W intersection to accommodate the site traffic that is required to turn onto Highway 99W to enter/exit the site because no access is provided on Highway 99W under this alternative. The additional two lanes will result in a five-lane roadway section on SW Cipole Road which would result in a change in its classification. Additionally, a third through lane on Highway 99W is needed in the northbound direction at the SW 124th Avenue intersection to maintain acceptable operation. This lane addition is required under all alternatives. The location at which the third northbound through lane would begin and ends needs to be further investigated. Further, in order to accommodate the heavy right-turn demand from Highway 99W to SW 124th Avenue, a separate right-turn lane could be constructed on Highway 99W in addition to the three through lanes; however, this would require the acquisition of additional right-of-way. It should be noted that the Highway 99W/SW 124th Avenue intersection is forecast to operate with a volume-to-capacity ratio of 0.88 under 2015 *background* (without site) conditions, as summarized in the August 7th memorandum.

Lastly, a signal is needed at the SW 124th Avenue/Quarry Road intersection to accommodate the forecast site traffic volumes. It should also be noted that a signal is needed at the south access location on SW 124th Avenue under all future alternatives. Because of the high traffic volumes that are expected to occur along SW 124th Avenue and SW Cipole Road, it is likely that all minor street stop-controlled left-turning movements along the roadways will experience high delays. The westbound left-turn movement at the SW Leveton Drive/SW 124th Avenue intersection is expected to operate at level-of-service "F" and below capacity. Further analysis would need to be performed at this intersection to determine if and/or when signal warrants would be met, and the effects that a signal at this location would have on other potential signals along SW 124th Avenue.

Year 2015 Operation Analysis - Alternative 1

As summarized in the August 7th memorandum, Alternative 1 assumes two right-in/right-out (RIRO) driveway access points and one RIRO public street access point on Highway 99W, in addition to one full-access street on SW Cipole Road and two full-access streets on SW 124th Avenue. This alternative also includes internal public roadways that connect to SW Cipole Road, SW 124th Avenue, and Highway 99W. Figures 4, 5, and 6 provide the lane configurations, site-generated traffic volumes, and total traffic volumes with levels of service for this alternative, respectively.

In order to accommodate the addition of site-traffic volumes under this alternative, a third eastbound through lane is needed on Highway 99W at the SW 124th Avenue intersection as in Alternative 1. Further, a signal is needed at the SW Leveton Drive/SW 124th Avenue intersection. A signal will likely be warranted at the south access/SW Cipole Road intersection to serve the left-turn egress movement onto SW Cipole Road. All other intersections are forecast to operate acceptably under Alternative 1. It should be noted that the planned roadway cross-section for SW Cipole Road includes a through lane in each direction and a center left-turn lane. Alternative 1 and the remaining alternatives analyzed in this report require that an additional turn lane be provided on the northbound approach to the Highway 99W intersection.

Year 2015 Operation Analysis - Alternative 2

Similarly to the previous alternative, Alternative 2 assumes three RIRO access points on Highway 99W, one full-access street on SW Cipole Road, and two full-access streets on SW 124th Avenue.

The difference from Alternative 1 however, is that Alternative 2 includes cul-de-sacs for the access locations on SW Cipole Road and SW 124th Avenue with private access connections between the cul-de-sacs rather than public connections. Figure 7 provides the lane configurations, Figure 8 the site-generated traffic volumes, and Figure 9 the 2015 traffic volumes and levels of service for Alternative 2.

As shown in Figure 7, a third northbound through lane is needed at the Highway 99W/SW 124th Avenue intersection and signals are needed at the south street access locations on SW Cipole Road and SW 124th Avenue. Because of the lack of internal public roadway connections under this alternative, traffic traveling east/west is expected to utilize Highway 99W more so than the internal roadway connections. This results in higher turning movements at the Highway 99W intersections with SW Cipole Road and SW 124th Avenue and thus worse traffic operating conditions compared to Alternative 1. The additional turning movement volumes at the Highway 99W intersections however are not forecast to warrant the need for additional mitigation measures above and beyond those identified for Alternative 1.

Year 2015 Operations Analysis - Alternative 3

Under Alternative 3, three RIRO driveways would be located along Highway 99W, one full-access street would be provided on SW Cipole Road, and two full-access driveways would be located on SW 124th Avenue. The access points on SW 124th Avenue would not provide any connections to the west side of the site. A private access would be provided at the center RIRO driveway on Highway 99W that would connect to a cul-de-sac at the public access connection on SW Cipole Road. Also, this alternative includes access points at SW Tualatin Road and SW Leveton Drive, creating four legged intersections at these locations. The lane configurations, site-generated traffic volumes, and 2015 traffic volumes/levels of service are shown in Figures 10, 11, and 12, respectively.

Similarly to Alternatives 1 and 2, a third northbound through lane is needed at the Highway 99W/SW 124th Avenue intersection. However, different from Alternatives 1 and 2, a separate right-turn lane would also be required on the northbound approach at the Highway 99W/SW 124th Avenue intersection. Traffic signals are warranted at the south access driveways on SW Cipole Road and SW 124th Avenue under this alternative as well. Because of the lack of connections to the driveways on SW 124th Avenue, motorists that might travel across the site to the east will exit to the north via the center RIRO access. Therefore, the driveway is expected to experience a right-turn egress demand greater than 400 vehicles. This results in failing conditions at the center RIRO driveway.

Year 2015 Operations Analysis - Modified Alternative 1

This alternative is similar to Alternative 1, with the exception that a traffic signal would be installed at the center street access on Highway 99W and only one access street would be provided on SW 124th Avenue which would be located opposite SW Leveton Drive. The modified Alternative 1 would also include public connections to facilitate east/west and north/south travel within the site. Figure 13 provides the lane configurations, Figure 14 the site-generated traffic volumes, and Figure 15 the 2015 total traffic volumes and levels of service for the Modified Alternative 1.

Under this alternative, traffic signals would be required at the center access/Highway 99W and SW Leveton Drive/SW 124th Avenue intersections. As with the previous alternatives, a third

northbound through lane is needed on Highway 99W at the intersection with SW 124th Avenue. Because the signal on Highway 99W at the center access serves a portion of the traffic demand destined to the west on Highway 99W and south on SW Cipole Road, a traffic signal is not warranted at the south access/SW Cipole Road intersection under these forecast conditions. However, the access on SW Cipole Road is forecast to operate near failing conditions due to the relatively high volume-to-capacity ratio (v/c = 0.67) and delay (LOS = "E") the westbound left-turn movement is expected to experience. Further, because access would not be provided on the west leg of the SW 124th Avenue/SW Tualatin Road intersection, corridor operations along SW 124th Avenue would likely improve and queuing between SW Tualatin Road and Highway 99W would be minimized.

Summary and Conclusions

Based on the results of the alternatives analysis conducted, the following table indicates the identified mitigation measures and operating conditions at the critical intersections on Highway 99W for each alternative.

Table 1
2015 Traffic Operations Alternatives Analysis Summary

Alternative	Identified Mitigation Measures	2015 Traffic Operations Results[1]	
		Highway 99W/ SW Cipole Rd	Highway 99W/ SW 124th Ave
Base	- Add two turn lanes on Cipole Road at Highway 99W - Add third NB TH/RT lane at Highway 99W/124th Ave - Signal at Quarry Rd/124th Ave	0.84/C	0.94/D
1	- Add one turn lane on Cipole Road at Highway 99W - Add third NB TH/RT lane at Highway 99W/124th Ave - Signal at Leveton Dr/124th Ave - Signal at south access/Cipole Rd	0.91/D	0.94/D
2	- Add one turn lane on Cipole Road at Highway 99W - Add third NB TH/RT lane at Highway 99W/124th Ave - Signal at Leveton Dr/124th Ave - Signal at south access/Cipole Rd	0.94/D	0.97/D
3	- Add one turn lane on Cipole Road at Highway 99W - Add third NB through lane at Highway 99W/124th Ave - Separate NB right turn lane at Highway 99W/124th Ave - Signal at Leveton Dr/124th Ave - Signal at south access/Cipole Rd	0.93/D	0.90/C
1 - Modified	- Add one turn lane on Cipole Road at Highway 99W - Add third NB TH/RT lane at Highway 99W/124th Ave - Signal at center access/Highway 99W - Signal at Leveton Dr/124th Ave	0.95/D	0.95/D

Notes: TH/RT - Shared through/right-turn lane.
1. Volume-to-Capacity Ratio/Level of Service

As shown in Table 1, under 2015 p.m. peak hour conditions the critical signalized intersections on Highway 99W at SW Cipole Road and SW 124th Avenue are expected to operate at or above a volume-to-capacity ratio of 0.90 under each alternative with the identified mitigation, with the

exception of the SW Cipole Road intersection under the base alternative. In the base alternative, this intersection operates at level-of-service "F." To mitigate this, an additional northbound right-turn lane is required. Given this, the intersection operates as shown above. Further, each alternative is identified as needing a third northbound through lane on Highway 99W at the intersection of Highway 99W/SW 124th Avenue. Each alternative also is identified as needing a traffic signal on SW 124th Avenue at the southern most access street or driveway. Under the forecast traffic volumes, a traffic signal is needed at the SW Cipole Road access under Alternatives 1, 2, and 3.

The following conclusions can be made regarding the access alternatives developed for the Tualatin Quarry Subarea:

- Under the base alternative, the SW Cipole Road/Highway 99W intersection will require the construction of an two additional turn lanes on SW Cipole Road based on the forecast 2015 traffic volumes. The remaining alternative will require the construction of one additional turn lane on SW Cipole Road.

- If full access is not provided at the center access location on Highway 99W, a public connection is needed at the south access location on SW 124th Avenue.

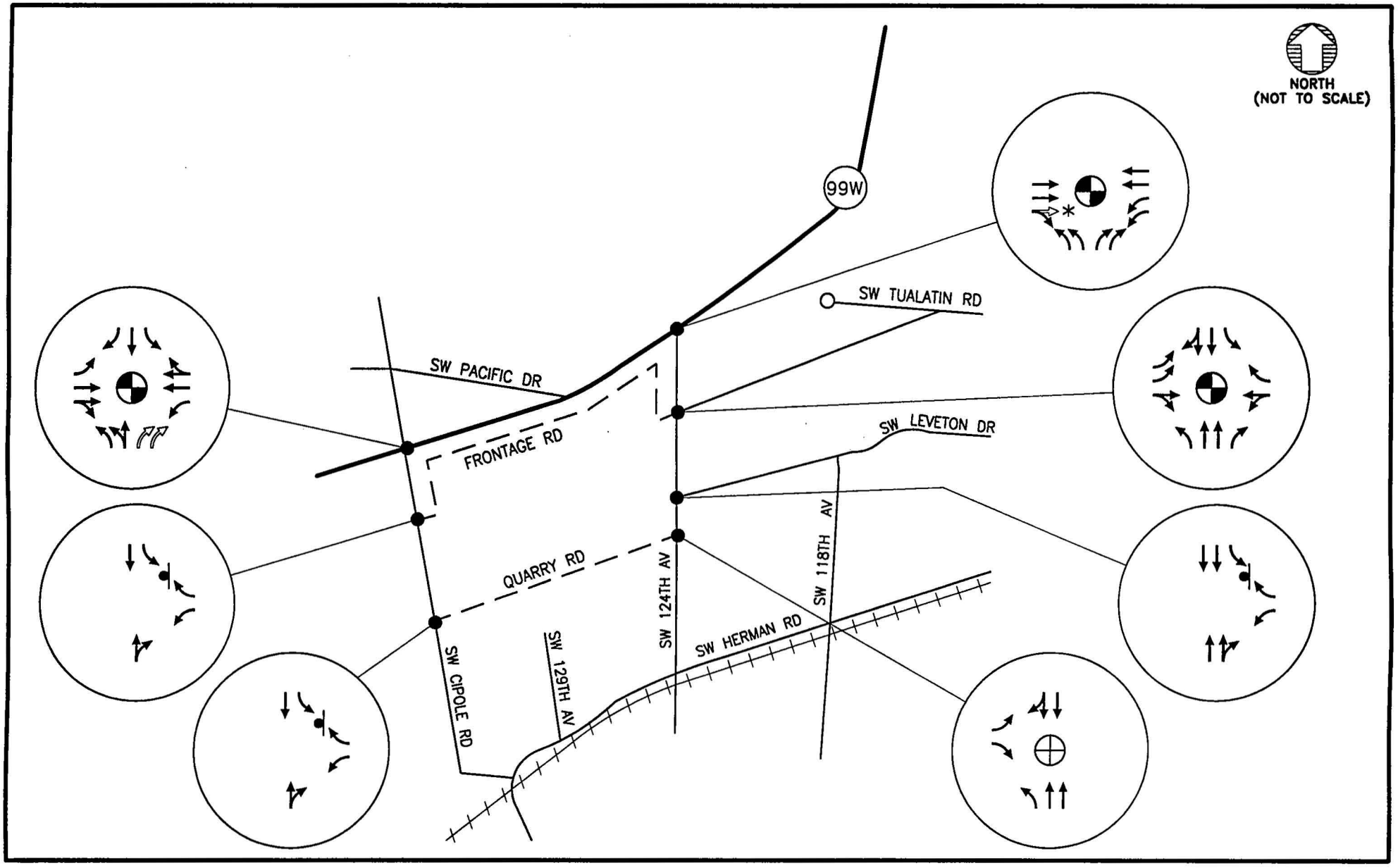
- Eliminating access to the study area at the SW Tualatin Road/SW 124th Avenue intersection will improve corridor operations along SW 124th Avenue. Without an access at this intersection (Modified Alternative 1), the SW Tualatin Road/SW 124th Avenue intersection is forecast to operate with an average delay of 15.9 seconds per vehicle, compared to a delay greater than 20 seconds per vehicle at the intersection as forecast under the other alternatives.

- Providing internal east/west public roadway connections will reduce turning movements at the critical intersections on Highway 99W and will improve overall traffic operations.

- A third northbound through lane is needed on Highway 99W at and continuing north of SW 124th Avenue. The location at which the third through lane begins and ends needs to be further investigated.

- It is recommended that the weekday a.m. peak hour conditions be analyzed under the preferred alternative to determine if additional mitigation measures would be triggered such as a third westbound through lane or dual westbound left-turn lanes at the SW Cipole Road/Highway 99W intersection, due to the reverse in traffic flows.

I hope that this analysis provides you with an adequate summary of the detailed operations analysis that was conducted for each alternative. Should you have any additional questions or comments please feel free to call us at 228-5230. Thank you for the opportunity to assist the City in their planning efforts.



LEGEND

- O CUL-DE-SAC
- TRAFFIC SIGNAL
- PUBLIC ACCESS
- STOP SIGN
- PRIVATE ACCESS
- IDENTIFIED MITIGATION
- * LOCATION OF LANE ADDITION TO BE DETERMINED

2015 BASE ALTERNATIVE LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON JANUARY 1999	FIGURE 1

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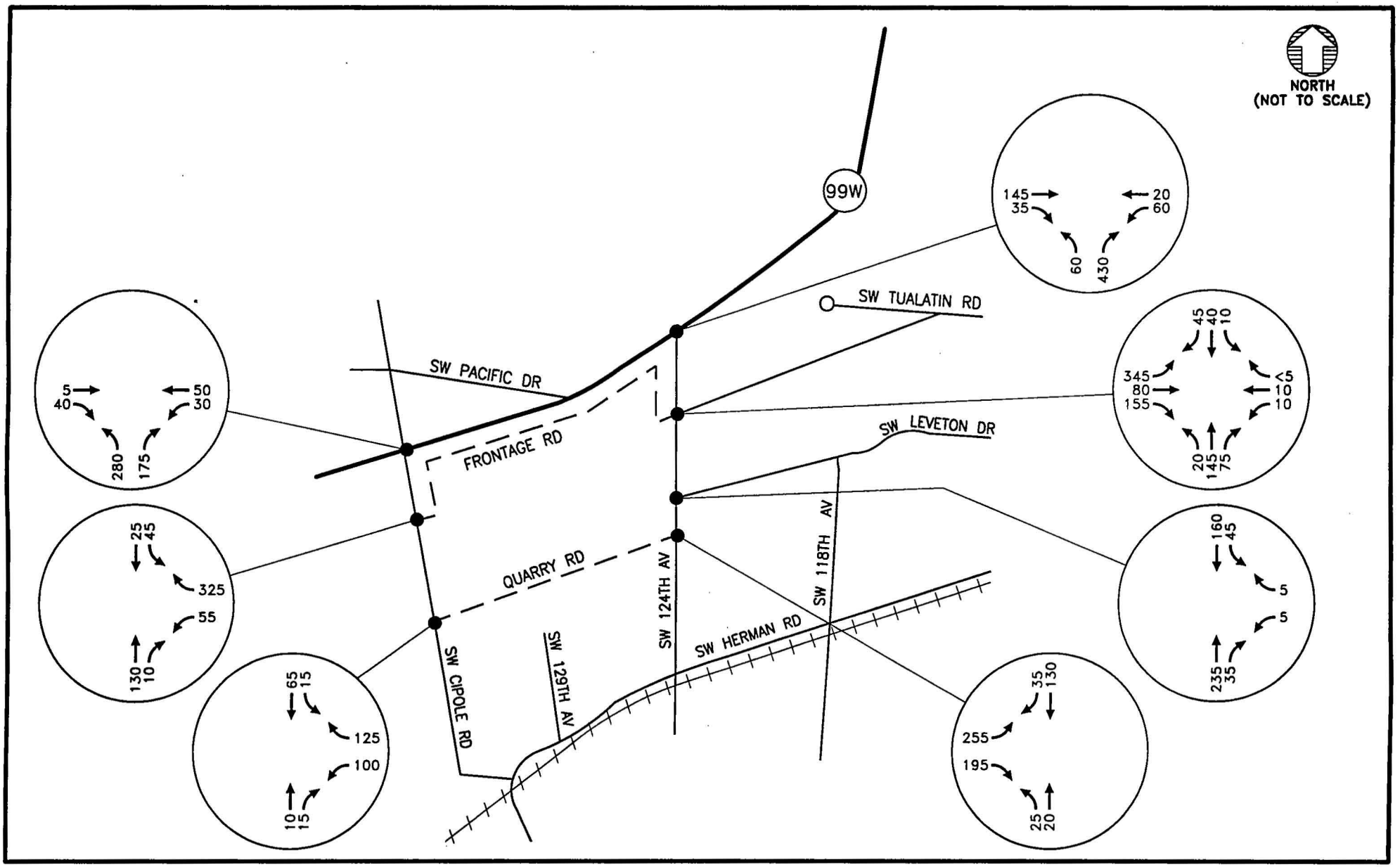


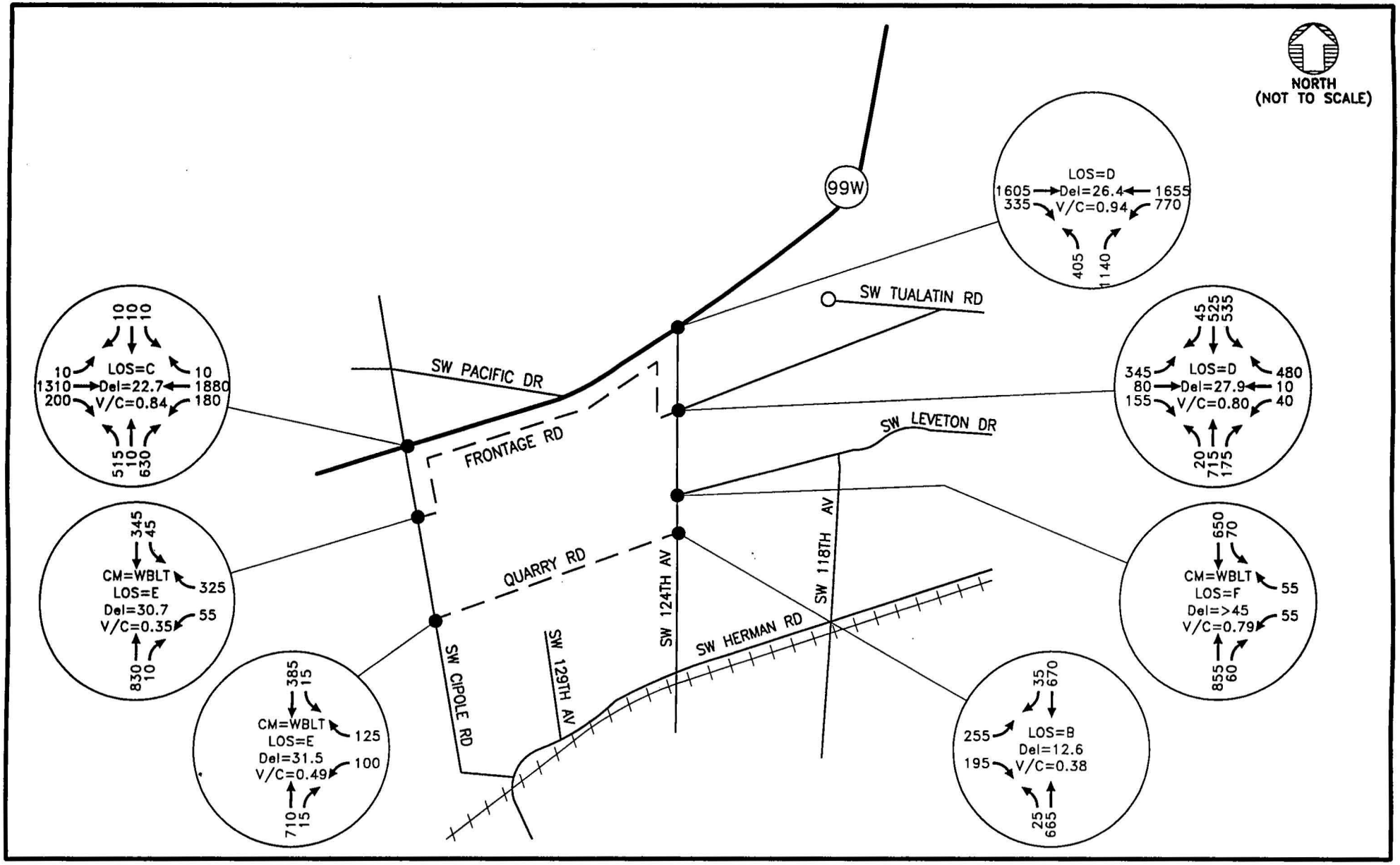
LEGEND

- CUL-DE-SAC
- PUBLIC ACCESS
- PRIVATE ACCESS

2015 BASE ALTERNATIVE SITE-GENERATED TRAFFIC VOLUMES WEEKDAY PM PEAK HOUR

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON	FIGURE
JANUARY 1999	2

DWGS\OPERATIONS\3365A0WS



LEGEND

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/ CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE DELAY (SIGNALIZED)/ CRITICAL MOVEMENT DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

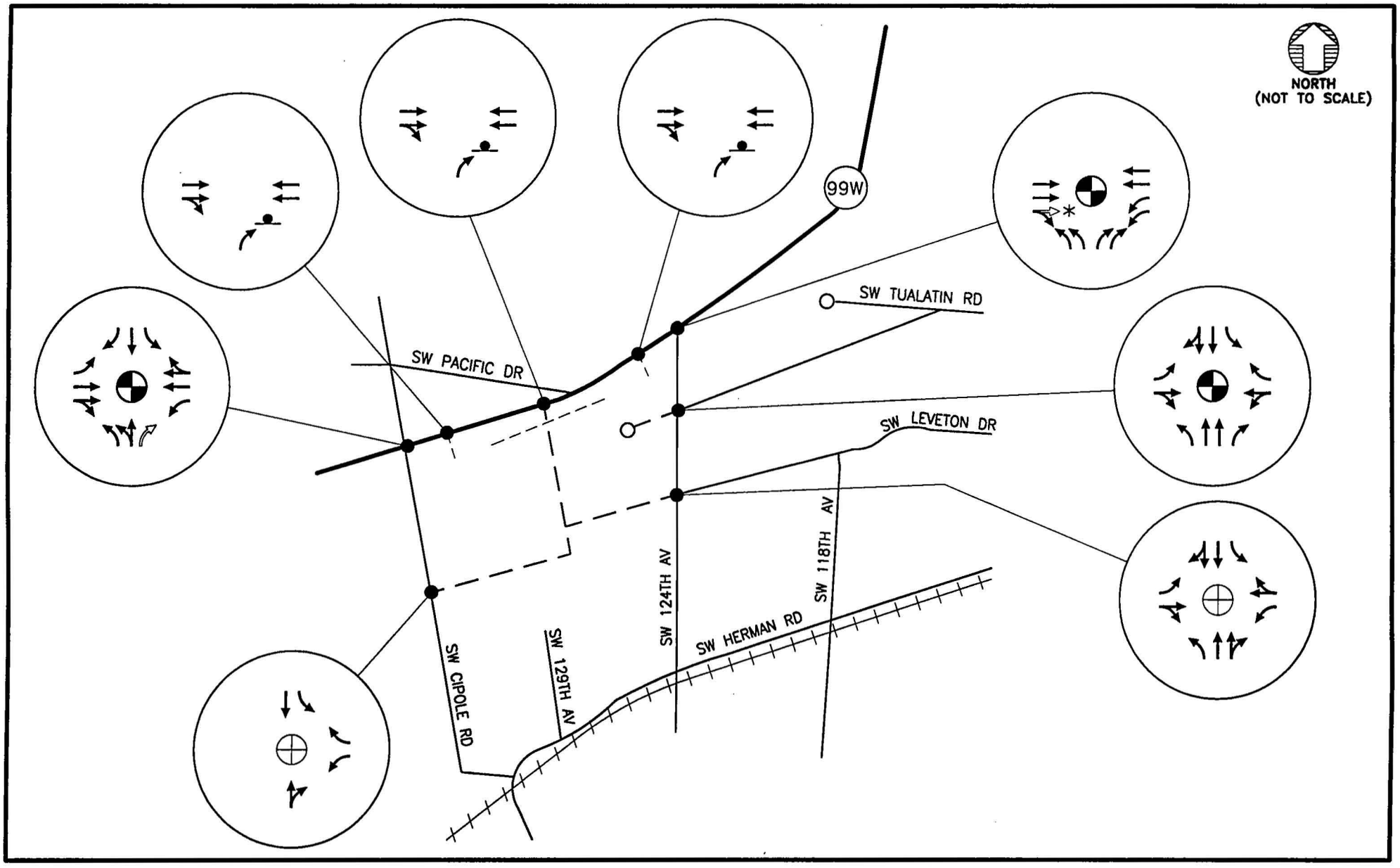
O CUL-DE-SAC
– — – PUBLIC ACCESS
– – – – – PRIVATE ACCESS

2015 BASE ALTERNATIVE PM PEAK HOUR TRAFFIC VOLUMES AND LEVELS OF SERVICE

QUARRY SECTOR SUB-AREA PLAN
TUALATIN, OREGON
JANUARY 1999

FIGURE 3

DWG RATIO 55A0E



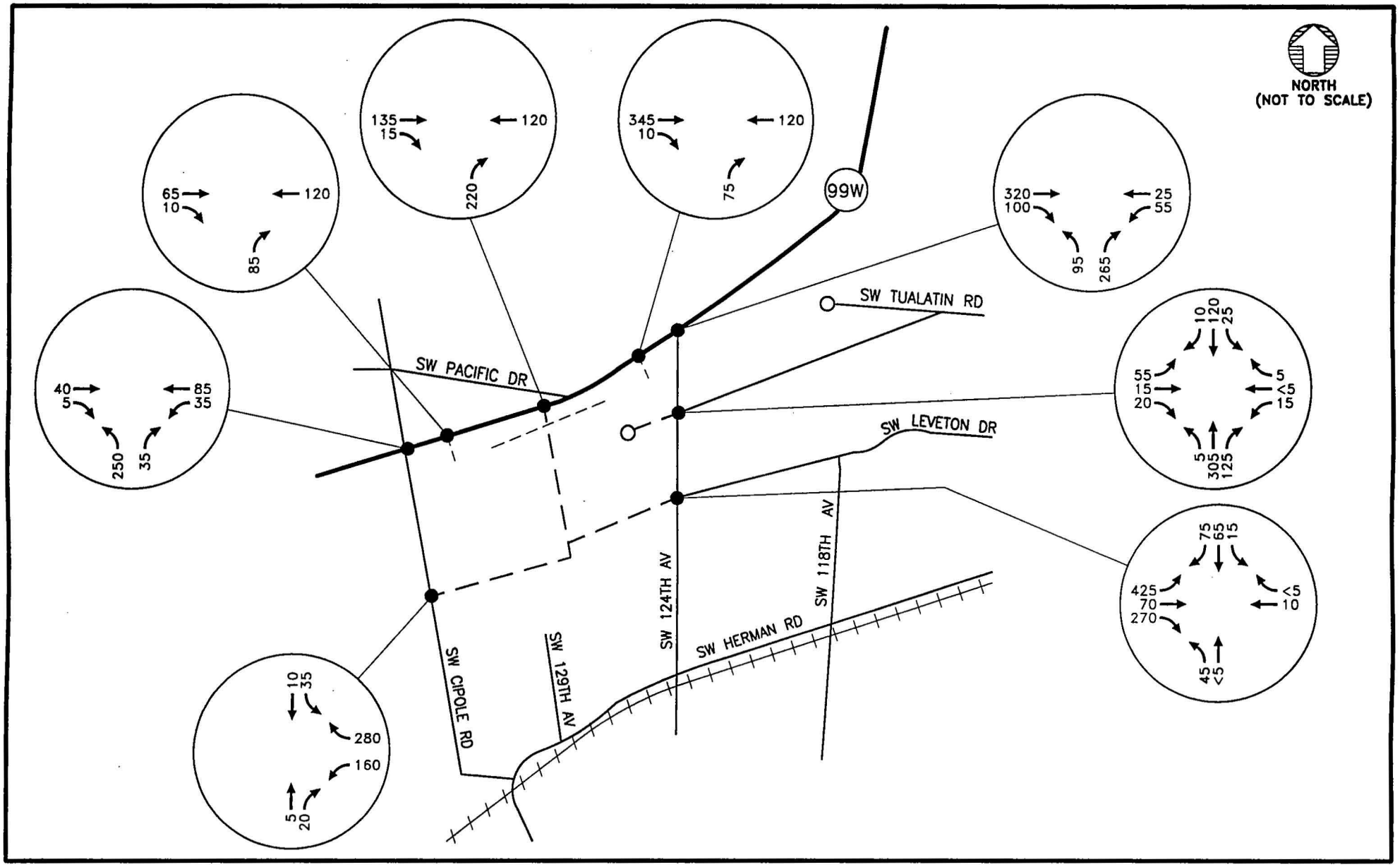
LEGEND

- O CUL-DE-SAC
- TRAFFIC SIGNAL
- PUBLIC ACCESS
- STOP SIGN
- PRIVATE ACCESS
- IDENTIFIED MITIGATION
- * LOCATION OF LANE ADDITION TO BE DETERMINED

2015 ALTERNATIVE 1 LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON JANUARY 1999	FIGURE 4

DWGS\OPERATIONS\3365A1LN



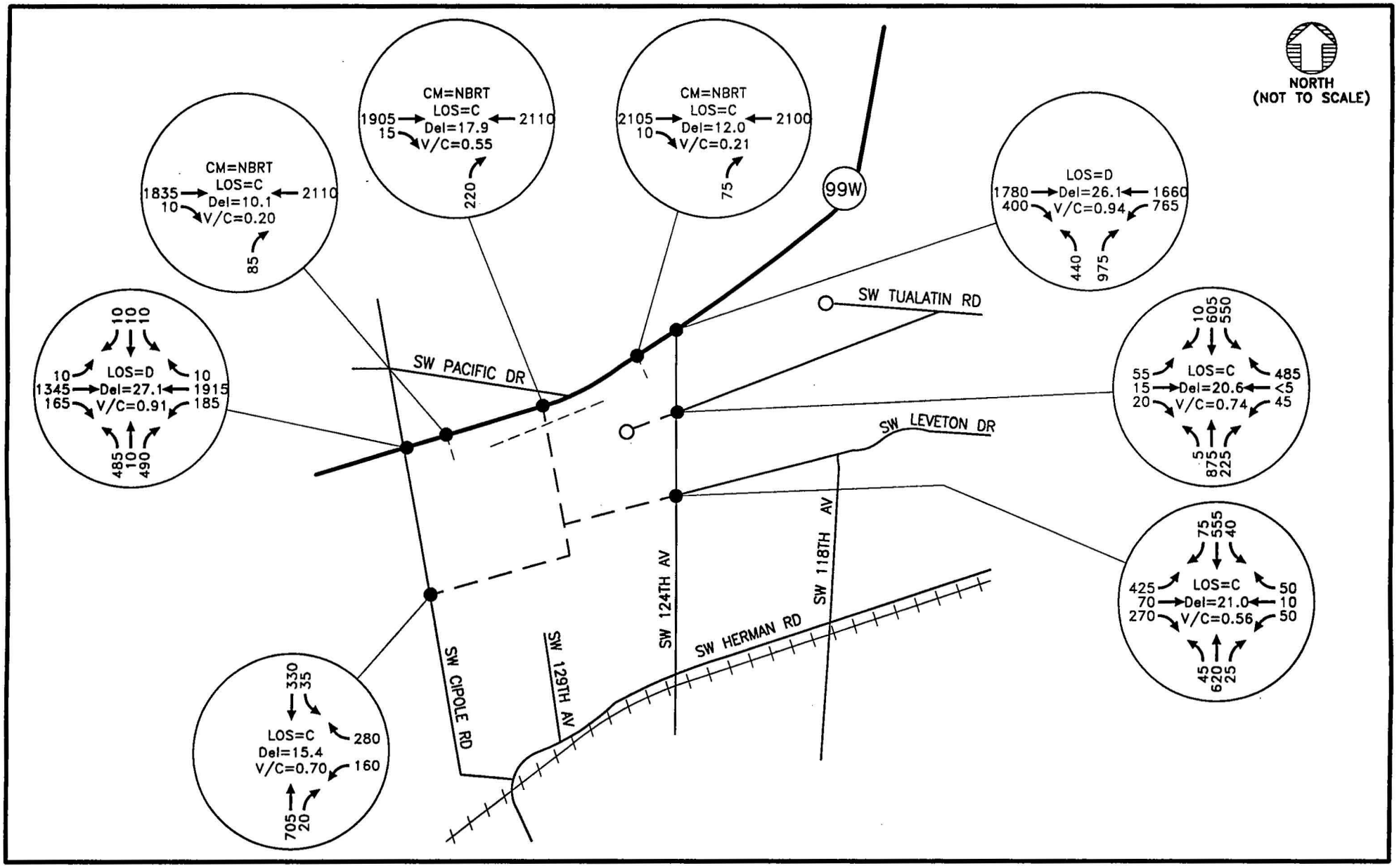
LEGEND

- CUL-DE-SAC
- PUBLIC ACCESS
- PRIVATE ACCESS

2015 ALTERNATIVE 1
SITE-GENERATED TRAFFIC VOLUMES
WEEKDAY PM PEAK HOUR

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON JANUARY 1999	FIGURE 5

DWG RATIO 55A1W



LEGEND

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V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

O CUL-DE-SAC
– — – PUBLIC ACCESS
– – – – – PRIVATE ACCESS

2015 ALTERNATIVE 1
PM PEAK HOUR TRAFFIC VOLUMES AND LEVELS OF SERVICE

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON	FIGURE 6
JANUARY 1999	

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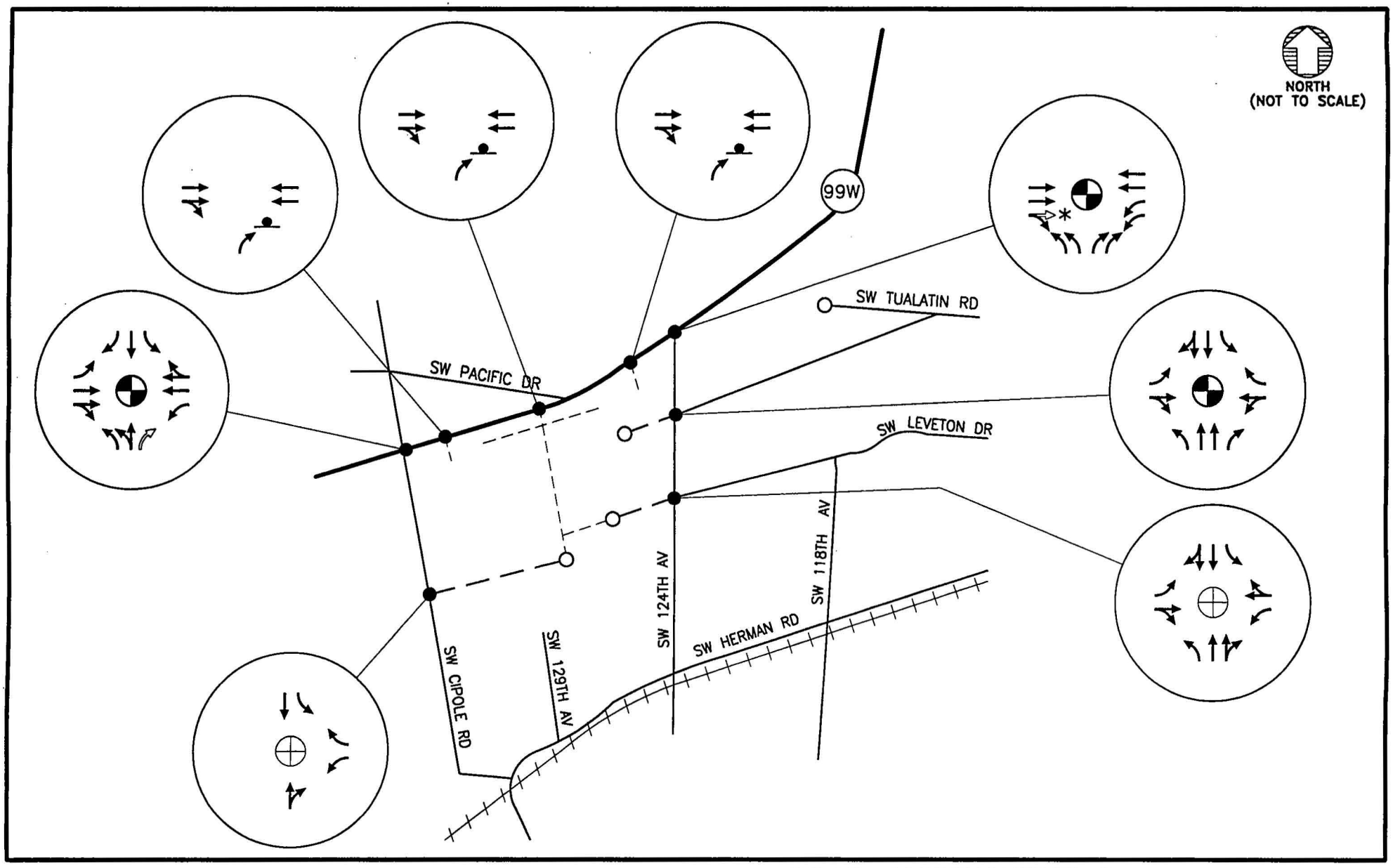

LEGEND

- CUL-DE-SAC
- PUBLIC ACCESS
- PRIVATE ACCESS
- TRAFFIC SIGNAL
- STOP SIGN
- IDENTIFIED MITIGATION
- * LOCATION OF LANE ADDITION TO BE DETERMINED

2015 ALTERNATIVE 2 LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES

QUARRY SECTOR SUB-AREA PLAN
TUALATIN, OREGON
JANUARY 1999

FIGURE 7

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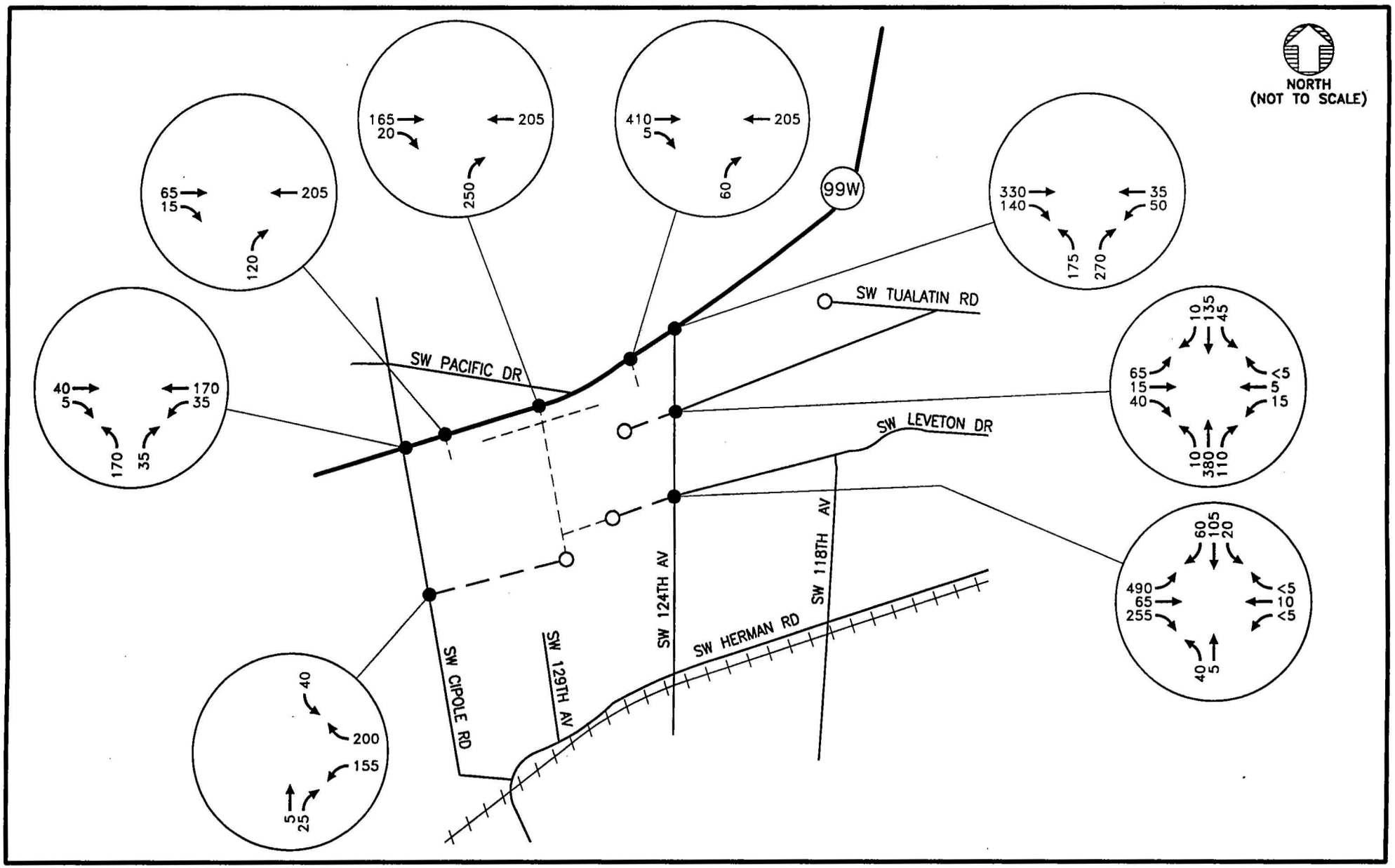


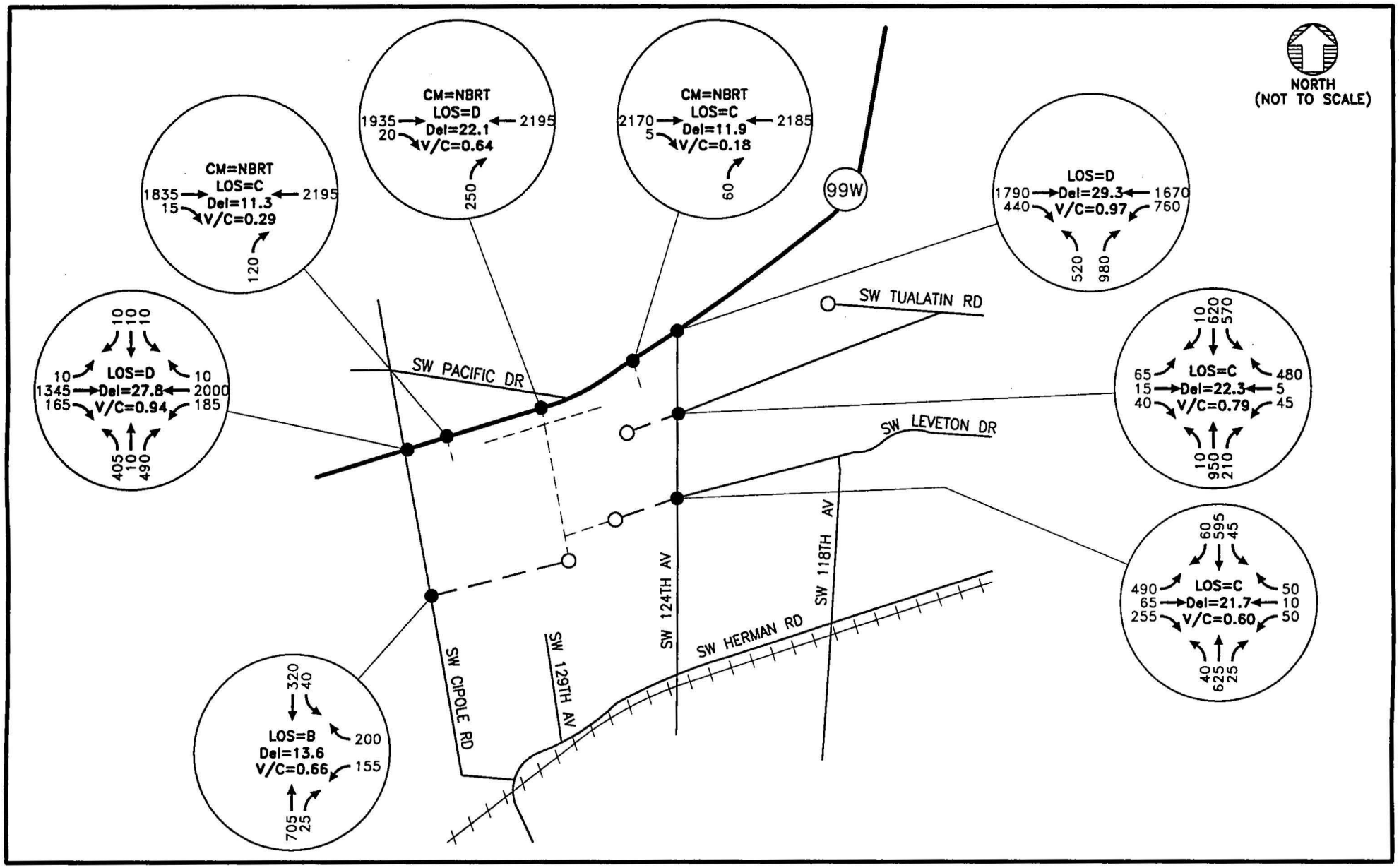
LEGEND

- CUL-DE-SAC
- PUBLIC ACCESS
- PRIVATE ACCESS

2015 ALTERNATIVE 2
SITE-GENERATED TRAFFIC VOLUMES
WEEKDAY PM PEAK HOUR

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON JANUARY 1999	FIGURE 8

DWGS\OPERATIONS\3365A2WS



LEGEND

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V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

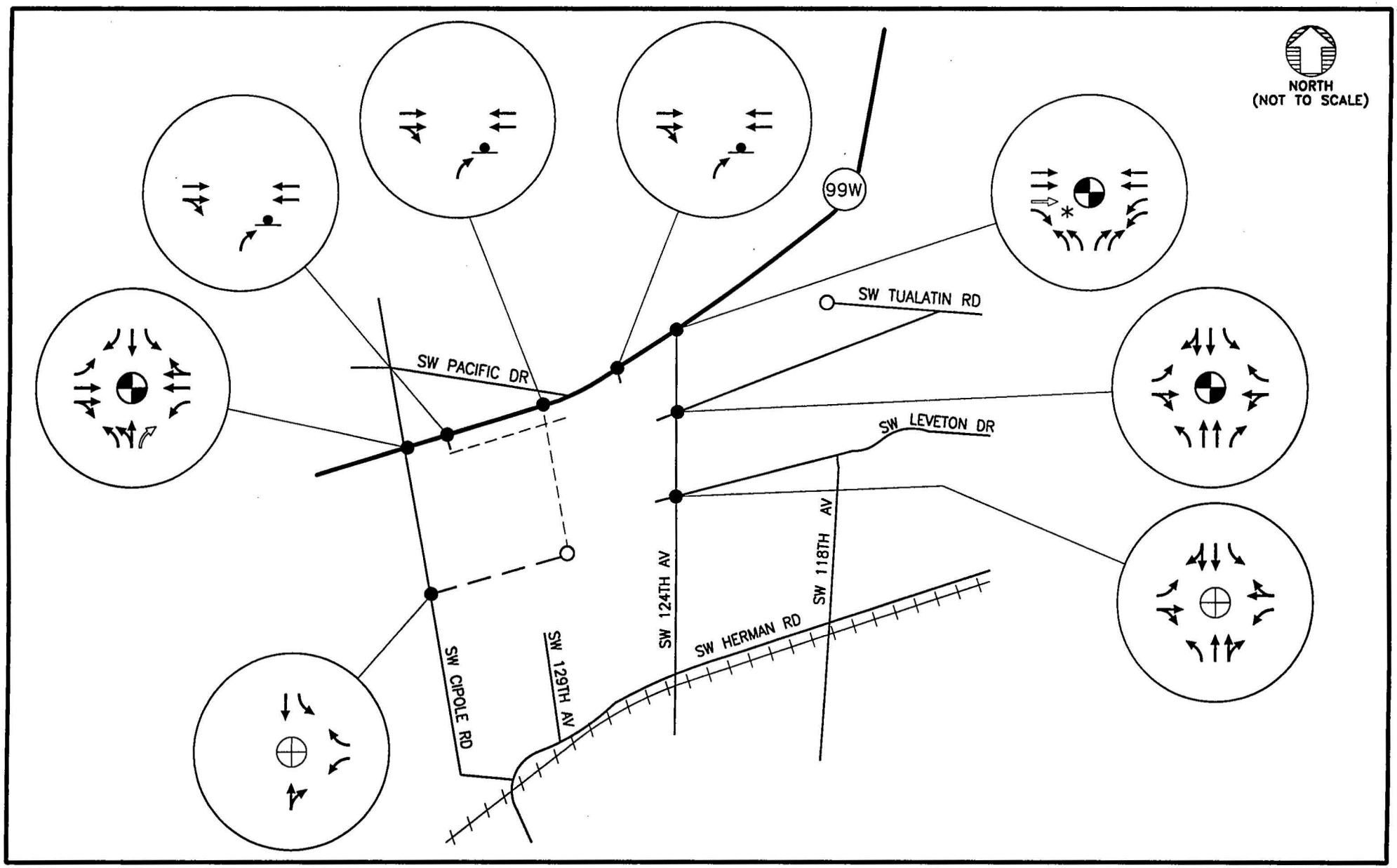
O CUL-DE-SAC
— — — PUBLIC ACCESS
- - - - - PRIVATE ACCESS

2015 ALTERNATIVE 2
PM PEAK HOUR TRAFFIC VOLUMES AND LEVELS OF SERVICE

QUARRY SECTOR SUB-AREA PLAN
TUALATIN, OREGON
JANUARY 1999

FIGURE 9

DWG RATIOI S5A2E



LEGEND

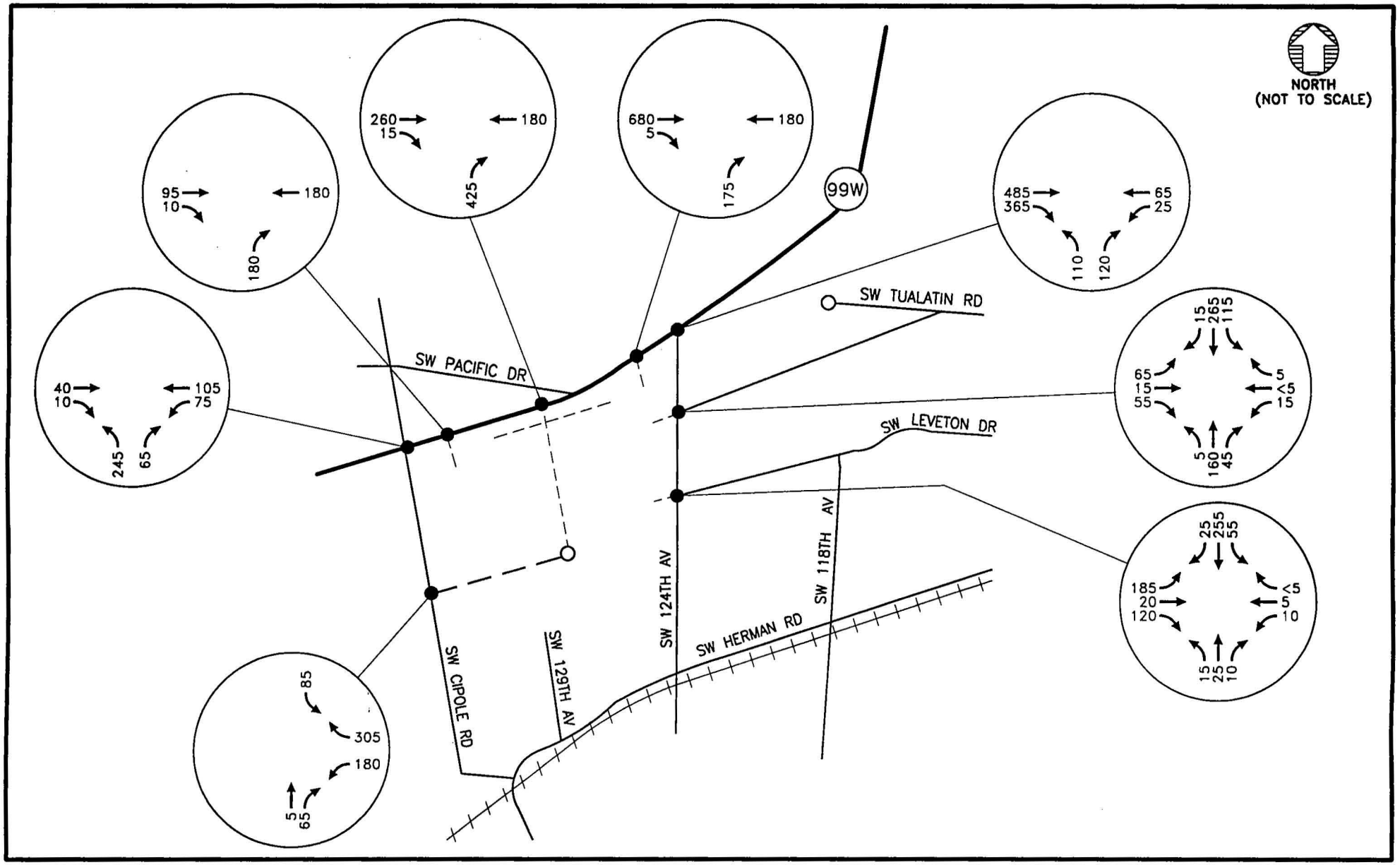
- O CUL-DE-SAC
- TRAFFIC SIGNAL
- – – – PUBLIC ACCESS
- STOP SIGN
- ----- PRIVATE ACCESS
- IDENTIFIED MITIGATION
- * LOCATION OF LANE ADDITION TO BE DETERMINED

2015 ALTERNATIVE 3
LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES

QUARRY SECTOR SUB-AREA PLAN
TUALATIN, OREGON
JANUARY 1999

FIGURE 10

DWGS\OPERATIONS\3365A3LN



LEGEND

- CUL-DE-SAC
- PUBLIC ACCESS
- PRIVATE ACCESS

2015 ALTERNATIVE 3
SITE-GENERATED TRAFFIC VOLUMES
WEEKDAY PM PEAK HOUR

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON JANUARY 1999	FIGURE 11

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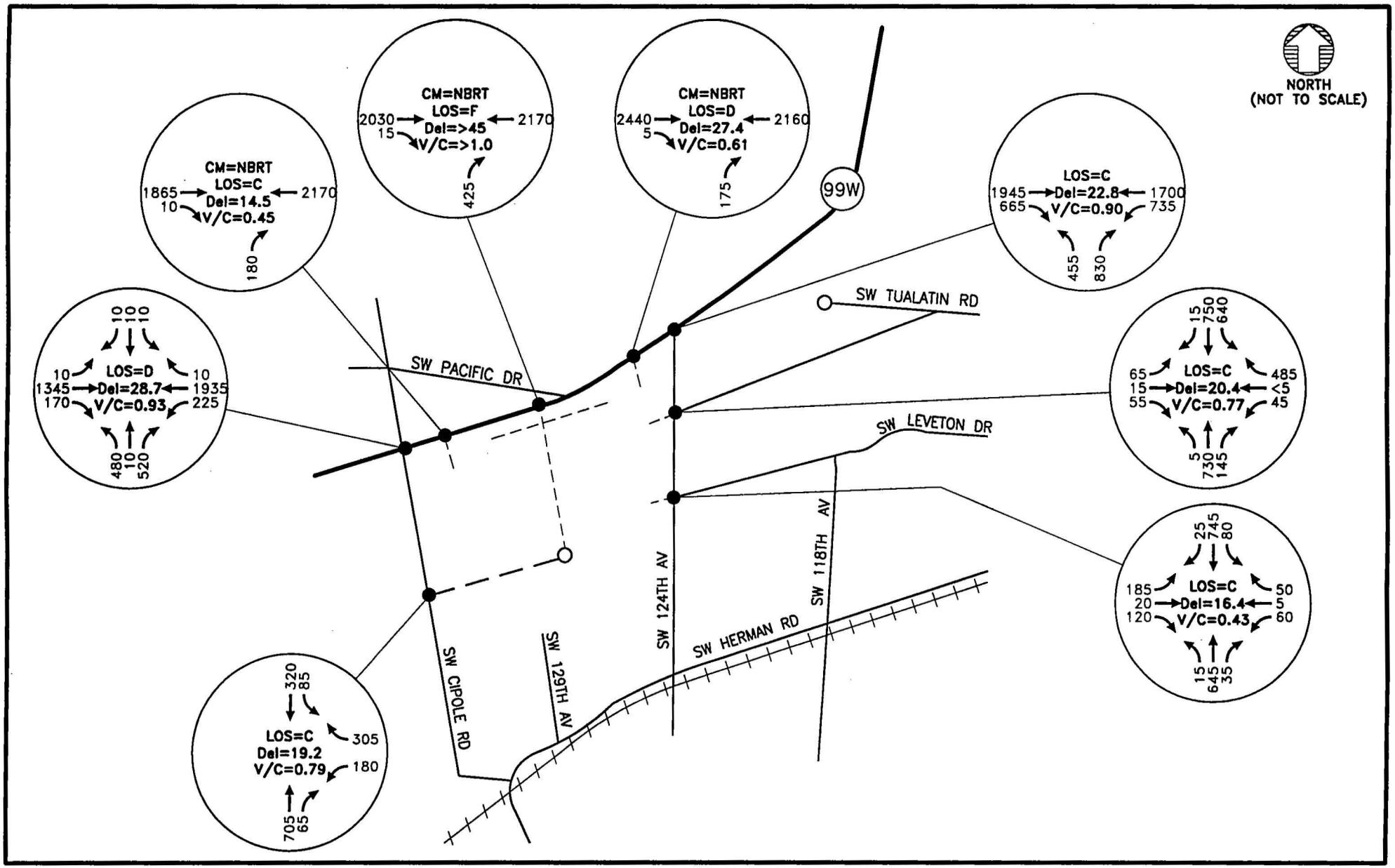

LEGEND

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Del = INTERSECTION AVERAGE DELAY (SIGNALIZED)/ CRITICAL MOVEMENT DELAY (UNSIGNALIZED)
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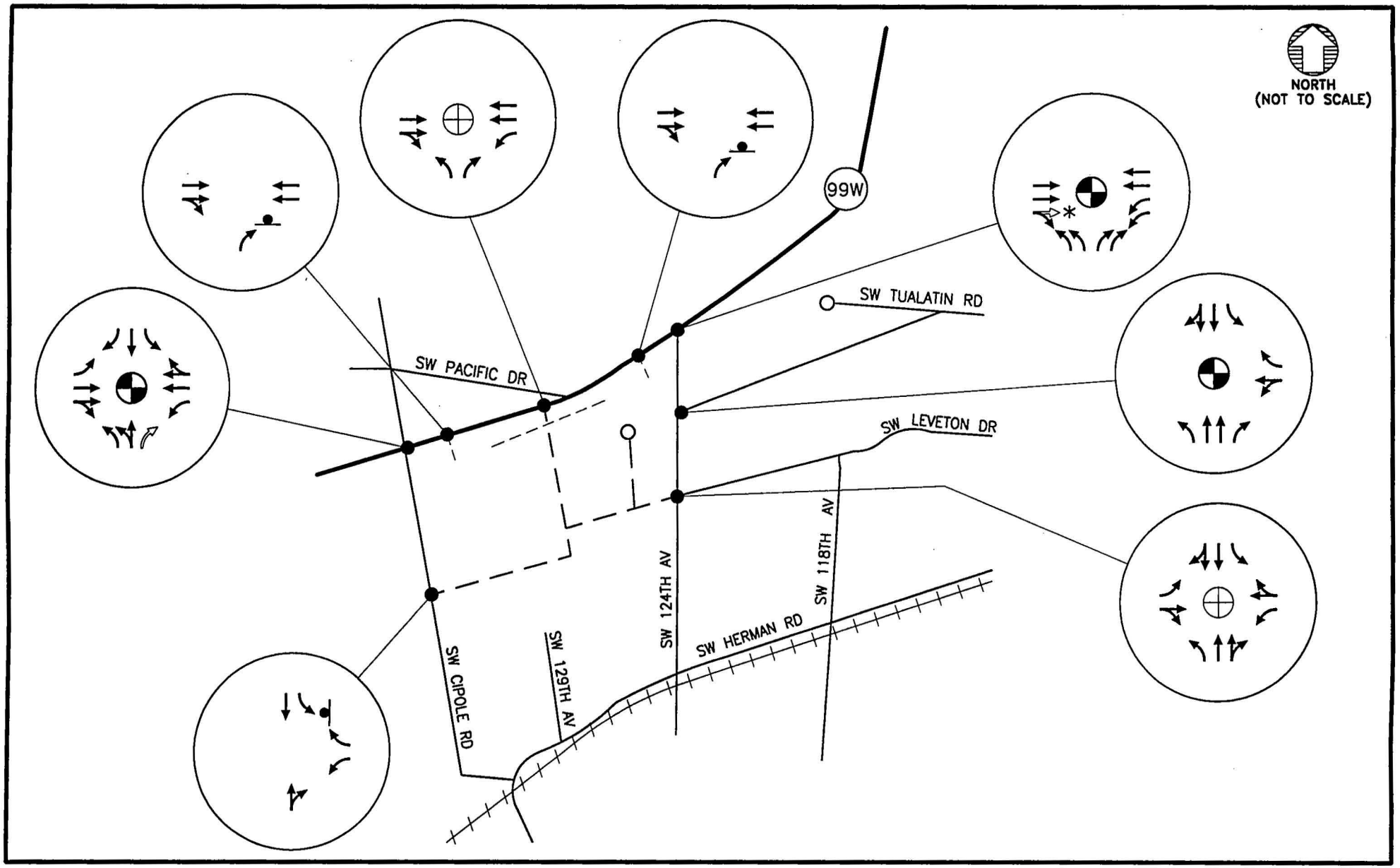
O CUL-DE-SAC
– — – PUBLIC ACCESS
- - - - - PRIVATE ACCESS

2015 ALTERNATIVE 3
PM PEAK HOUR TRAFFIC VOLUMES AND LEVELS OF SERVICE

QUARRY SECTOR SUB-AREA PLAN
TUALATIN, OREGON
JANUARY 1999

FIGURE 12

DWGS\OPERATIONS\3365A3EX



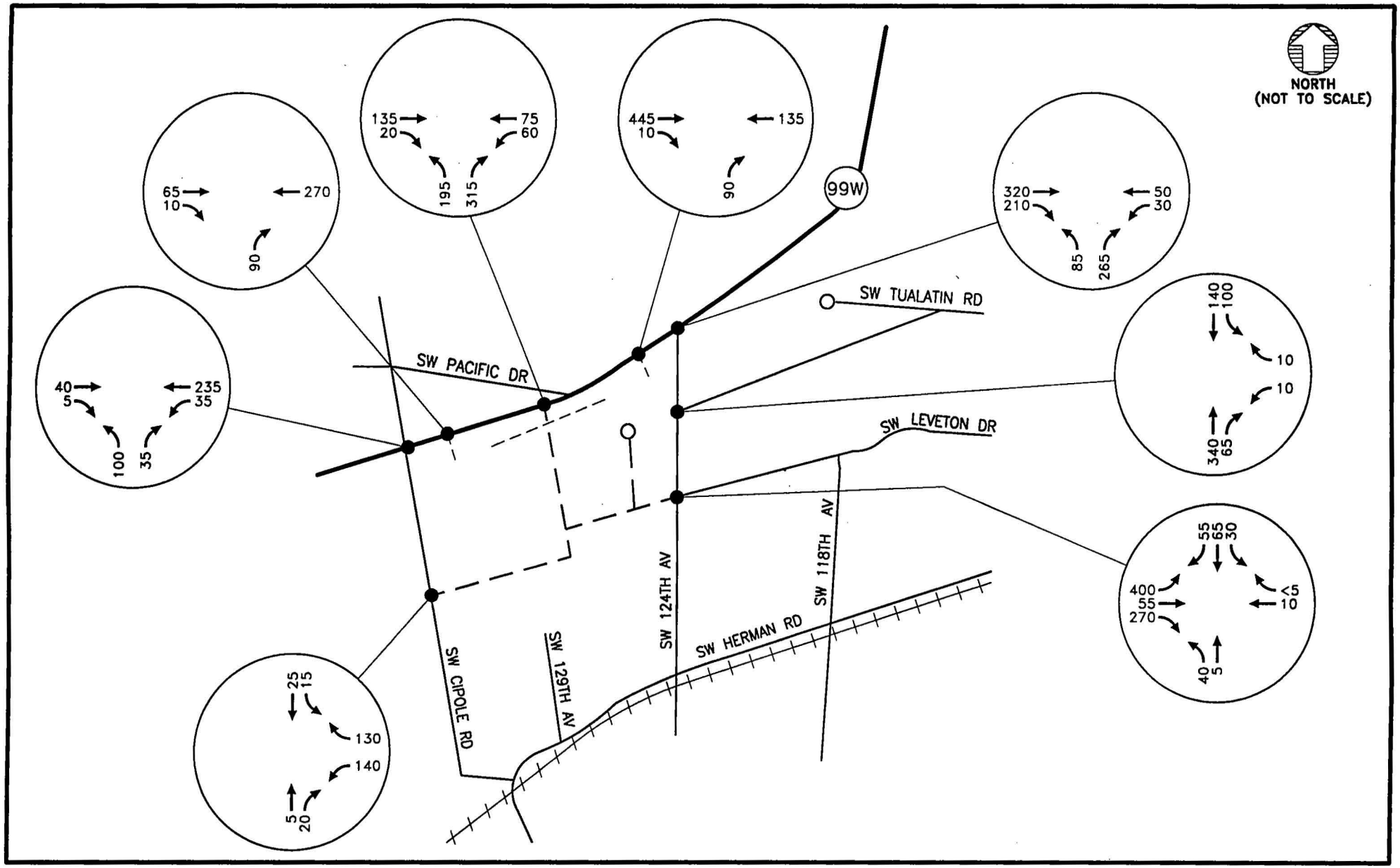
LEGEND

- CUL-DE-SAC
- TRAFFIC SIGNAL
- PUBLIC ACCESS
- STOP SIGN
- PRIVATE ACCESS
- IDENTIFIED MITIGATION
- * LOCATION OF LANE ADDITION TO BE DETERMINED

2015 MODIFIED ALTERNATIVE 1 LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON JANUARY 1999	FIGURE 13

DWG ATION MDLN



LEGEND

- CUL-DE-SAC
- PUBLIC ACCESS
- PRIVATE ACCESS

2015 MODIFIED ALTERNATIVE 1 SITE-GENERATED TRAFFIC VOLUMES WEEKDAY PM PEAK HOUR

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON	FIGURE 14
JANUARY 1999	

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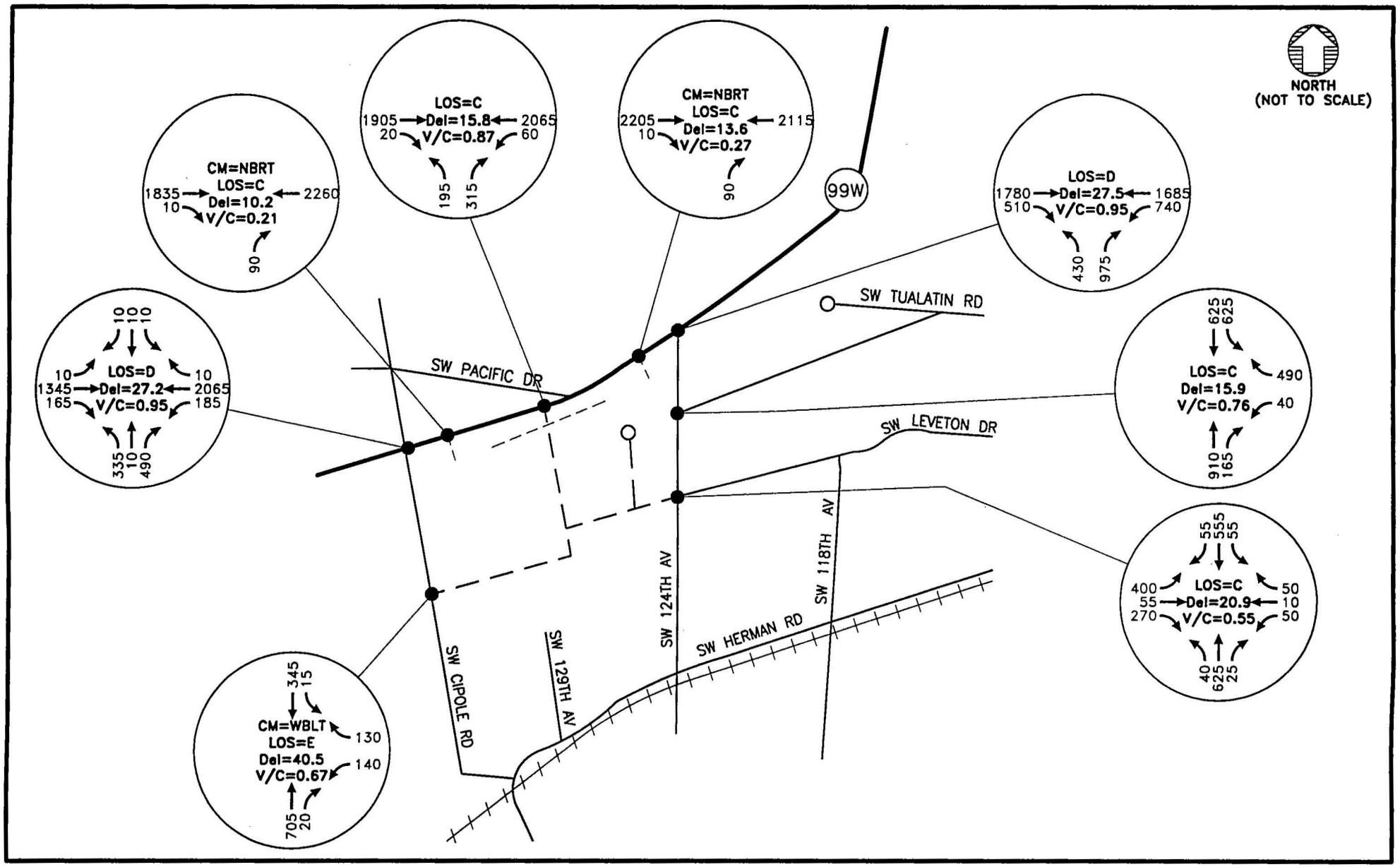


LEGEND

CM =	CRITICAL MOVEMENT (UNSIGNALIZED)	O	CUL-DE-SAC
LOS =	INTERSECTION LEVEL OF SERVICE (SIGNALIZED)/ CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)	- - -	PUBLIC ACCESS
		-----	PRIVATE ACCESS
Del =	INTERSECTION AVERAGE DELAY (SIGNALIZED)/ CRITICAL MOVEMENT DELAY (UNSIGNALIZED)		
V/C =	CRITICAL VOLUME-TO-CAPACITY RATIO		

2015 MODIFIED ALTERNATIVE 1 PM PEAK HOUR TRAFFIC VOLUMES AND LEVELS OF SERVICE

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON JANUARY 1999	FIGURE 15

DWG RATION MODEL

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION PLANNING/TRAFFIC ENGINEERING
610 SW ALDER, SUITE 700 • PORTLAND, OR 97205 • (503) 228-5230 • FAX (503) 273-8169

MEMORANDUM

Date: February 18, 1999 **Project #:** 3365

To: Doug Rux, Program Coordinator - Economic Development
City of Tualatin
PO Box 369
Tualatin, Oregon 97062-0369

From: Elizabeth A. Wemple, P.E.
Project: Tualatin Quarry Sector Subarea Plan
Subject: Detailed Traffic Operations Summary Addendum

The purpose of this memorandum is to summarize the additional analysis that has been performed for the Tualatin Quarry Sector Subarea Traffic Study. Per the request of the City of Tualatin and ODOT, an Alternative 4 was analyzed which assumes that no additional traffic signal would be located on Highway 99W. Alternative 4 includes the same internal roadway connections and lane configurations as the Modified Alternative 1; however, the center access on Highway 99W would operate with right-in/right-outmovements only. Figure A identifies the required lane configurations and traffic control devices for the study intersections under this alternative. Figure B and C provide the site-generated traffic volumes and 2015 total traffic volumes/levels of service, respectively, during the weekday p.m. peak hour.

As shown in Figure A, if the Center Access/Highway 99W intersection is developed as right-in/right-out driveway it is forecasted that a traffic signal will be warranted at the South Access/SW Cipole Road intersection. The additional mitigations identified, *which are identical to the improvements identified under the Modified Alternative 1 scenario*, include the following:

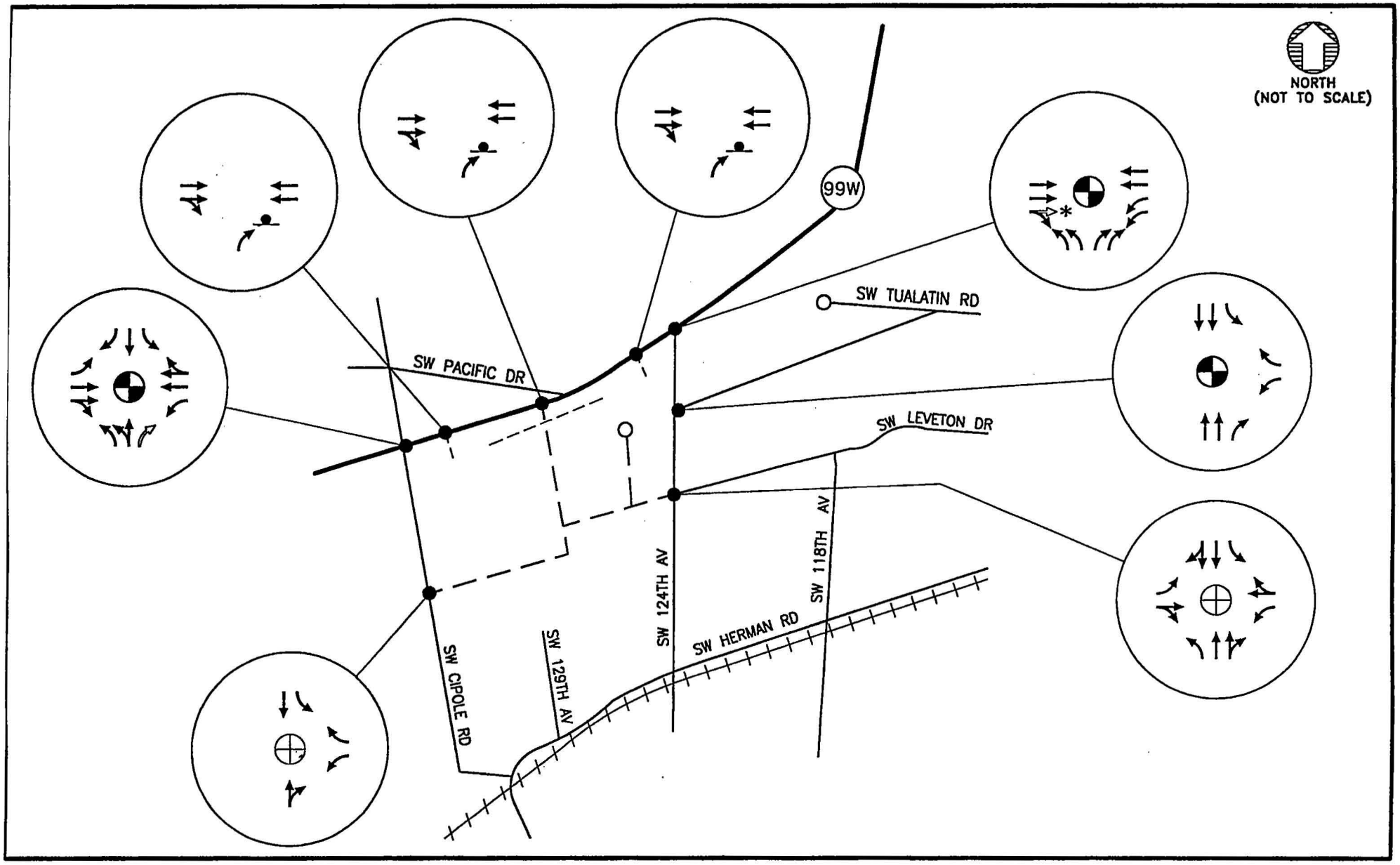
- signalization of the SW Leveton Drive/SW 124th Avenue intersection;
- construction of a right-turn lane on the northbound approach at the SW Cipole Road/Highway 99W intersection; and
- construction of an additional through lane on northbound Highway 99W at the Highway 99W/SW 124th Avenue intersection.

All other study intersections are forecast to operate acceptably under 2015 Alternative 4 conditions, which is comparable to the results found under the Modified Alternative 1 scenario.

In summary, if the Center Access/Highway 99W intersection is constructed as a right-in/right-out driveway, then a traffic signal will likely be required at the South Access/SW Cipole Road intersection.

FILE NAME: H:\PROJFILE\3365\REPORT\3365ADDN.WPD

I trust this memorandum adequately addresses your questions regarding the Alternative 4 scenario. Please call if you have any additional questions or concerns.



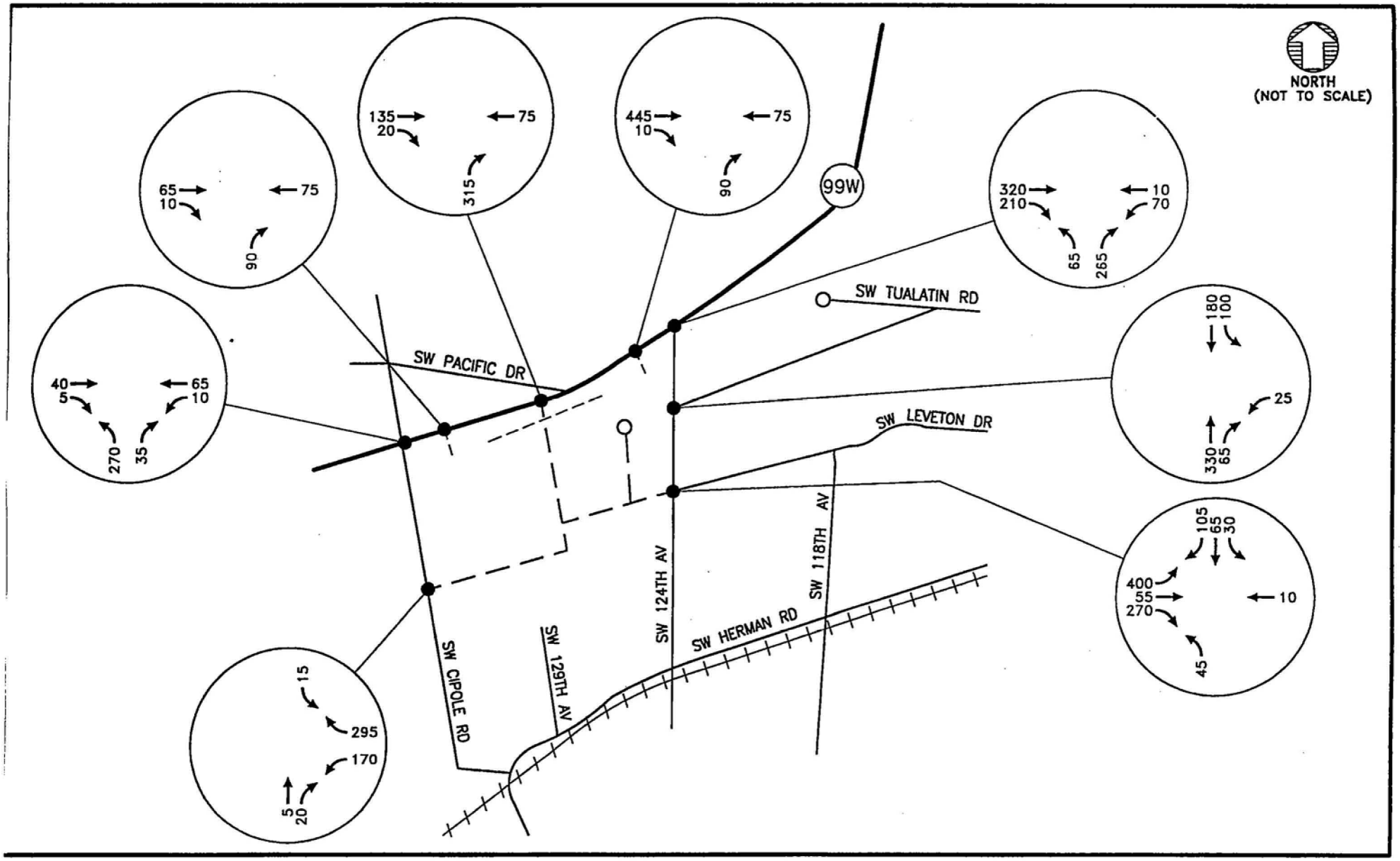
LEGEND

- O CUL-DE-SAC
- TRAFFIC SIGNAL
- PUBLIC ACCESS
- STOP SIGN
- PRIVATE ACCESS
- IDENTIFIED MITIGATION
- * LOCATION OF LANE ADDITION TO BE DETERMINED

2015 ALTERNATIVE 4
LANE CONFIGURATIONS AND TRAFFIC CONTROL DEVICES

QUARRY SECTOR SUB-AREA PLAN TUALATIN, OREGON FEBRUARY 1999	FIGURE A

DWGS\OPERATIONS\ALT4LN



LEGEND

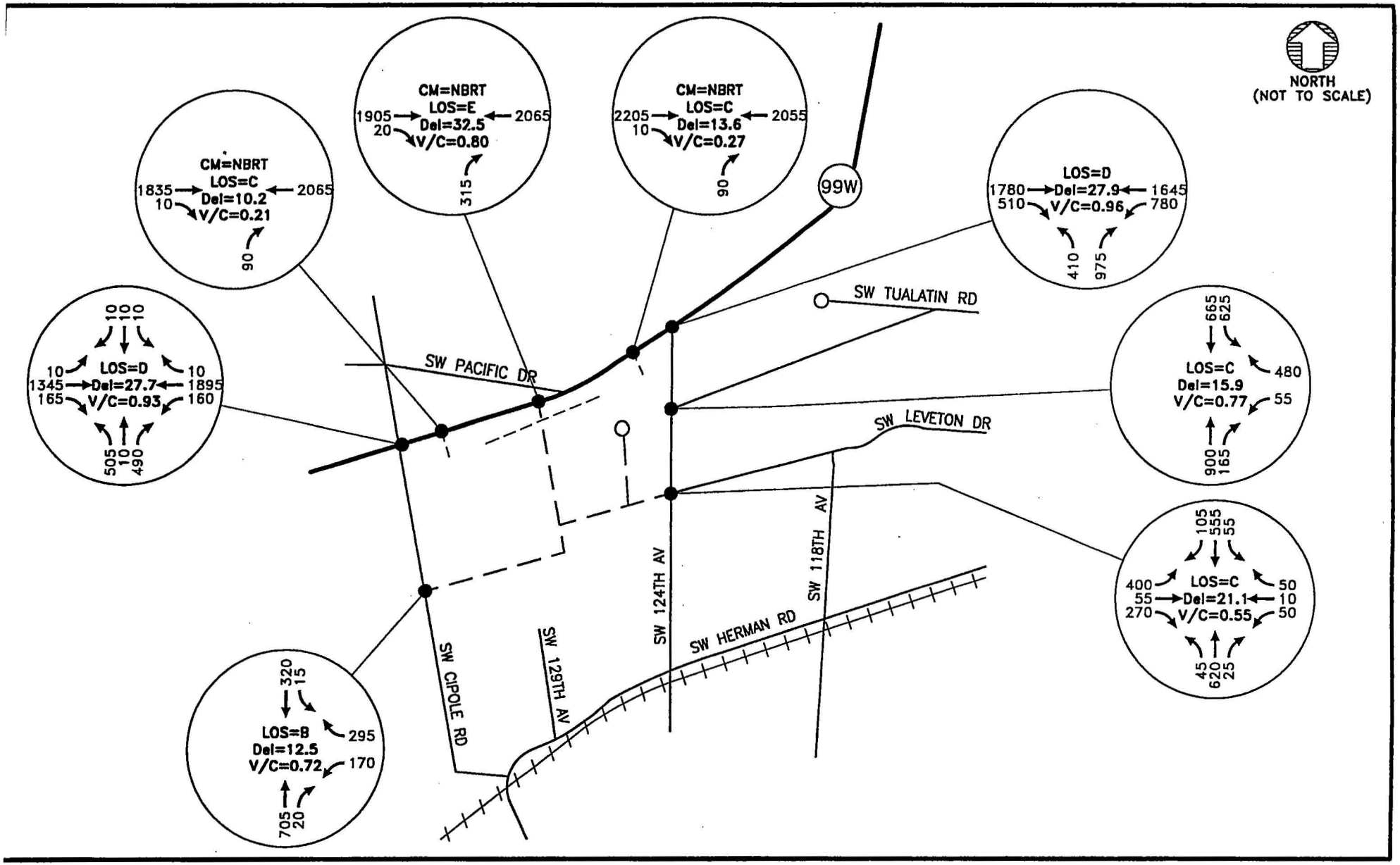
- CUL-DE-SAC
- PUBLIC ACCESS
- PRIVATE ACCESS

2015 ALTERNATIVE 4
SITE-GENERATED TRAFFIC VOLUMES
WEEKDAY PM PEAK HOUR

QUARRY SECTOR SUB-AREA PLAN
TUALATIN, OREGON
FEBRUARY 1999

FIGURE
B

DWGS\ OPERATIONS\ ALT4WS



LEGEND

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
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V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

O CUL-DE-SAC
– — – PUBLIC ACCESS
– – – – – PRIVATE ACCESS

2015 ALTERNATIVE 4
PM PEAK HOUR TRAFFIC VOLUMES AND LEVELS OF SERVICE

QUARRY SECTOR SUB-AREA PLAN
TUALATIN, OREGON
FEBRUARY 1999

FIGURE
C

DWGS\OPERATIONS\ALT4EX

APPENDIX 4

ODOT COMMENTS TRIP DISTRIBUTION STUDY

July 24, 1998

Oregon

DEPARTMENT OF
TRANSPORTATION

Region 1

City of Tualatin
PO Box 369
Tualatin, OR 97062

CITY OF TUALATIN
RECEIVED
JUL 2 8 1998
ECONOMIC DEVELOPMENT

Att: Doug Rux

Re: Quarry Sector Sub-Area Plan Revisions: 99W between 124th and Cipole Rd.
Draft Kittleson Traffic Analysis dated June 12, 1998

FILE CODE:

We appreciate the opportunity to work with you as the City develops a better plan to provide better local circulation for the Quarry Sector. According to the Oregon Highway Plan, 99W has a Statewide *Level of Importance* and we have an interest in maintaining the safe and efficient operation of this facility. Signal spacing standards are one half mile and access spacing standards for public roads is a half to one mile for Statewide facilities. The signalized intersections at 124th and Cipole Road are only 6/10ths of a mile apart. While ODOT may consider one right-in/right-out access to 99W between 124th and Cipole Road, the future signalization of this intersection is not supported by ODOT.

We have reviewed the alternatives and have the following comments:

Base Alternative:

- We are concerned that this alternative does not provide for north-south connectivity.
- It is unclear from the plan sheet whether existing driveways would be maintained or eliminated. We recommend the plan sheet be changed to reflect that all 99W driveways would be eliminated if the frontage road goes in.
- All the traffic would be funneled through the 99W intersections of 124th and Cipole Road which are already expected to be operating near capacity in 2015. No improvements were identified to mitigate the impact.
- We are concerned about the frontage road intersection operations at 124th and Cipole Road and the potential for future signalization given the proximity of these intersections to 99W which could impact the operation of the highway intersections.

Alternative 1 and Alternative 2:

- We are concerned that the shared access as shown on the plan sheet is to close to the highway and could cause traffic conflicts at the new intersection with 99W.
- We do not support adding a 4th leg to the Tualatin Rd./124th intersection because of its proximity to 99W and the potential to impact the operation of the 124th/99W intersection. It would be our preference to have access to these properties via Leveton Drive.

123 NW Flanders
Portland, OR 97209-4037
(503) 731-8200
FAX (503) 731-8259

- Our access management policy is to eliminate as many driveways to the highway as possible. Alternative access to all parcels should be provided by the internal street network and shown on the plan sheet.

Alternative 2

- We are concerned that terminating Leveton Drive in a cul-de-sac would eliminate east-west connectivity and increase reliance on the highway.

Alternative 3

- We are concerned that the shared access as shown on the plan sheet is to close to the highway and could cause traffic conflicts at the new intersection with 99W.

- We are concerned that that there is no east-west connectivity which would increased reliance on the highway.

- Even with the future consolidation of accesses, the properties near the 124th intersection will continue to have direct access to the highway. Alternative access to these properties and the closure of the highway accesses should be shown on the site plan.

Conclusion:

While the base alternative analyzed (frontage road) is consistent with ODOT standards, we understand and support the City's efforts to provide better internal circulation. However, further analysis is needed to evaluate what it would take improvement wise at the 124th and Cipole Road intersections to provide better internal circulation and comply with ODOT standards. None of the alternatives analyzed in the report have addressed this issue. In addition, to better identify traffic impacts, Kittleson should back out the trips that the ME2 model assumed would be generated by the site before adding in the build out trip generation of the site.

General Comments:

I received your letter dated July 13, 1998 which requested information on ODOT's legal authority in regards to access to 99W. Unfortunately, Dale Hormann our legal council has been out this week and I am waiting for his response to the concerns raised. When I receive this information I will forward it to you.

Martin Jensvold PE, Sr. Traffic Analyst, has reviewed the traffic analysis for this project as well as the proposed rezone of the property at the 124th/99W intersection. Unfortunately, Mr. Jensvold has been on vacation this week so I could not prepare our response to the proposed rezone. I hope to prepare our response next week. If you have any questions regarding our traffic comments, he can be reached at 731-8219.

I look forward to continuing to work with you as the City pursues various planning efforts that impact ODOT facilities. I can be reached at 731-8258.

Sincerely,

Marah Danielson, Planner
Development Review

Cc: Martin Jensvold, ODOT Region 1, Jane Estes, ODOT District 2A

WASHINGTON COUNTY
OREGON

July 14, 1998

Mr. Douglas Rux
Program Coordinator – Economic Development
City of Tualatin
PO Box 369
Tualatin, OR 97062

RE: Comments on Quarry Sector and Loop Road Transportation Analyses

Our comments on these studies follow:

Quarry Sector Project

SW Cipole Road is classified as a 3-lane major collector in the Washington County Transportation Plan. Access spacing along this road is every 100 feet. However, additional access spacing may be necessary where safety issues arise, such as opposing left turns to sites with significant trip generation. SW Cipole is not on the proposed countywide road system map. As such we anticipate ultimately transferring jurisdiction of the road to Tualatin.

On a technical issue, it may be useful to review the 2015 EMME2 plot that Kittelson used for the analysis. In some other scenarios, the centroid connector for this zone connects directly to Hwy. 99, which may impact the background volumes used in the study in this area. Also, we're curious if the I-5 to Hwy 99 connector was assumed in the 2015 analysis.

It appears that several of the alternatives propose a 5 lane Cipole and a 5 lane 124th Ave for at least a portion of these roadways. We note that changing Cipole to 5 lanes would require a legislative action by Washington County. Additionally, we are unaware of any "5 lane major collectors", thus the functional classification of Cipole would be an issue if this is part of the final recommendation. We also note that both Cipole and 124th were probably modeled as 3 lanes. Making them 5 lanes would likely induce traffic and possibly result in different traffic volumes and intersection lane configurations.

At this point, we are unsure regarding a preferred alternative. We are sensitive to ODOT's concerns regarding the function and operation of Hwy 99. As such, any of the alternatives that include a roadway parallel to HWY 99 between Cipole and 124th seem favorable.

Loop Road Transportation Analysis

Nyberg Road is a 5 lane minor arterial in the Washington County Transportation Plan. It is currently part of the proposed countywide system. As such we have an interest in it continuing to function as a minor arterial. We are supportive of the City's efforts to identify means of decreasing the use of Nyberg for

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"local" trips. Thus, we urge the City to continue to look at the loop road alternatives. We recognize the costs of both the Base Alternative and Alternative 2 may be high, but the traffic benefit they provide are also significant, and discussions should continue regarding both of these alternatives.

As you continue discussions on these alternatives, we offer the following options in the spirit of thinking broadly about the issue.

1. Has the city looked at the possibility of directly connecting the loop road to Boones Ferry at the north, west of Martinazzi? This would likely increase the use of the loop road for trips traveling north/south to/from Boones Ferry.

2. A possibility for Alternative #2 is to allow lefts in, but not lefts out of K-Mart and Fred Meyer. Our experience is that retailers are more concerned with access to their sites, and less concerned with access leaving their sites.

3. Another possibility for improving the utilization of the loop road would be to provide a connection between Mohawk Street and Sagert just west of I-5. We realize there would be impacts with such a connection, but it might be what we all mutually need to get a road that decreases the burden on "major" streets in the area.

Thanks for the opportunity to comment on these studies. If you have questions I can be reached at 681-3875.

Sincerely,

Andy Back
Senior Planner

APPENDIX 5

ODOT COMMENTS TRAFFIC OPERATIONS SUMMARY

Oregon
John A. Kitzhaber, M.D., Governor

Department of Transportation
Region 1
123 NW Flanders
Portland, OR 97209-4037
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FAX (503) 731-8259

May 27, 1999

CITY OF TUALATIN
RECEIVED
JUN - 2 1999
ECONOMIC DEVELOPMENT

FILE CODE:
PLA9-2A-TUA-1W

City of Tualatin
Economic Development Department
PO Box 369
Tualatin, OR 97062

Att: Doug Rux

Subject: Response to Draft May 25, 1999 correspondence and May 24, 1999 Phone Conversation
PTA-99-01: Quarry Sector Subarea Project

In our phone conversation, it was requested that ODOT prepare comments to address three outstanding issues:

A. Signalization of the future 130th Ave./ OR 99W intersection.

The newly adopted Oregon Highway Plan Action 3A.3 states, " Manage the location and spacing of traffic signals on state highways to ensure the safe and efficient movement of people and goods. Safe and efficient traffic signal timing depends on optimal intersection spacing. It is difficult to predetermine where such locations should exist, although half-mile intersections spacing for Statewide and Regional Highways is desirable." OR 99W has a Statewide highway classification and is identified as a freight route. ODOT has determined that a signal at this intersection would not be consistent with the management objective for this facility. ODOT does not support a signal at this location.

B. Two access location on OR 99W between 124th Ave. and 130th Ave. See response to section 7 below.

C. Proposed code language and the incorporation of proposed language by ODOT. Your draft response to our conversation and our April 14, 1999 correspondence included 8 sections. In the following comments, I will respond to each section.

1.We understand now that "street" is defined in the Tualatin Development Code as a public facility and therefore it is no longer an ODOT recommendation for the City to include in the code amendment language to specifically reference 130th Ave. as a public street.

2. ODOT's jurisdictional authority is clearly limited to state facilities and we did not intend for the City to include ODOT as an authority on City facilities. For the purposes of the Quarry Sector Subarea code amendments, at this time ODOT is only requesting that language which specifically identifies ODOT's authority be included in the subsection for Pacific Highway 99W. Thus, ODOT withdraws previous proposed language which identifies ODOT's jurisdictional authority under Ch.75.120 Existing Streets as proposed in our April 14, 1999 comments. This issue will be revisited through the Transportation System Plan process.

We request the City amend Chapter 75.120 as follows (ODOT changes):

> Pacific Highway 99W: Pacific Highway 99W cuts through the City of Tualatin along its western boundaries. On the southeasterly side of Pacific Highway 99W access will be provided in the future by a un-named public street located midway between 124th Ave. and Cipole Rd as discussed in the Transportation Element of the Community Plan. Prior to the construction of this street, interim access in accordance with 75.090 of this Chapter may be approved by the City Engineer **in coordination with the Oregon Department of Transportation.** In addition to the un-named street access, two shared driveway accesses will be allowed between Tax Lots 1800 and 1801, and Lots 200 and 2101, Tax Map 2S121A. One shared driveway access will also be allowed between the un-named street and 124th Ave. East of 124th Avenue on the southeasterly side of Pacific Highway 99W, property will access onto Tualatin Road or onto Hazelbrook Road. In this area a central access from Pacific Highway consisting of one right-in and one right-out driveway will be provided. The access points shall be located within the middle one-third of the frontage between Fir Lane and Hazelbrook Road. Final location to be determined by the City Engineer **in coordination with the Oregon Department of Transportation** at the time any portion of either site is developed. **The recommendations included in this section are examples of possible solutions and shall not be construed as limiting the City's or the Oregon Department of Transportation's authority to change or impose different conditions on Pacific Highway 99W at the time a property redevelops based on the proposed development, existing traffic conditions, safety and the availability of alternative access and/or if additional studies/plans result in different recommendations from those listed in this section.** On the northwesterly side of Pacific Highway 99W, Pacific Drive will be extended as a frontage road to approximately the intersection with 124th Avenue. From the existing intersection with Pacific Drive and 99W to 124th Avenue. Interim access may be approved in accordance with 75.090 of this chapter. Between 124th Avenue and the Tualatin River on the northwesterly side of Pacific Highway 99W these will be limited to right-turn in, right-turn out as they are now. Any redevelopment in this area will require that the driveway

accesses be consolidated to a minimum amount. At this time it is anticipated that the accesses in this area will be configured as shown on Map 75-1. Some driveways will be joint driveways as shown on Map 75-1.

The language we have proposed is intended to improve coordination between the City, property owners, developers and the Oregon Department of Transportation. We believe that the proposed language would assist both City of Tualatin planners and future developers through land use review by identifying the need to coordinate with ODOT. The existing code language in Ch. 75.120 does not specifically identify a coordination process with agencies outside the city that may have jurisdictional authority. Inclusion of this language in the Tualatin Development Code would serve to clarify for the City and Public when coordination with ODOT is necessary and expedite the land use review process.

In addition, the access management language is important for property owners and developers to understand that ODOT will review each access to OR 99W on a case by case basis based on the proposed development, existing traffic conditions, safety and the availability of alternative access and/or if additional studies/plans result in different recommendations from those included in the code language. The new administrative rule being drafted by ODOT is intended to provide specific direction on how access management is implemented. The plan amendment language that we are proposing for Tualatin at this time is basic and is not expected to change as a result of the new rule. The City's proposed code amendment language should be based on existing plans and administrative rules.

ODOT's recommended modifications to the proposed code amendment language is consistent with the requirements of the Transportation Planning Rule 660-012-0045. Transportation Planning Rule 660-012-0045 (2d) requires that local jurisdictions adopt into their codes "A process for coordinated review of future land use decisions affecting transportation facilities".

ODOT's proposed language for joint access is no longer a recommendation. Tualatin Development Code 75.130 addresses our issue.

3. We understand the City's rationale for not including a map that specifically identifies the locations of existing and proposed access locations. We support the City's approach and withdraw our previous request.

4. Based on the information ODOT reviewed for the proposed code amendments, it was not clear to us that the easements previously identified in the Technical Report had been eliminated. Therefore, our comments on this subject are no longer relevant at this time. However, if in the future such easements are pursued our comments on this issue would apply.

5. We appreciate the City's providing an explanation for the changes in the proposed street alignment. While a direct north/south connection from the highway to Cummins St. is desirable, we understand the City's rationale for proposing the new alignment and do not have any additional concerns.

6. It is not clear to us that the City had a process for interim private streets or what the threshold of development would trigger the development of the public streets. This is a City issue, ODOT has no more comments on this issue.

7. Previous comments on this point have not changed. These comments from April 14, 1999 still stand, "In response to identifying an additional right-in/right-out driveway between 130th Avenue and 124th Avenue on Pacific Highway 99W, we do not believe it is necessary. The proposed amendments are intended to be guidelines for access locations and to support both the City and ODOT's goal to reduce the number of accesses to the highway. The determination of access will be made at the time a property redevelops based on the proposed development, existing traffic conditions, safety. and the availability of alternative access."

8. We appreciate the City forwarding this comment to the Planning and Engineering Departments to be addressed during the City's upcoming TSP process.

I hope that this letter clarifies ODOT comments on the Quarry Sector Subarea project code amendments. If you would like to discuss these comments, I can be reached at 731-8258.

Sincerely,

Marah Danielson

Marah Danielson
Planner
Development Review

Cc: Gail Curtis, Leo Huff, Martin Jensvold, Lidwien Rahman, ODOT Region 1

Oregon
John A. Kitzhaber, M.D., Governor

Department of Transportation
Region 1
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Portland, OR 97209-4037
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CITY OF TUALATIN
RECEIVED
APR 19 1999
ECONOMIC DEVELOPMENT

April 14, 1999

FILE CODE:
PLA9-2A-TUA-LEG

City of Tualatin
Economic Development Department
PO Box 369
Tualatin, OR 97062-0369

Att: Doug Rux

Subject: PTA-99-01- amend chapter 34 transitional uses, chapter 11 transportation, chapter 12 water system master plan and chapter 75 access management Quarry Sector OR 99W from 124th Ave. to Cipole Rd.

Dear Mr. Rux,

As stated in prior correspondence on the Quarry Sector Project, ODOT supports the City's efforts to provide better local circulation in the study area by providing an internal east-west public roadway through the sector to reduce reliance on the highway.

We have the following comments regarding the proposed amendments:

- All references to the "un-named street midway between 124th Ave. and Cipole Road, extending south of Pacific Highway connecting with the unnamed street" should be changed to specify that the street will be public.

- We request the City amend Chapter 75.120 as follows (**ODOT changes**):

  Existing Streets: The following list describes in detail the arterials as defined in TDC 75.030 with respect to access. Recommendations are made for future changes in accesses and location of future accesses. These recommendations are examples of possible solutions and shall not be construed as limiting the City's **or the Oregon Department of Transportation's** authority to change or impose different conditions on arterials **at the time a property redevelops based on the proposed development, existing traffic conditions, safety and the availability of alternative access and/or** if additional studies**/plans** result in different recommendations from those listed below.

  Pacific Highway 99W: Pacific Highway 99W cuts through the City of Tualatin along its western boundaries. On the southeasterly side of Pacific Highway 99W access will be provided in the future by a un-named public street located midway between

124th Ave. and Cipole Rd as discussed in the Transportation Element of the Community Plan. Prior to the construction of this street, interim access in accordance with 75.090 of this Chapter may be approved by the City Engineer **and the Oregon Department of Transportation.** In addition to the un-named street access, two shared driveway accesses will be allowed between Tax Lots 1800 and 1801, and Lots 200 and 2101, Tax Map 2S121A. One shared driveway access will also be allowed between the un-named street and 124th Ave. East of 124th Avenue on the southeasterly side of Pacific Highway 99W, property will access onto Tualatin Road or onto Hazelbrook Road. In this area a central access from Pacific Highway consisting of one right-in and one right-out driveway will be provided. The access points shall be located within the middle one-third of the frontage between Fir Lane and Hazelbrook Road. Final location to be determined by the City Engineer **and the Oregon Department of Transportation** at the time any portion of either site is development. On the northwesterly side of Pacific Highway 99W, Pacific Drive will be extended as a frontage road to approximately the intersection with 124th Avenue. From the existing intersection with Pacific Drive and 99W to 124th Avenue. Interim access may be approved in accordance with 75.090 of this chapter. Between 124th Avenue and the Tualatin River on the northwesterly side of Pacific Highway 99W these will be limited to right-turn in, right-turn out as they are now. Any redevelopment in this area will require that the driveway accesses be consolidated to a minimum amount. At this time it is anticipated that the accesses in this area will be configured as shown on Map 75-1. Some driveways will be joint driveways as shown on Map 75-1. **As properties redevelop property owners may be required to establish legal permanent crossover easements to adjacent properties to facilitate the future consolidation of access.**

- The driveway locations are not clearly identified on the Access Management Map 75-1 that was sent for our review. The accesses identified in the amendment language appear to be consistent with those shown on the Quarry Sector Subarea Technical Report Map 13: Alternative 1 (modified). We recommend the City include a map that clearly shows the existing deeded access locations and a map that clearly identifies the access scenario proposed.

Additional Comments:

In previous comments dated August 4, 1998 to the City we forwarded our Assistant Attorney General's legal opinion regarding whether ODOT would have the legal authority to close the permitted driveways if alternative access other than the frontage road was adopted in the City's Comprehensive Plan. Mr. Hormann's legal opinion is that the alternative access would at a minimum need to be from a public facility. The Alternative 1(modified) proposed for adoption identifies two long private drives that would go east and west of the new 130th Ave. ODOT recommends the City adopt these as public streets. To establish a legal mechanism to consolidate accesses it is imperative for the city to establish legal crossover easements as properties redevelop.

We received the March 23, 1999 copy of Map 13 with proposed changes identified. It is unclear why there have been changes to the proposed east-west road alignment. The new proposed alignment would not allow for a direct connection between Cummins St. and Pacific Highway 99W. It was our understanding that the City's goal is to improve street connectivity. The proposed alignment does not provide as good street connectivity and accessibility to the Quarry Sector as a whole then the original proposal.

It is unclear why the City is considering in the interim allowing the construction of private driveway connections between public roads and how the City would decide when the streets would be brought up to public standards.

In response to identifying an additional right-in/right-out driveway between 130th Avenue and 124th Avenue on Pacific Highway 99W, we do not believe it is necessary. The proposed amendments are intended to be guidelines for access locations and to support both the City and ODOT's goal to reduce the number of accesses to the highway. The determination of access will be made at the time a property redevelops based on the proposed development, existing traffic conditions, safety. and the availability of alternative access.

We recommend the City further study and adopt improvements to the Cipole Rd. and 124th Ave. intersections with Pacific Highway 99W through the transportation system planning process.

ODOT appreciates the City's coordination on the proposed Comprehensive Plan amendments and looks forward to continuing to work with the City as you embark on the transportation system planning process. If you have any questions regarding the above comments, I can be reached at 731-8258.

Thank you,

Marah Danielson

Marah Danielson
Planner
Development Review

Cc: Martin Jensvold, ODOT Region 1
Sam Hunaidi, ODOT District 2A

Oregon

December 11, 1998

CITY OF TUALATIN
RECEIVED
DEC 23 1998
ECONOMIC DEVELOPMENT

DEPARTMENT OF TRANSPORTATION

Region 1

City of Tualatin
P.O. Box 369
Tualatin, OR 97062

Attn: Doug Rux

FILE CODE:

Subject: Tualatin Quarry Sector Subarea Plan
October 14, 1998 Detailed Traffic Operations Summary

Following a review of the October 14, 1998 Detailed Traffic Operations Summary for the Tualatin Quarry Sector Subarea Plan, and the November 16 meeting with you and I, Bill Ciz, Leo Huff, Mike McKillip, and Marah Danielson, please accept this letter as ODOT's response to the subject memo.

ODOT is in general agreement with most of the conclusions of the subject memo. Our primary objection is with the proposed signalized intersection on ORE 99W in between 124th Avenue and Cipole Road. A signal at this location would violate ODOT's signal spacing standards. The proposed signal's proximity to the ORE 99W / Pacific Drive intersection could lead to operational concerns or an unanticipated fourth leg to the intersection.

It is also not clear from the information provided that "a signalized full-access driveway with public connections is needed at either the center access on ORE 99W or on SW 124th Avenue opposite SW Tualatin Road to adequately serve the northeast portion of the site", as the memo contends. By comparing "Alternative 1" to "Alternative 1, Modified", it appears the northeast portion of the site could be served adequately with a right-in, right-out access to the highway and a second full access to the proposed east-west collector road.

We support maintaining the 124th Avenue / Tualatin Road intersection as a "T" intersection (not allowing access to the northeast parcel) to protect traffic operations in the corridor. We support the creation of an internal east-west public roadway through the sector to reduce reliance on the highway. We acknowledge a third eastbound lane on ORE 99W will probably be needed in the future to maintain an adequate level of service at the 124th Avenue intersection. We also support the proposal of analyzing future AM peak traffic conditions to assess traffic mitigation requirements.

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Given the heavy eastbound right turn movements anticipated at the ORE 99W / 124th Avenue intersection under all of the access scenarios, it's recommended a separate eastbound right turn lane be assumed under each scenario.

A few other comments:

In the first paragraph on the second page, it says the June 12th memorandum indicated the 2015 background v/c ratio was 0.98. I believe the memo said 0.98 was the existing condition.

Figures 4, 7, and 10 indicate eastbound dual left turns at the 124th Avenue / Tualatin Road intersection for Alternatives 1, 2, and 3. However, the anticipated eastbound left turn demand for these alternatives is only 55 or 65 vehicles, in which case the second left turn lane probably isn't necessary.

Martin Jensvold
Senior Transportation Analyst

cc: Bill Ciz
Leo Huff
Marah Danielson

APPENDIX 6

TRIP GENERATION

Institute of Transportation Engineers
Trip Generation, January 1991

Modified Alternative 1

19-Nov-98

* Net acres may change based on final right-of-way, wetland areas and public water quality facilities.

Grimm's Fuel

Tax Lot	1800
Acres	6.15
Square Footage	267,894.00
Right-of-way Dedication sq. ft.	4,160.00
Wetlands	0.00
Net Square Footage	263,734.00
Net Acres Developable	6.05*
Landscaping (15%)	39,560.00
Building Square Footage (35%)	92,307.00
Pavement Square Footage	131,867.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak.	
Average rate .98	91
Total Trips Generated Weekday per 1000 sq. ft. gross floor area.	
Average rate 6.97	643

Grimm's Fuel

Tax Lot	1900
Acres	5.27
Square Footage	229,561.00
Right-of-way Dedication sq. ft.	12,840.00
Wetlands	0.00
Net Square Footage	216,721.00
Net Acres Developable	4.98*
Landscaping (15%)	32,508.00
Building Square Footage (35%)	75,779.00
Pavement Square Footage	108,361.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak.	
Average rate .98	74
Total Trips Generated Weekday per 1000 sq. ft. gross floor area.	
Average rate 6.97	528

Grimm's Fuel

Tax Lot	2190
Acres	0.35
Square Footage	15,246.00
Right-of-way Dedication sq. ft.	15,246.00
Wetlands	0.00
Net Square Footage	0.00
Net Acres Developable	0.00
Landscaping (15%)	0.00
Building Square Footage (35%)	0.00
Pavement Square Footage	0.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak.	
Average rate .98	0
Total Trips Generated Weekday per 1000 sq. ft. gross floor area.	
Average rate 6.97	0

CEC

Tax Lot	1801
Acres	2.01
Square Footage	87,555.60
Right-of-way Dedication sq. ft.	0.00
Wetlands	0.00
Net Square Footage	87,555.60
Net Acres Developable	2.01
Landscaping (15%)	13,133.34
Building Square Footage (35%)	30,644.46
Pavement Square Footage	43,777.80
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak.	
Average rate .98	30
Total Trips Generated Weekday per 1000 sq. ft. gross floor area.	
Average rate 6.97	214

SW Readymix

Tax Lot	2000
Acres	5.41
Square Footage	235,659.60
Right-of-way Dedication sq. ft.	3,128.76
Wetlands	0.00
Net Square Footage	232,530.84
Net Acres Developable	5.34*
Landscaping (15%)	348,79.63
Building Square Footage (35%)	81,385.79
Pavement Square Footage	116,265.42
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak. Average rate .98	80
Total Trips Generated Weekday per 1000 sq. ft. gross floor area. Average rate 6.97	567

Anderson Forge

Tax Lot	2101
Acres	6.08
Square Footage	264,844.80
Right-of-way Dedication sq. ft.	6,952.80
Wetlands	0.00
Net Square Footage	257,892.00
Net Acres Developable	5.92*
Landscaping (15%)	38,683.80
Building Square Footage (35%)	90,262.20
Pavement Square Footage	128,946.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak. Average rate .98	89
Total Trips Generated Weekday per 1000 sq. ft. gross floor area. Average rate 6.97	629

Grimm's Fuel

Tax Lot	2100 (west side)
Acres	10.55
Square Footage	459,558.00
Right-of-way Dedication sq. ft.	50,700.00
Wetlands	0.00
Net Square Footage	408,858.00
Net Acres Developable	9.39*
Landscaping (15%)	61,328.70
Building Square Footage (35%)	143,100.00
Pavement Square Footage	204,429.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak.	
Average rate .98	140
Total Trips Generated Weekday per 1000 sq. ft. gross floor area.	
Average rate 6.97	997

Grimm's Fuel

Tax Lot	2100 (east side)
Acres	19.69
Square Footage	857,838.60
Right-of-way Dedication sq. ft.	15,885.90
Wetlands	198,198.00
Net Square Footage	643,754.70
Net Acres Developable	14.78*
Landscaping (15%)	96,563.20
Building Square Footage (35%)	225,313.90
Pavement Square Footage	321,877.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak.	
Average rate .98	221
Total Trips Generated Weekday per 1000 sq. ft. gross floor area.	
Average rate 6.97	1,570

Grimm's Fuel

Tax Lot	2202
Acres	4.05
Square Footage	176,418.00
Right-of-way Dedication sq. ft.	21,060.00
Wetlands	0.00
Net Square Footage	155,358.00
Net Acres Developable	3.57*
Landscaping (15%)	23,303.70
Building Square Footage (35%)	54,375.30
Pavement Square Footage	77,679.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak. Average rate .98	53
Total Trips Generated Weekday per 1000 sq. ft. gross floor area. Average rate 6.97	379

CEC

Tax Lot	2201
Acres	5.18
Square Footage	225,640.80
Right-of-way Dedication sq. ft.	37,950.00
Wetlands	0.00
Net Square Footage	187,690.00
Net Acres Developable	4.31*
Landscaping (15%)	28,153.50
Building Square Footage (35%)	65,691.00
Pavement Square Footage	93,845.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak. Average rate .98	64
Total Trips Generated Weekday per 1000 sq. ft. gross floor area. Average rate 6.97	458

Highway 99W Fill

Tax Lot	2200
Acres	5.66
Square Footage	246,549.60
Right-of-way Dedication sq. ft.	6,600.00
Wetlands	0.00
Net Square Footage	239,949.00
Net Acres Developable	5.51*
Landscaping (15%)	35,992.00
Building Square Footage (35%)	83,982.00
Pavement Square Footage	119,974.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak. Average rate .98	82
Total Trips Generated Weekday per 1000 sq. ft. gross floor area. Average rate 6.97	585

Ingram

Tax Lot	2203 (proposed)
Acres	2.6
Square Footage	113,256.00
Right-of-way Dedication sq. ft.	0.00
Wetlands	0.00
Net Square Footage	113,256.00
Net acres Developable	2.6*
Landscaping (15%)	16,988.00
Building Square Footage (35%)	39,639.00
Pavement Square Footage	56,628.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak. Average rate .98	39
Total Trips Generated Weekday per 1000 sq. ft. gross floor area. Average rate 6.97	276

Valley Yard Supply	
Tax Lot	2300
Acres	3.47
Square Footage	151,153.00
Right-of-way Dedication sq. ft.	0.00
Wetlands	0.00
Net Square Footage	151,153.00
Net Acres Developable	3.47*
Landscaping (15%)	22,672.98
Building Square Footage (35%)	52,903.62
Pavement Square Footage	75,576.60
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak. Average rate .98	52
Total Trips Generated Weekday per 1000 sq. ft. gross floor area. Average rate 6.97	369

McCulloch	
Tax Lot	2400
Acres	3.5
Square Footage	152,460.00
Right-of-way Dedication sq. ft.	0.00
Wetlands	0.00
Net Square Footage	152,460.00
Net Acres Developable	3.5*
Landscaping (15%)	22,869.00
Building Square Footage (35%)	53,361.00
Pavement Square Footage	76,238.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak. Average rate .98	52
Total Trips Generated Weekday per 1000 sq. ft. gross floor area. Average rate 6.97	372

Leveton

Tax Lot	
Acres	2.31
Square Footage	100,623.60
Right-of-way Dedication sq. ft.	0.00
Wetlands	0.00
Net Square Footage	100,623.60
Net Acres Developable	2.31*
Landscaping (15%)	15,093.54
Building Square Footage (35%)	35,218.26
Pavement Square Footage	50,311.80
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak.	
Average rate .98	35
Total Trips Generated Weekday per 1000 sq. ft. gross floor area.	
Average rate 6.97	246

Ingram

Tax Lot	2501
Acres	1.35
Square Footage	58,806.00
Right-of-way Dedication sq. ft.	0.00
Wetlands	0.00
Net Square Footage	58,806.00
Net Acres Developable	1.35*
Landscaping (15%)	8,820.90
Building Square Footage (35%)	20,582.10
Pavement Square Footage	29,403.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak.	
Average rate .98	20
Total Trips Generated Weekday per 1000 sq. ft. gross floor area.	
Average rate 6.97	144

Henricksen	
Tax Lot	2500
Acres	13
Square Footage	566,280.00
Right-of-way Dedication sq. ft.	0.00
Wetlands	0.00
Net Acres Developable	13.0*
Net Square Footage	566,280.00
Landscaping (15%)	84,942.00
Building Square Footage (35%)	198,198.00
Pavement Square Footage	283,140.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak.	
Average rate .98	187
Total Trips Generated Weekday per 1000 sq. ft. gross floor area	
Average rate 6.97	1,381

Henricksen	
Tax Lot	2600
Acres	9.6
Square Footage	418,176.00
Right-of-way Dedication sq. ft.	56,700.00
Wetlands	10,000.00
Net Square Footage	351,476.00
Net Acres Developable	8.07*
Landscaping (15%)	52,721.00
Building Square Footage (35%)	123,016.00
Pavement Square Footage	175,739.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak.	
Average rate .98	121
Total Trips Generated Weekday per 1000 sq. ft. gross floor area	
Average rate 6.97	857

Martin

Tax Lot	100
Acres	21.97
Square Footage	957,013.00
Right-of-way Dedication sq. ft.	45,300.00
Wetlands	20,000.00
Net Square Footage	892,000.00
Net Acres Developable	20.47*
Landscaping (15%)	133,800.00
Building Square Footage (35%)	312,200.00
Pavement Square Footage	446,000.00
Average vehicle trip ends/1000 sq. ft. gross floor area, PM peak. Average rate .98	306
Total Trips Generated Weekday per 1000 sq. ft. gross floor area Average rate 6.97	2,176
Total Trips PM Peak	**1,736**
Total Trips Weekday	**12,391**

c:Quarry/TripGenerationCalc's81798

APPENDIX 7

SUMMARY AND MAP OF ODOT ACCESS PERMITS

QUARRY SECTOR HIGHWAY ACCESS PERMITS AND DEEDS

Grimm's Fuel - Rod Grimm

Warranty Deed for ROW, 15376, File No. 19697 - Emil and Anna Krause, clause on easements and access to State. Nov 3, 1954.

Access locations:

Station	Width	Restricted	Unrestricted
299+00	25'	yes	
301+40	40'		yes
304+00	40'		yes

Refers to elimination of access if frontage road developed.

Albert Cole modification to access rights to widen access at 299+00 to 35' and to remove use restrictions. Dated Dec 22, 1980. All remaining requirements of deed remain except for this modification.

SW Ready Mix - Don Macaulay

Warranty Deed for ROW, 15080, File No. 19696 - Jese and Virginia Tittle, clause on easements and access to State. July 3, 1954.

Access locations:

Station	Width	Restricted	Unrestricted
294+82		yes	

Refers to elimination of access if frontage road developed.

Everet and Carol Weber modification to access rights by canceling the original access @ 294+82 and creating a new access. Dated Sept. 15, 1961. All remaining requirements of deed remain except for this modification.

Station	Width	Restricted	Unrestricted
294+35	40'		yes

Donald Macaulay approved for an access permit on 7/25/96, permit # 02AA35384. The access permit issued to Dale's Sand and Gravel (#2AA35384-85) was canceled.

Station	Width	Restricted	Unrestricted
294+35	40'		yes

Donald Macaulay approved for an access permit on 7/25/97, permit # 02AA35385.

Station	Width	Restricted	Unrestricted
296+00			

Anderson Forge - Andy Anderson

Warranty Deed for ROW, 15388, File No. 19695 - Magdalena Krause, clause on easements and access to State. Nov. 15, 1954.

Access locations:

Station	Width	Restricted	Unrestricted
287+30	25'	yes	
291+00	25'	yes	
293+00	25'		yes

Refers to elimination of access if frontage road developed.

Magdalena Krause modification to access rights by modifying the access width. Dated Oct. 28, 1955. All remaining requirements of deed remain except for this modification.

Station	Width	Restricted	Unrestricted
293+00	40'		yes

George & Esther Albertson modification to access by eliminating 287+30 and 291+00 and creating a new access. Dated Aug. 31, 1988. All remaining requirements of deed remain except for this modification.

Station	Width	Restricted	Unrestricted
287+40	35'		yes

Sept 2, 1988 application to construct approach road of 35' width by Albertson and sold to Grimm at station 287+40, 1989.

Highway 99 Fill - Lorrel Hock

Warranty Deed for ROW, 15175, File No. 19692 - Malfred & Louise Barstad, clause on easements and access to State. Aug. 20, 1954.

Access locations:

Station	Width	Restricted	Unrestricted
280+30	25'		yes
283+00	25'		yes
287+00	25'	yes	

Refers to elimination of access if frontage road developed.

Malfred Barstad modification to access rights by modifying the access locations and restriction. Dated Aug. 5, 1958. All remaining requirements of deed remain except for this modification.

Deleted:

Station	Width	Restricted	Unrestricted
287+00	25'	yes	
280+30	25'		yes

Modification or new:

Station	Width	Restricted	Unrestricted
280+30	25'	yes	
285+00	25'		yes

Garren Ingram

Garren Ingram modification to access by correct the location of 280+30 which was constructed in the incorrect location and is deleted. Dated April 9, 1990. All remaining requirements of deed remain except for this modification.

Station	Width	Restricted	Unrestricted
279+52	25'		yes

Valley Yard Supply - Larry Speight

Warranty Deed for ROW, 13836, File No. 19690 - Charles & Clara Smith. June 6, 1953Nov. 17, 1954.

Bargain and Sale Deed for ROW, _____, File No. 19690, John & Ann Burge. March 11, 1958. Slope easement issue.

Access locations:

Station	Width	Restricted	Unrestricted
275+50	40'		
277+80	40'		

Refers to elimination of access if frontage road developed in deed.

George Albertson application for approach road construction of 35', 1969. Station 275+93 which does not have an access permit.

George Albertson application for approach road construction of 35', Jan. 19, 1970. Station 275+50.

GH McCulloch - Grant McCulloch

Quitclaim Deed for ROW, 15375, File No. 19689 - Earnest & Cathleen Hamback. Nov. 17, 1954. Clause on easements and access to State.

Access locations:

Station	Width	Restricted	Unrestricted
272+40	25'	yes	
274+55	25'	yes	

Refers to elimination of access if frontage road developed in deed.

Quitclaim Deed for ROW, 15375, File No. 19689- F. Hill & Arline Hill. Dec. 7, 1954.

Refers to elimination of access if frontage road developed in deed.

Warranty Deed for ROW, file No. 19689 - Helen Weston, Mary Weston & Carrie Hill. June 17, 1954. Clause on easements and access to State.

Access locations:

Station	Width	Restricted	Unrestricted
272+40	25'	yes	
274+55	25'	yes	

Refers to elimination of access if frontage road developed in deed.

L. J. Blum application for construction of an approach road at Station 274+55, Sept 9, 1964.

<u>Leveton</u>

Warranty Deed for ROW, 15764, File No. 19687- Hill & Looney. March 30, 1955. Clause on easements and access to State.

Access locations:

Station	Width	Restricted	Unrestricted
266+90	30'		yes
269+70	30'		yes
268+20	25'	yes	

Warranty Deed for ROW, 15574, File No. 19688 - Harriet & CL Harsch. Jan. 7, 1955. Clause on easements and access to State.

Access locations:

Station	Width	Restricted	Unrestricted
265+75	25'		

City of Tualatin

Application to construct an approach road (Tualatin Road), Oct. 22, 1992.

Access locations:

Station	Width	Restricted	Unrestricted
265+90	24'		

C:Doug/Quarry/Quarry Sector 99W Access Permits

APPENDIX 8

ODOT STATE ATTORNEY GENERAL'S OFFICE CORRESPONDENCE

CHAPTER 5: FLOOD PLAIN

Background

A portion of the Quarry Sector study area is located within the 100-year flood plain. Map 9, Page 39 identifies the flood plain boundary area. There are approximately eight (8) acres of the study area within the 100-year flood plain designated A10. The remaining area is designated B and C and out of the 100-year flood plain. The 100 year boundary within the Quarry Sector study area is primarily located on Tax Lot 100, Tax Map 2S121D (Martin) with a small portion on Tax Lot 400, Tax Map 2S121DA (Au/Bentley).

The City of Tualatin has development regulations contained in TDC Chapter 70 which address development within the 100-year flood plain area. This includes buildings constructed one-foot above and roadways developed at or above the base flood elevation (approximately 129 feet). Presently the transportation system contained in the TDC is outside of the 100-year flood plain.

Objectives

1. Comply with objectives contained in Chapter 70, Flood Plain, in the TDC.

2. Identify a transportation system which is located outside of the 100-year flood plain area.

Flood Plain Options

Base Scenario

The Base Scenario indicates Quarry Road and the Frontage Road to be located outside of the 100-year flood plain.

This alternative rates above average for flood plain issues.

Alternative 1

Alternative 1 indicates SW Leveton Drive, SW Cummins Street, SW 130th Avenue and SW Aspen Court to be located outside of the 100-year flood plain area allowing optimum access during a flood event.

This alternative rates above average for flood plain issues.

APPENDIX 9

CHAPTER 75 ACCESS MANAGEMENT (EXCERPTS)

(3) The City Council may include additional streets on Map 75-1 through the plan amendment procedure. In addition to other required findings, the City Council must find that the addition is necessary to implement the objectives of this chapter. [Added by Ord. 635-84, Sec. 53, passed June 11, 1984; amended by Ord. 743-88, Sec. 31, passed March 28, 1988; Ord. 975-97, Sec. 3, passed May 12, 1997.]

75.120 Existing Streets.

The following list describes in detail the arterials as defined in TDC 75.030 with respect to access. Recommendations are made for future changes in accesses and location of future accesses. These recommendations are examples of possible solutions and shall not be construed as limiting the City's authority to change or impose different conditions on arterials if additional studies result in different recommendations from those listed below.

PACIFIC HIGHWAY 99W

Pacific Highway 99W cuts through the City of Tualatin along its western boundaries. On the southeasterly side of Pacific Highway 99W access will be provided in the future by a frontage road to be constructed as discussed in the Transportation Element of the Comprehensive Plan. Prior to the construction of this frontage road, interim access in accordance with 75.090 of this Chapter may be approved by the City Engineer. North of Tualatin Road on the southeasterly side of Pacific Highway 99W, property will access onto Tualatin Road or onto Hazelbrook Road. In this area there will be no frontage road constructed and a central access from Pacific Highway consisting of one right-in and one right-out driveway will be provided. The access point shall be located within the middle one-third of the frontage between Tualatin Road (existing) and Hazelbrook Road. Final location to be determined by the City Engineer at the time any portion of either site is developed. On the northwesterly side of Highway 99, Pacific Drive will be extended as a frontage road to approximately the intersection with Tualatin Road. From the existing intersection with Pacific Drive and 99W to Tualatin Road, interim accesses may be approved in accordance with 75.090 of this chapter. Between Tualatin Road and the Tualatin River on the northwesterly side of Pacific Highway 99 existing accesses will remain; due to the median configuration of Highway 99 these will be limited to right-turn in, right-turn out as they are now. Any redevelopment in this area will require that the driveway accesses be consolidated to a minimum amount. At this time it is anticipated that the accesses in this area will be configured as shown on Map 75-1. Some driveways will be joint driveways as shown on May 75-1.

NORWOOD EXPRESSWAY

The Norwood Expressway will run from the Interchange of Norwood Road and I-5 to Tualatin-Sherwood Road and Edy Road intersection. Access along this expressway will be limited to the following points:

(1) The intersection of Martinazzi Avenue and Norwood Expressway.

(2) The intersection of Boones Ferry Road and Norwood Expressway.

(3) The intersection of Grahams Ferry Road and Norwood Expressway.

(4) The intersection of Tonquin Loop Road and the Norwood Expressway in the vicinity of the Burlington Northern Railroad tracks.

(5) The intersection of the Norwood Expressway and Tualatin-Sherwood Road.

If the Norwood Expressway is constructed in a phase construction approach, some interim accesses may be provided in accordance with 75.090 of this Chapter when the road is a two-lane road. When the road is completed to its ultimate, it may be necessary to construct short sections of Frontage road to provide access to properties along the Norwood Expressway. This would be mainly in

Nyberg to Tualatin-Sherwood Road: There shall be no access to this section of Martinazzi Street.

Tualatin-Sherwood Road to Warm Springs: There shall be no access granted in this section of road except at a point directly opposite the Fred Meyer driveway (2S1 24C/100).

Warm Springs to Sagert: There shall be no additional access granted with an exception of a street intersection at the location of the current Mohawk intersection. Any redevelopment or modifications to the apartment complexes located on the west side of Martinazzi (2S1 24CC/200) shall result in closure of the apartment complex driveway to Martinazzi. An alternative to a complete closure of these driveways would be extension of the left turn medians resulting in an elimination of left turns in and out of these driveway accesses.

124TH

Tualatin Road to Herman Road: The intersection of 124th and Tualatin Road shall be designed in accordance with the discussion in the Transportation Element of the Community Development Code. Between this intersection and Herman Road, access to 124th shall be limited to street accesses. This may result in some interim accesses being granted in accordance with 75.090 for properties on the west side. Access to 124th in this section will require the execution of interim agreements as discussed in 75.090 to serve properties located on the west side of 124th until the new street system can be constructed in this area to adequately serve all the property.

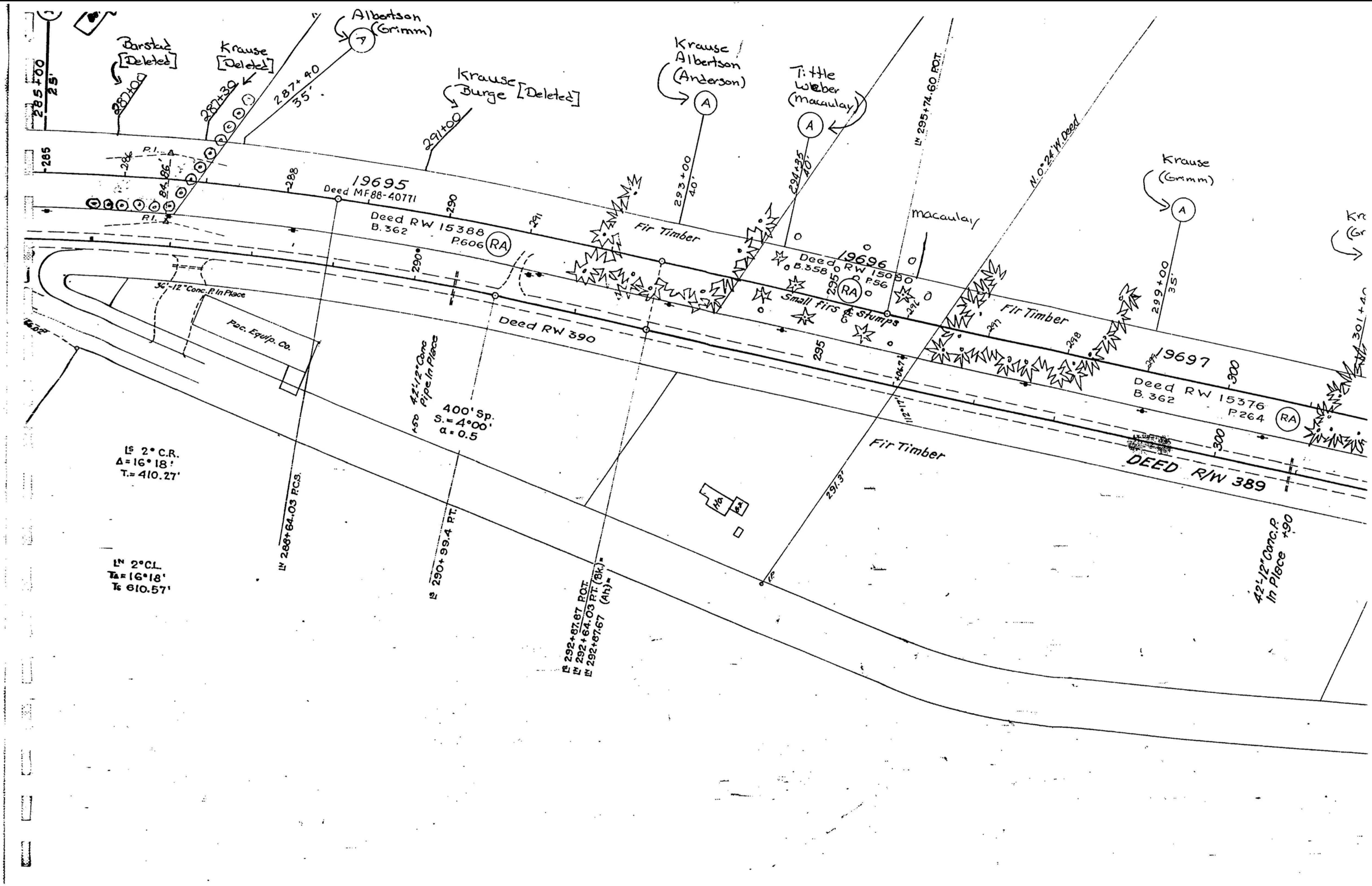
Herman Road to Tualatin-Sherwood Road: On the east side of 124th Avenue between Herman Road and Tualatin-Sherwood Road the area will be served by the following street or drive aisle system: 1) A street intersection at Myslony Street. 2) An intersection approximately 800 feet south of the Myslony Street/124th Avenue intersection extending east with an alternative to extend north to connect with Myslony Street a minimum of 150 feet east of 124th Avenue. Access may be limited to right in/right out in the future as determined by the City Engineer. 3) An intersection approximately 800 feet north of the intersection of Tualatin-Sherwood Road and 124th Avenue which will extend east and south to a intersection at Tualatin -Sherwood Road across from 120th Avenue. The exact location and configuration of the streets or private drive aisles shall be determined by the City Engineer.

On the west side of 124th Avenue between Herman Road and Tualatin-Sherwood Road the area will be served by the following street or drive aisle system: 1) An intersection at Myslony Street. 2) An intersection approximately 800 feet north of the intersection of Tualatin-Sherwood Road and 124th Avenue. The exact location and configuration of the streets shall be determined by the City Engineer.

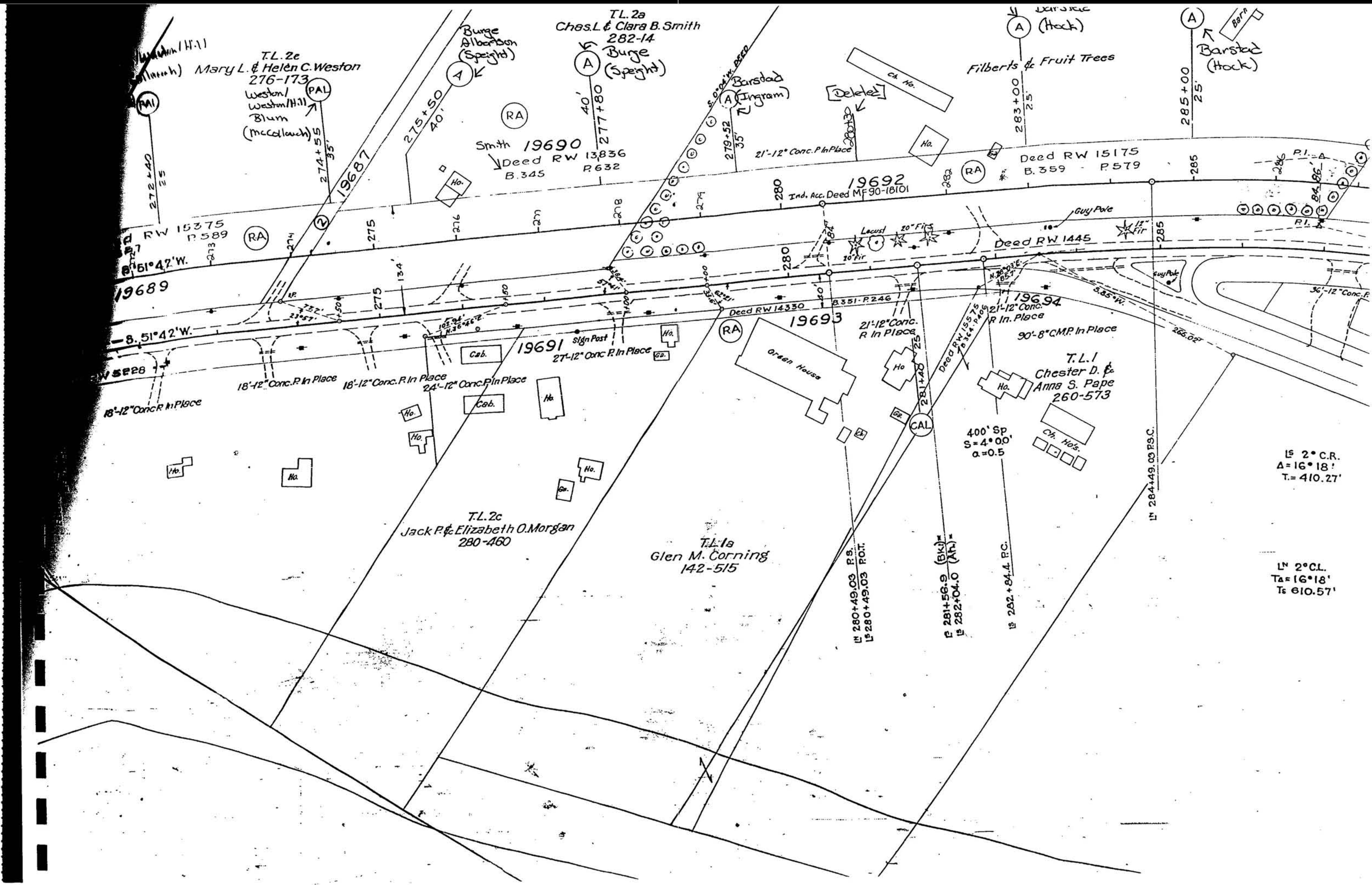
[Added by Ord. 635-84, Sec. 54, passed June 11, 1984; amended by Ord. 786-89, passed Nov. 14, 1989; Ord. 859-92, Sec. 1, passed Feb. 24, 1992; Ord. 800-90, Secs. 2, 3 and 4, passed March 26, 1990; Ord. 849-91, Sec. 41, passed Nov. 25, 1991; Ord. 879-92, Sec. 1, passed October 12, 1992; Ord. 882-92, Secs. 26 and 27, passed Dec. 14, 1992; Ord. 975-97, Sec. 4, passed May 12, 1997; Ord. 982-97, Sec. 9, passed Aug. 4, 1997.]

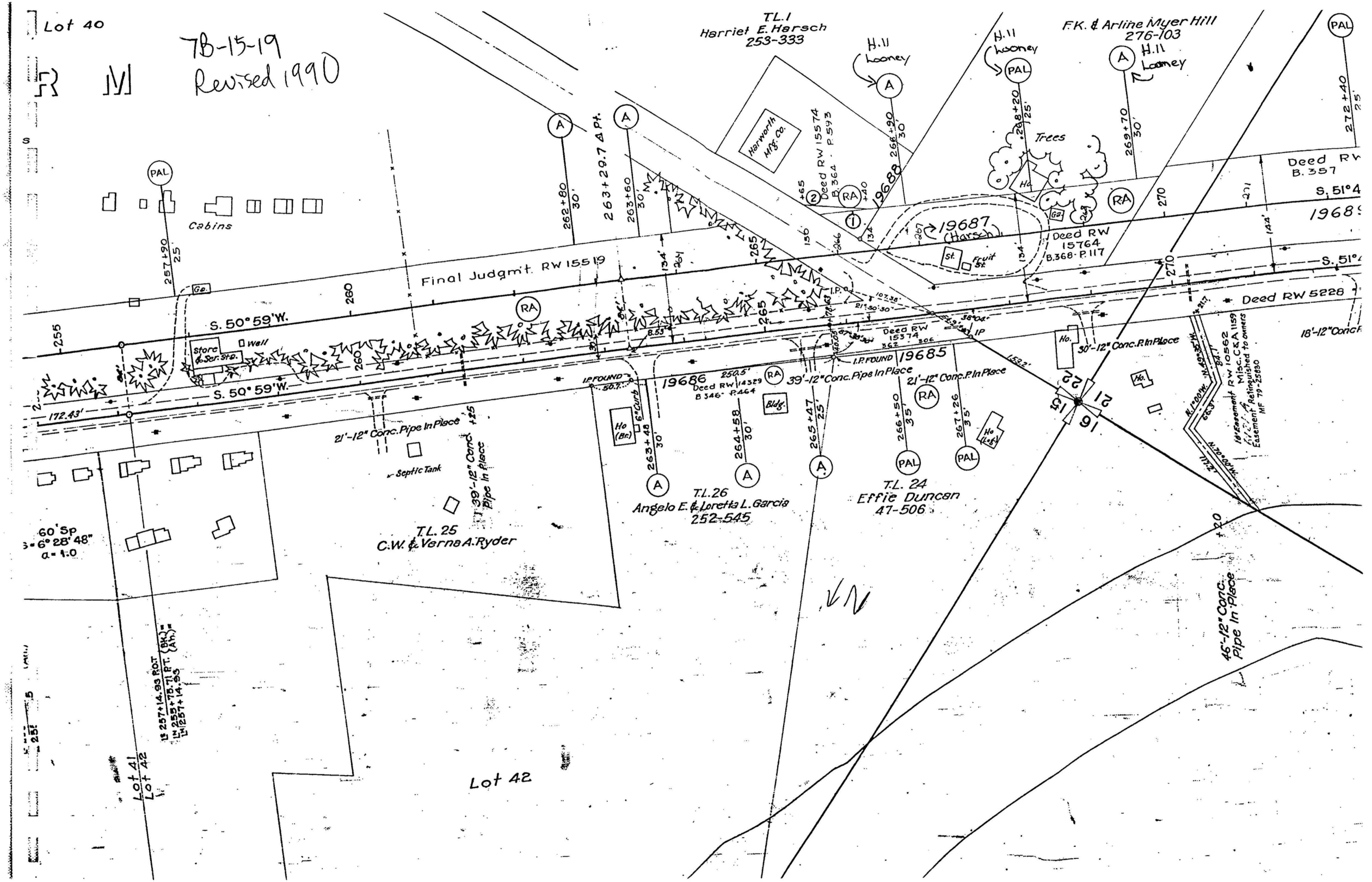
75.130 Joint Accesses Required.

When the City Engineer determines that joint accesses are required by properties undergoing development or redevelopment, an overall access plan shall be prescribed by the City Engineer and all properties shall adhere to this. Interim accesses may be allowed in accordance with 75.090 of this chapter to provide for the eventual implementation of the overall access plan. [Added by Ord. 635-84, Sec. 55, passed June 11, 1984.]



Albertson (Grimm)
Barstad [Deleted]
Krause [Deleted]
285+00 25'
287+00
287+30
287+40 35'
Krause Burge [Deleted]
291+00
Krause Albertson (Anderson)
Tittle Weber (Macaulay)
Ln 295+74.60 P.O.T.
N.0°24'W. Deed
Krause (Grimm)
19695
Deed MF88-40771
Deed RW 15388
B. 362
P.606
RA
Fir Timber
293+00 40'
294+35 40'
Macaulay
19696
Deed RW 15080
B. 358
P. 56
Small firs & stumps
Fir Timber
299+00 35'
19697
Deed RW 15376
B. 362
P. 264
36'-12" Conc. P. In Place
Pac. Equip. Co.
Deed RW 390
42'-12" Conc. Pipe In Place
400' Sp.
S.= 4°00'
a = 0.5
Fir Timber
DEED R/W 389
Ls 2° C.R.
Δ=16°18'
T.= 410.27'
Ln 288+64.03 P.C.S.
Ls 290+99.4 P.T.
Ln 2° C.L.
Ta= 16°18'
Ts 610.57'
Ls 292+87.87 P.O.T.
Ln 292+64.03 P.T. (Bk.)=
Ln 292+87.67 (Ah)=
291.3'
42'-12" Conc. P. In Place +90


T.L. 2e
Mary L. & Helen C. Weston
276-173
Weston/
Weston/Hill
Blum
(McCollough)
PAL
PAI
274+55
35'
272+40
Burge
Albertson
(Speight)
A
275+50
40'
19687
T.L. 2a
Chas. L & Clara B. Smith
282-14
Burge
(Speight)
A
40'
277+80
RA
Smith 19690
Deed RW 13836
B. 345
P. 632
Barstad
(Ingram)
A
279+52
35'
Deleted
21'-12" Conc. P. In Place
Ch. Ho.
Ho.
Filberts & Fruit Trees
(Hock)
A
283+00
25'
Barstad
(Hock)
A
285+00
25'
Barn
Deed RW 15175
B. 359
P. 579
19692
Ind. Acc. Deed MF90-18101
RA
P.I.
84.86
Guy Pole
Locust
20" Fir
20" Fir
12" Fir
Deed RW 1445
RW 15375
P. 589
RA
S. 51°42' W.
19689
S. 51°42' W.
RW 5228
Deed RW 14330
B. 351 - P. 246
19693
RA
21'-12" Conc.
P. In Place
196 94
21'-12" Conc.
P. In Place
90'-8" CMP. In Place
Guy Pole
36'-12" Conc. P.
265.02'
19691
Sign Post
27'-12" Conc. P. In Place
18'-12" Conc. P. In Place
18'-12" Conc. P. In Place
24'-12" Conc. P. In Place
18'-12" Conc. P. In Place
Cab.
Cab.
Ho.
Ga.
Green House
Ho
281+40
25
Deed RW 15575
B. 364 - P. 406
CAL
T.L. 1
Chester D. &
Anna S. Pape
260-573
Ch. Ho's.
400' Sp.
S = 4°0.0'
a = 0.5
284+49.03 P.S.C.
L^S 2° C.R.
Δ = 16°18'
T. = 410.27'
L^N 2° C.L.
Δ = 16°18'
T = 610.57'
T.L. 2c
Jack P. & Elizabeth O. Morgan
280-460
T.L. 1a
Glen M. Corning
142-515
L^N 280+49.03 P.S.
L^S 280+49.03 P.O.T.
L^S 281+56.9 (Bk.)
L^S 282+04.0 (Ah.)
L^S 282+84.4 P.C.



Lot 40
7B-15-19
Revised 1990
T.L.1
Harriet E. Harsch
253-333
F.K. & Arline Myer Hill
276-103
H.11 Looney
Harworth Mfg. Co.
Deed RW 15574 B.364 - P.593
19688
19687 (Harsch)
Deed RW 15764 B.368-P.117
Deed RW B.357
Trees
Cabins
Final Judgm't. RW 15519
S. 50°59'W.
S. 51°4
Store & Ser. Sta.
Well
19686
Deed RW 14329 B346- P.464
19685
Deed RW 15374
I.P. FOUND
Deed RW 5228
39'-12" Conc. Pipe In Place
21'-12" Conc. P. In Place
30'-12" Conc. P. In Place
18'-12" Conc. P.
21'-12" Conc. Pipe In Place
39'-12" Conc. Pipe In Place
Septic Tank
6" Curb
T.L.26
Angelo E. & Loretta L. Garcia
252-545
T.L. 24
Effie Duncan
47-506
T.L. 25
C.W. & Verna A. Ryder
60' Sp
Δ=6°28'48"
Lot 41
Lot 42
46'-12" Conc. Pipe In Place
16' Easement RW 10562 Misc. C&A 1159 Easement Relinquished to owners MF 79-25830