COUNTY OF EL DORADO

CARSON CROSSING DRIVE DRAINAGE ZONE OF BENEFIT 98310
WITHIN COUNTY SERVICE AREA NO. 9

ENGINEER'S REPORT

FEBRUARY 2016

PREPARED FOR:
BOARD OF SUPERVISORS
COUNTY OF EL DORADO

PURSUANT TO THE BENEFIT ASSESSMENT ACT OF 1982 AND
ARTICLE XIIID OF THE CALIFORNIA CONSTITUTION

PREPARED BY:
SCIConsultingGroup
4745 MANGELS BOULEVARD
FAIRFIELD, CALIFORNIA 94534
PH: 707.430.4300
FAX: 707.430.4319
www.sci-cg.com

TABLE OF CONTENTS

INTRODUCTION

OVERVIEW

The County of El Dorado ("County") is proposing formation of the Carson Crossing Drive Drainage Zone of Benefit in order to provide funding for the maintenance and replacement of drainage improvements for the Carson Creek subdivision (also known as Heritage El Dorado Hills), within the County. The funding mechanism will be a County Service Area Zone of Benefit ("Zone of Benefit", or "Zone"), which is being required as a condition of development approval by the County.

The proposed Zone of Benefit contains all parcels in the planned development known as Carson Creek, or Heritage El Dorado Hills, to be located south of Golden Foothill Parkway and west of Latrobe Road. The assessments for this Zone of Benefit will be used to maintain and improve certain drainage facilities and would be levied annually.

LEGAL ANALYSIS

PROPOSITION 218

This assessment is formed consistent with Proposition 218, The Right to Vote on Taxes Act, which was approved by the voters of California on November 6, 1996, and is now codified as Articles XIIIC and XIIID of the California Constitution. Proposition 218 provides for benefit assessments to be levied to fund the cost of providing services, improvements, as well as maintenance and operation expenses to a public improvement which benefits the assessed property.

Proposition 218 describes a number of important requirements, including property-owner balloting, for the imposition, increase and extension of assessments, and these requirements are satisfied by the process used to establish this assessment.

SILICON VALLEY TAXPAYERS ASSOCIATION, INC. V SANTA CLARA COUNTY OPEN SPACE AUTHORITY

In July of 2008, the California Supreme Court issued its ruling on the Silicon Valley Taxpayers Association, Inc. v. Santa Clara County Open Space Authority ("SVTA vs. SCCOSA"). This ruling is the most significant legal document in further legally clarifying Proposition 218. Several of the most important elements of the ruling included further emphasis that:

- Benefit assessments are for special, not general, benefit
- The services and/or improvements funded by assessments must be clearly defined
- Special benefits are directly received by and provide a direct advantage to property in the district or zone

This Engineer's Report is consistent with the SVTA vs. SCCOSA decision and with the requirements of Article XIIIC and XIIID of the California Constitution because the improvements to be funded are clearly defined; the benefiting property in the Zone of Benefit

enjoys close and unique proximity and access to the Improvements; and such special benefits provide a direct advantage to property in the Zone of Benefit that is not enjoyed by the public at large or other property.

DAHMS V. DOWNTOWN POMONA PROPERTY

On June 8, 2009, the 4th Court of Appeal amended its original opinion upholding a benefit assessment for property in the downtown area of the City of Pomona. On July 22, 2009, the California Supreme Court denied review. On this date, Dahms became good law and binding precedent for assessments. In Dahms the Court upheld an assessment that was 100% special benefit (i.e. 0% general benefit) on the rationale that the services and improvements funded by the assessments were directly provided to property in the district. The Court also upheld discounts and exemptions from the assessment for certain properties.

BONANDER V. TOWN OF TIBURON

In the December 31, 2009, the 1st District Court of Appeal overturned a benefit assessment approved by property owners to pay for placing overhead utility lines underground in an area of the Town of Tiburon. The Court invalidated the assessments on the grounds that the assessments had been apportioned to assessed property based, in part, on relative costs within sub-areas of the assessment district instead of proportional special benefits.

BEUTZ V. COUNTY OF RIVERSIDE

On May 26, 2010 the 4th District Court of Appeals issued a decision on the Steven Beutz v. County of Riverside ("Beutz") appeal. This decision overturned an assessment for park maintenance in Wildomar, California, primarily because the general benefits associated with improvements and services was not explicitly calculated, quantified and separated from the special benefits.

GOLDEN HILL NEIGHBORHOOD ASSOCIATION V. CITY OF SAN DIEGO

On September 22, 2011, the San Diego Court of Appeal issued a decision on the Golden Hill Neighborhood Association v. City of San Diego appeal. This decision overturned an assessment for street and landscaping maintenance in the Greater Golden Hill neighborhood of San Diego, California. The court described two primary reasons for its decision. First, like in Beutz, the court found the general benefits associated with services were not explicitly calculated, quantified and separated from the special benefits. Second, the court found that the City had failed to record the basis for the assessment on its own parcels.

COMPLIANCE WITH CURRENT LAW

This Engineer's Report is consistent with the requirements of Article XIIIC and XIIID of the California Constitution and with the *SVTA* decision because the improvements to be funded are clearly defined; the improvements are directly available to and will directly benefit property in the Zone of Benefit; and the improvements provide a direct advantage to property in the Zone of Benefit that would not be received in absence of the assessments.

This Engineer's Report is consistent with *Buetz, Dahms* and *Greater Golden Hill* because, the improvements will directly benefit property in the Zone of Benefit and the general benefits have been explicitly calculated and quantified and excluded from the assessments. The Engineer's Report is consistent with *Bonander* because the assessments have been apportioned based on the overall cost of the improvements and proportional special benefit to each property.

DESCRIPTION OF THE ZONE OF BENEFIT

IMPROVEMENTS AND SERVICES WITHIN THE ZONE OF BENEFIT:

The work and improvements (the "Improvements") to be maintained with the funding from the Carson Crossing Drive Drainage Zone of Benefit and the cost thereof, including any debt service on bonds or other indebtedness issued for the work and improvements, paid from the levy of the annual assessment provide special benefit to Assessor Parcels within the Zone of Benefit as defined in the Method of Assessment herein. The work and improvements are generally described as follows:

The Improvements for the Carson Crossing Drive Zone of Benefit are limited to the segment of Carson Crossing Drive beginning at the northwest boundary of the Zone, continuing in a counter-clockwise direction to the intersection of Golden Foothill Parkway. The improvements consist of three large Con-Span structures across Carson Creek and two tributaries, as well as other drainage improvements as listed in Table 1 below.

Table 1 – Description of Improvements

Item	Quantity	Unit
12" SD HDPE	987	LF
18" SD HDPE	2,420	LF
36" SD HDPE	1,382	LF
Type "B" Drop Inlet	14	EA
Grated Inlet	27	EA
Eccentric SD Manhole w/Grate Top	1	EA
48" SDMH	5	EA
72" SDMH	1	EA
Rock Outfall Protection	7	EA
Crossing A (Con-Span B Series 36' Span x 8' Rise)	5,281	SF
Crossing B (O Series 55' Span x 8'-11 1/8 Rise)	14,121	SF
Crossing C (Bebo 2-48' Span x 13' Rise 1-60' Span x 17' Rise)	25,356	SF

The improvements to be maintained include all necessary service, operations, administration, and maintenance required to keep the above-mentioned improvements in a safe, clean and reliable condition.

"Maintenance" means the furnishing of services and materials for the ordinary and usual maintenance and operation of any improvement, including repair, removal or replacement of all or any part of any improvement; the removal of vegetation, sediment, rubbish, debris, and other solid waste, and the cleaning, sandblasting, and painting of walls and other improvements to remove or cover graffiti.

"Incidental expenses" may include any of the following: (a) The costs of preparation of the Engineer's Report, including plans, specifications, estimates, diagram, and assessment; (b) the costs of printing, advertising, and the giving of published, posted, and mailed notices; (c) compensation payable for collection of assessments; (d) compensation of any engineer or

attorney employed to render services in proceedings pursuant to this part; (e) any other expenses incidental to the construction, installation, or maintenance of the Improvements; (f) any expenses incidental to the issuance of bonds or; and (g) costs associated with any elections held for the approval of a new or increased assessment.

The assessment proceeds will be exclusively used for Improvements within the Zone of Benefit plus incidental expenses. Reference is made to the Summary of County's Improvement Plans section in the following section of this Report which specifically identifies the drainage improvements to be funded by the assessment proceeds and to the plans and specifications, including specific expenditure and improvement plans, which are on file with the County. Any further plans and specifications for the Zone of Benefit will be filed with the Community Development Agency of the County and are incorporated herein by reference.

ESTIMATE OF COST

INTRODUCTION

Following are the Improvements for the Zone of Benefit. Improvements funded by the assessments will be used to maintain and improve the Carson Crossing Drive drainage facilities. The formula below describes the relationship between the final level of improvements, the existing baseline level of service, and the level of improvements for the drainage facilities funded by the assessments.

Final Level of Improvements	=	Baseline Level of Improvements	+	Enhanced Level of Improvements

SUMMARY OF ZONE'S IMPROVEMENT PLANS

Improvements to be installed at Carson Crossing Drive have been identified. The Zone of Benefit boundaries have been narrowly drawn to include properties, within the Carson Creek development, that have good proximity and access to the Improvements.

ESTIMATE OF COSTS

Table 2, below, displays the estimate of the cost of the Improvements that would be funded by the proposed Zone of Benefit. The expenditures would be governed by the policies, criteria and requirements established within this Report, the Article and by the Act.

Table 2 – Estimate of Cost

Annual Maintenance Costs

Description	Quantity	Unit	Unit Price	Total Amount
Annual: Clean existing drainage structures	48	EA	$200.00	$9,600.00
Annual: Inspect and clean drain lines for siltation	4789	LF	3.00	14,367.00
Every 5 Years Con-Span A: Inspect and clean facility for trash, debris, and siltation	0.2	Events	2,500.00	500.00
Every 5 Years Con-Span B: Inspect and clean facility for trash, debris, and siltation	0.2	Events	5,000.00	1,000.00
Every 5 Years Con-Span C: Inspect and clean facility for trash, debris, and siltation	0.2	Events	15,000.00	3,000.00
			Total Annual Maintenance Costs	**$28,467.00**

Annualized Capital Replacement Costs

Description	Total Installation Amount	Unit Life	Annual Replacement Cost
12" SD HDPE	$50,139.60	50	$1,002.79
18" SD HDPE	135,278.00	50	2,705.56
36" SD HDPE	102,889.90	50	2,057.80
Type "B" Drop Inlet	14,224.00	50	284.48
Grated Inlet	97,200.00	50	1,944.00
Eccentric SD Manhole w/Grate Top	3,300.00	50	66.00
48" SDMH	15,240.00	50	304.80
72" SDMH	7,500.00	50	150.00
Rock Outfall Protection	5,600.00	50	112.00
Crossing A (Con-Span B Series 36' Span x 8' Rise)	633,720.00	75	8,449.60
Crossing B (O Series 55' Span x 8'-11 1/8 Rise)	1,694,520.00	75	22,593.60
Crossing C (Bebo 2-48' Span x 13' Rise 1-60' Span x 17' Rise)	3,042,720.00	75	40,569.60
		Total Annualized Replacement Costs	**$80,240.23**
		Sub-Total Annual Maintenance Cost and Capital Replacements	**$108,707.23**

Annual Administrative Costs

Administration (2%)	$2,174.14
Insurance (3%)	3,261.22
Total Annual Administrative Costs	**$5,435.36**

Total Annual Costs	**$114,142.59**

Assessment Calculation

Total Annual Costs	**$114,142.59**
Less Contribution for General Benefit (82.0%) [1]	**($93,615.78)**
Balance to Levy	**$20,526.81**
Total Benefit Units [2]	**486.55**
Levy per Benefit Unit [3]	**$42.19**
Total Assessment Levy [4]	**$20,526.81**

Notes to Estimate of Cost:

1. As determined in the following section, at least 82.0% of the cost of Improvements must be funded from sources other than the assessments to cover any general benefits from the Improvements. Therefore, out of the total cost of Improvements of $114,142.59 the County must contribute at least $93,615.78 from sources other than the assessments. The County will contribute this amount, which covers any general benefits from the Improvements.

2. Total Benefit Units are based on full build-out of the assessed area (see Appendix B for Overall Site Plan, Units 1 through 3). There are two types of units planned: 1,059 Age Restricted Units (ARUs), and a memory care facility. Benefit Units are summarized below:

Unit Type	Quantity	SFE	Total Benefit Units
ARU	1,059	0.45	476.55
Memory Care Facility	1	10	10.00
TOTAL			486.55

   For actual assessment amounts prior to full build-out, unimproved parcels will be assessed at the unimproved rate (25% of normal rate), and total assessment proceeds will be reduced accordingly.

3. The Levy per Benefit Unit (SFE) is $42.19. However, the only single family homes planned for this Zone are Age Restricted Units (ARUs). The levy per ARU is ($42.19 x .45 =) $18.98 (rounded down), and the levy for the Memory Care Facility is ($42.19 x 10 =) $421.90. A check of the total assessments to be levied shows a total of ((1,059 x $18.98) + (1 x $421.90) =) $20,521.72. This does not exceed the Special Benefit amount of $20,526.81. The discrepancy is due to rounding down the ARU levy amount.

4. The Act requires that proceeds from the assessments must be deposited into a special fund that has been set up for the revenues and expenditures of the Zone of Benefit. Moreover, funds raised by the assessment shall be used only for the purposes stated within this Report. Any balance remaining at the end of the fiscal year, June 30, must be carried over to the next fiscal year. The Zone of Benefit may also establish a reserve fund for contingencies and special projects as well as a capital improvement fund for accumulating funds for larger capital improvement projects or capital renovation needs. Any remaining balance would either be placed in the reserve fund, the capital improvement fund, or would be used to reduce future years' assessments.

METHOD OF APPORTIONMENT

METHOD OF APPORTIONMENT

This section of the Engineer's Report includes an explanation of the special and general benefits derived from the proposed Improvements to Carson Crossing Drive, and the methodology used to apportion the total assessment to properties within the Zone of Benefit.

The method used for apportioning the assessment is based upon the proportional special benefits conferred to the properties over and above the general benefits conferred to real property in the Zone of Benefit or to the public at large. Special benefit is calculated for each parcel in the Zone of Benefit using the following process:

1. Identification of all benefit factors derived from the Improvements
2. Calculation of the proportion of these benefits that are general
3. Determination of the relative special benefit within different areas within the Zone of Benefit
4. Determination of the relative special benefit per property type
5. Calculation of the specific assessment for each individual parcel based upon special vs. general benefit; location, property type, property characteristics, improvements on property and other supporting attributes

DISCUSSION OF BENEFIT

Assessments can only be levied based on the special benefit to property. This special benefit is received by property over and above any general benefits. Any and all general benefit must be funded from another source. With reference to the requirements for assessments, Section 54711(a)(1) of the Benefit Assessment Act of 1982 states:

> *"The amount of the assessment to be imposed on any parcel of property shall be related to the benefit to the parcel which will be derived from the provision of the service."*

Proposition 218, as codified in Article XIIID of the California Constitution, has confirmed that assessments must be based on the special benefit to property:

> *"No assessment shall be imposed on any parcel which exceeds the reasonable cost of the proportional special benefit conferred on that parcel."*

Since assessments are levied on the basis of special benefit, they are not a tax and are not governed by Article XIIIA of the California Constitution.

The SVTA v. SCCOSA decision clarifies that a special benefit is a service or improvement that provides a direct advantage to a parcel and that indirect or derivative advantages resulting from the overall public benefits from a service or improvement are general benefits.

Finally, Proposition 218 twice uses the phrase "over and above" general benefits in describing special benefit. (Art. XIIID, sections 2(i) & 4(f).) The SVTA v. SCCOSA decision further clarifies that special benefits must provide a direct advantage to benefiting property and that proximity to a park is an example of a special benefit.

BENEFIT FROM DRAINAGE IMPROVEMENTS TO CARSON CROSSING DRIVE

Carson Crossing Drive was constructed to be a regional connector road between the El Dorado Hills Business Park and White Rock Road. The developer of the nearby Heritage El Dorado Hills development project was required, among other things, to form a zone of benefit for drainage improvements on Carson Crossing Drive. While this Report focuses primarily on the drainage improvements described above, those Improvements are a critical component of this roadway, which provides benefits to various properties in the vicinity.

The drainage Improvements are a critical part of the Carson Crossing Drive roadway system in that they were designed to capture and convey rain water from the roadway and surrounding drainage area in order to protect the structural integrity of the roadway, its embankments and pavements, and to provide for a safe and reliable transportation facility. As the roadway provides numerous and significant benefits to the assessed parcels and other surrounding properties, so do the drainage Improvements.

BENEFIT TO ASSESSED PROPERTIES

In summary, real property located within the boundaries of the Zone of Benefit distinctly and directly benefits from the drainage facilities funded by the Assessments. Carson Crossing Drive provides primary access to the properties within Zone of Benefit and significantly increases the usefulness of these properties. The Improvements are specifically designed to preserve and protect Carson Crossing Drive and, thus, serve local properties in the Zone of Benefit. (The engineering analysis concedes that other properties and the public at large also benefit from the Improvements, as described in the following section.)

GENERAL VERSUS SPECIAL BENEFIT

Article XIIIC of the California Constitution requires any local agency proposing to increase or impose a benefit assessment to "separate the general benefits from the special benefits conferred on a parcel." The rationale for separating special and general benefits is to ensure that property owners subject to the benefit assessment are not paying for general benefits. The assessment can fund special benefits but cannot fund general benefits. Accordingly, a separate estimate of the special and general benefit is given in this section.

In other words:

Total Benefit	=	General Benefit	+	Special Benefit

There is no widely-accepted or statutory formula for general benefit. General benefits are benefits from improvements or services that are not special in nature, are not "particular and distinct" and are not "over and above" benefits received by other properties. SVTA vs. SCCOSA provides some clarification by indicating that general benefits provide "an indirect, derivative advantage" and are not necessarily proximate to the improvements.

The starting point for evaluating general and special benefits is the current, baseline level of service. The assessments fund Improvements "over and above" this general, baseline level and the general benefits estimated in this section are over and above the baseline.

Special benefit, on the other hand, is defined in the state constitution as "a particular and distinct benefit over and above general benefits conferred on real property located in the district or to the public at large." The SVTA v. SCCOSA decision indicates that a special benefit is conferred to a property if it "receives a direct advantage from the improvement (e.g., proximity to a park)." In this Assessment, as noted, properties in the Zone of Benefit have close proximity and uniquely improved desirability from the Improvements as do other properties and the public at large.

CALCULATING GENERAL BENEFIT

In this section, the general benefit is liberally estimated and described, and then budgeted so that it is funded by sources other than the assessment, as required.

The following formula has been developed based upon the Silicon Valley and judicial decisions, and has widespread use by this Engineer to estimate the general benefit for complex, multi-benefit assessments:

General Benefit	=	Benefit to Real Property Outside the Zone of Benefit	+	Benefit to Real Property Inside the Zone of Benefit that is Indirect and Derivative	+	Benefit to the Public at Large

Carson Crossing Drive benefits the assessed parcels (as special benefits) as well as other properties outside the Zone of Benefit and the public at large (as general benefits). Any indirect and derivative benefits to those parcels within the Zone of Benefit would also be conferred to those parcels outside the Zone of Benefit in the same proportion. Because of the single-purpose benefit of the Improvements, the sum total general benefit of all three general benefit components in the above formula can be calculated through a careful analysis of relative traffic use volumes of the assessed properties versus other properties and the public.

The 6,000'± roadway that traverses the Phase 2 Carson Creek Specific Plan (CCSP) is predicted to experience a traffic volume of **22,400** Average Daily Trips (ADT) at the year 2025[1].

[1] Appendix B, Fehr & Peers Traffic Study, June 2012

The assessed parcels within Phase 2 of the CCSP are comprised of 1,059 age restricted units (ARU) and the 139-unit assisted living memory care facility (refer to Appendix B for Overall Site Plan).

1. The ADT for an ARU is 37% of a typical single family dwelling unit, or 3.7 trips per day. For the 1,059 ARU, the total ADT would be (1,059 x 3.7 =) **3,918** ADT.

2. The memory care facility, the ADT is estimated to be **110** (based on a similar project.)

3. Therefore, the total ADT for the Phase 2 project is estimated to be (3,918 + 110 =) **4,028** ADT[2].

4. Conversely, the non-Phase 2 traffic would be (**22,400 – 4,028** =) **18,372** ADT.

Therefore the General Benefit of the Improvements would be (**18,372 ÷ 22,400** =) **82.0%**.

Hence, this analysis finds that 82.0% of the Improvements' benefit may provide general benefits. The Assessment Engineer establishes a requirement for a minimum contribution from sources other than the assessments of 82.0%.

The Zone of Benefit's total budget for maintenance and improvement of drainage facilities is $114,143. Of this total budget amount, the County will contribute at least $93,616 from sources other than the drainage assessments. This contribution by the County equates to approximately 82.0% of the total budget for maintenance and improvements and constitutes the amount attributable to the general benefits from the Improvements.

METHOD OF ASSESSMENT

As previously discussed, the assessments provide comprehensive Improvements that will clearly confer special benefits to properties in the Zone of Benefit. The allocation of special benefits to property is partially based on the type of property and the size of property. These benefits can also partially be measured by the occupants on a property in the Zone of Benefit because such parcel population density is a measure of the relative benefit a parcel receives from the Improvements. It should be noted that many other types of "traditional" assessments also use parcel population densities to apportion the assessments. For example, the assessments for sewer systems, roads and water systems are typically allocated based on the population density of the parcels assessed. Therefore, the apportionment of benefit is reasonably based the type of parcel, the size of parcels and the population density of parcels.

The next step in apportioning assessments is to determine the relative special benefit for each property. This process involves determining the relative benefit received by each property in relation to a single family home, or, in other words, on the basis of Single Family Equivalent benefit units (SFE or "Benefit Units"). This benefit unit methodology is commonly used to distribute assessments in proportion to estimated special benefit and is generally

[2] CTA Engineering and Surveying

recognized as providing the basis for a fair and appropriate distribution of assessments. For the purposes of this Engineer's Report, all properties are designated a SFE value, which is each property's relative benefit in relation to a single family home on one parcel. In this case, the "benchmark" property is a single family home. Such properties are assigned one benefit unit, which is one Single Family Equivalent (1 SFE).

In the process of determining the appropriate method of assessment, the Engineer considered various alternatives. For example, an assessment for only improved residential property was considered but was determined to be inappropriate because commercial properties also receive direct benefits from the Improvements.

Moreover, a fixed or flat assessment for all properties of similar type was deemed to be inappropriate because larger properties receive a higher degree of benefit than other similarly used properties that are significantly smaller. (For two properties used for commercial purposes, there is clearly a higher benefit provided to the larger property in comparison to a smaller commercial property because the larger property generally supports a larger building and has higher numbers of employees, customers and guests that would benefit from well maintained and improved drainage facilities. So the potential population of employees or residents is a measure of the special benefits received by the property.) Larger parcels, therefore, receive an increased benefit from the assessments.

Finally, the special benefits to be derived from the proposed assessments will be conferred on property and are not based on a specific property owner's use of the improvements, or a specific property owner's occupancy of property or the property owner's demographic status such as age or number of dependents. However, it is ultimately people who value the special benefits described above and use and enjoy the Zone of Benefit's facilities. In other words, the benefits derived to property are related to the average number of people who could potentially live on, work at, or otherwise could use a property, not how the property is currently used by the present owner. Therefore, the number of people who could or potentially live on, work at or otherwise use a property is one indicator of the relative level of benefit received by a property.

In conclusion, the Assessment Engineer determined that the appropriate method of assessment apportionment should be based on the type and use of property, the relative size of the property and its relative population. This method is further described below.

RESIDENTIAL PROPERTIES

Certain residential properties in the Zone of Benefit that contain a single residential dwelling unit are assigned one Single Family Equivalent or 1.0 SFE or 1.0 benefit unit. Traditional houses, zero-lot line houses and town homes are included in this category of single family residential property. If there is more than one single family detached dwelling on a parcel, it will be charged one SFE per single family detached dwelling.

Most of the assessed parcels are being developed as age restricted units ("ARUs"). These units benefit from the Improvements in proportion to the average number of occupants and relative size for the typical ARU, both of which tend to be lower than for a SFE.

Properties with more than one residential unit (other than parcels with more than one detached single family dwelling as described above) are designated as multi-family residential properties. These properties benefit from the Improvements in proportion to the number of dwelling units that occupy each property, the average number of people who reside in multi-family residential units versus the average number of people who reside in a single family home and the relative size of each type of residential dwelling unit. The population density factors for the area in El Dorado County encompassing the Zone of Benefit, as depicted in the following table, provide the basis for determining the SFE factors for residential properties. Using the total population in a certain property type in the area of the Zone of Benefit from the 2010 Census and dividing it by the total number of such households, finds that approximately 3.06 persons occupy each single family residence, whereas an average of 1.8 persons occupy each ARU[3]. The ratio of 3.06 people on average for a single family residence and 1.8 people per dwelling unit in an ARU results in a population density equivalent of 0.59 for ARUs. Next, the relative building areas are factored into the analysis because special benefits are related to the average size of a property, in addition to average population densities. For ARUs, this calculation results in an SFE factor of 0.45 per dwelling unit. A similar calculation is used for the SFE Rates for other residential property types.

[3] Census data for age restricted unit occupancy rates is not available. This figure is based on the El Dorado Hills Community Service District Park Impact Fee Nexus Study (2007).

TABLE 3 - RESIDENTIAL POPULATION FACTORS

Type of Residential Property	Pop. Density Equivalent	SqFt Factor	SFE Factor
Single Family Residential	1.00	1.00	**1.00**
Age Restricted Unit	0.59	0.76	**0.45**
Condominium	0.94	0.42	**0.39**
Duplex, Triplex, Fourplex	0.59	0.35	**0.21**
Multi-Family Residential (5+ Units)	0.74	0.32	**0.23**

Sources: 2010 Census, El Dorado Hills CPD

The single family equivalency factor of 0.23 per dwelling unit for multifamily residential properties applies to such properties with 20 or fewer units. Properties in excess of 20 units typically contain on-site drainage facilities that tend to offset some of the benefits provided by the improvements. Therefore the benefit for properties in excess of 20 units is determined to be 0.23 SFE per unit for the first 20 units and 0.10 SFE per each additional unit in excess of 20 dwelling units.

COMMERCIAL PROPERTIES

SFE values for commercial land uses are based on the equivalence of special benefit on a land area basis between single family residential property and the average commercial property. The SFE values for various commercial land uses are further defined by using average employee densities because the special benefit factors described previously can be measured by the average number of people who work at commercial properties.

In order to determine employee density factors, the findings from the San Diego Association of Governments Traffic Generators Study (the "SANDAG Study") are used because these findings were approved by the State Legislature as being a good representation of the average number of employees per acre of land area for commercial properties. As determined by the SANDAG Study, the average number of employees per acre for commercial property is 24.

In comparison, the average number of people residing in a single family home in the area is 3.06. Since the average lot size for a single family home in the Zone of Benefit is approximately 0.20 acres, the average number of residents per acre of residential property is 15.30.

The employee density per acre is nearly 2 times the population density of single family residential property per acre (24 employees per acre / 15.30 residents per acre). Therefore, the average employee density can be used as the basis for allocating benefit to commercial property since a commercial property with 2 employees receives generally similar special benefit to a residential property with 1 resident. This factor of equivalence of benefit between 1 resident to 2 employees is the basis for allocating commercial benefit. Table 4 below shows the average employees per acre of land area or portion thereof for commercial

properties and lists the relative SFE factors per quarter acre for properties in each land use category.

Commercial properties in excess of 5 acres generally involve uses that are more land intensive relative to building areas and number of employees (lower coverage ratios). As a result, the benefit factors for commercial property land area in excess of 5 acres is determined to be the SFE rate per fifth acre for the first 5 acres and the relevant SFE rate per each additional acre over 5 acres.

The planned assisted living facility is considered to be a commercial use. Institutional properties that are used for residential or commercial purposes are also assessed at the appropriate residential or commercial rate.

TABLE 4 – COMMERCIAL DENSITY AND ASSESSMENT FACTORS

Type of Commercial/Industrial Land Use	*Average Employees Per Acre* [1]	*SFE Units per 1/5 Acre* [2]	*SFE Units per Acre After 5*
Commercial	24	0.500	0.500

UNIMPROVED/UNDEVELOPED PROPERTIES

The benefits to be received from the Improvements by unimproved, undeveloped properties are passive benefits, which are generally not related to active use of the property. The benefit to undeveloped properties is determined to be proportional to the corresponding benefits for similar type developed properties, but at a lower rate due to the lack of active benefits conferred to undeveloped properties. Since traffic volumes are the underlying measure of benefit, the percentage of traffic for unimproved parcels, or parcels under construction, is much less than occupied parcels. While construction traffic may be less in volume, it necessarily includes significantly heavier vehicles that move more slowly. Therefore, from the stance of congestion as well as that of structural road wear, it is reasonable to assume that unimproved land benefits at approximately 25% of the level of occupied land. Using this ratio, the SFE factor for unimproved or undeveloped parcels is 0.25 per parcel.

The value of properties increases as properties are approved for parcel division and development. Likewise, the special benefits received by unimproved property increases as the property is approved for parcel division and development. When property is approved for parcel division and development with a final map, the property has passed the final significant hurdle to development and can shortly undergo construction. Since the property is nearing the point of development, its special benefits increase. In addition, these properties are generally sold soon after completion of improvements, so the properties receive the additional benefit of desirability from prospective buyers due to the special benefits provided by drainage facilities in the Zone of Benefit. It is therefore determined that

property with final map approval be assessed at the Unimproved rate on a per-mapped parcel basis.

OTHER PROPERTIES

Article XIIID stipulates that publicly owned properties must be assessed unless there is clear and convincing evidence that those properties receive no special benefit from the assessment.

All properties that are specially benefited are assessed. Other publicly owned property that is used for purposes similar to private residential or commercial uses is benefited and assessed at the same rate as such privately owned property.

Miscellaneous, small and other parcels such as roads, right-of-way parcels, and common areas typically do not generate significant numbers of employees, residents, customers or guests and have limited economic value. These miscellaneous parcels receive minimal benefit from the Improvements and are assessed an SFE benefit factor of zero.

DURATION OF ASSESSMENT

It is recommended that the Assessment be levied for fiscal year 2017-18 and continued every year thereafter, so long as the Carson Crossing Drive Drainage Zone of Benefit needs to be improved and maintained and the County requires funding from the Assessments for its Improvements in the Zone of Benefit.

ANNUAL COST INDEXING

The assessment is subject to an annual adjustment tied to the Consumer Price Index-U for the San Francisco Bay Area as of December of each succeeding year (the "CPI"), with a maximum annual adjustment not to exceed 3%.

CERTIFICATE

I do hereby apportion said net amount of the cost and expenses of said improvements, including the costs and expenses incident thereto, upon the parcels and lots of land within said Zone of Benefit, in accordance with the special benefits to be received by each parcel or lot, from the improvements, and more particularly set forth in the Cost Estimate and Method of Assessment hereto attached and by reference made a part hereof.

The assessment is made upon the parcels or lots of land within the Zone of Benefit in proportion to the special benefits to be received by the parcels or lots of land, from said improvements.

Each parcel or lot of land is described in the Assessment Roll by reference to its parcel number as shown on the Assessor's Maps of the County of El Dorado. For a more particular description of said property, reference is hereby made to the deeds and maps on file and of record in the office of the County Recorder of said County.

I hereby place opposite the Assessor Parcel Number for each parcel or lot within the Assessment Roll, the amount of the assessment for each parcel or lot of land within the said Zone of Benefit.

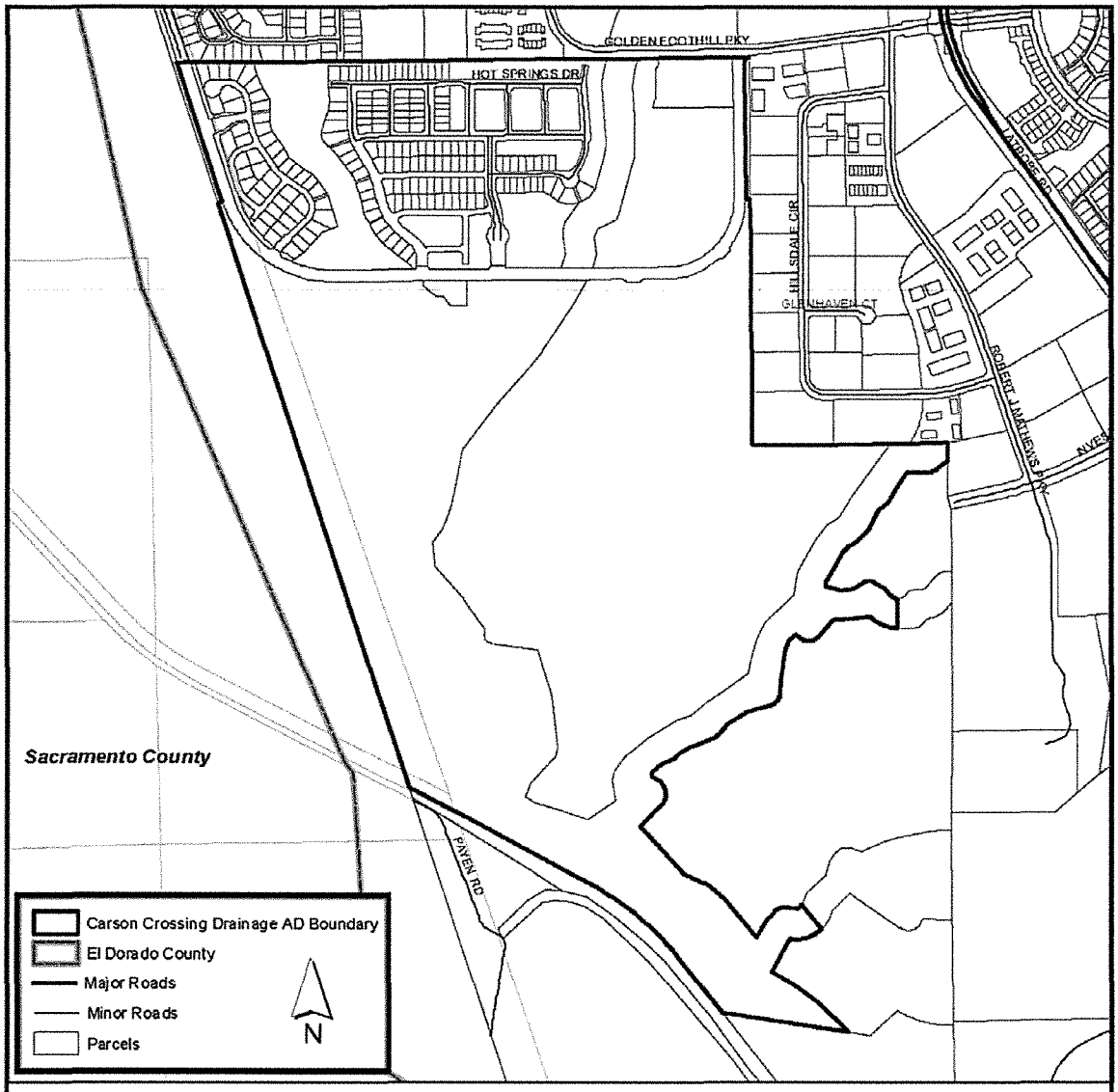
Dated: February 15, 2016

Engineer of Work

By _____

Jerry Bradshaw
Engineer of Work, License No. C48845

ASSESSMENT DIAGRAM



FILED AND RECORDED IN THE OFFICE OF THE CLERK OF THE BOARD OF SUPERVISORS OF THE COUNTY OF EL DORADO, COUNTY OF EL DORADO, CALIFORNIA, THIS _____ DAY OF _____, 20__

_____
CLERK OF THE BOARD

AN ASSESSMENT WAS CONFIRMED AND LEVIED BY THE BOARD OF SUPEVISORS OF THE COUNTY OF EL DORADO ON THE LOTS, PIECES AND PARCELS OF LAND ON THIS ASSESSMENT DIAGRAM ON THE _____ DAY OF _____, 20__ AND SAID ASSESSMENT DIAGRAM AND THE ASSESSMENT ROLL FOR SAID FISCAL YEAR WERE FILED IN THE OFFICE OF THE COUNTY AUDITOR OF THE COUNTY OF EL DORADO ON THE _____ DAY OF _____, 20__
REFERENCE IS MADE TO SAID RECORDED ASSESSMENT ROLL FOR THE EXACT AMOUNT OF EACH ASSESSMENT LEVIED AGAINST EACH PARCEL OF LAND.

_____
CLERK OF THE BOARD

FILED THIS _____ DAY OF _____, 20__ AT THE HOUR OF _____ M. IN THE OFFICE OF THE COUNTY AUDITOR OF THE COUNTY OF EL DORADO, STATE OF CALIFORNIA AT THE REQUEST OF THE BOARD OF SUPERVISORS OF THE COUNTY OF EL DORADO.

_____
COUNTY AUDITOR, FOR THE COUNTY OF EL DORADO, STATE OF CALIFORNIA

SCI Consulting Group
4745 Mangels Blvd, Fairfield, CA 94534

NOTE: REFERENCE IS HEREBY MADE TO THE MAPS AND DEEDS OF RECORD IN THE OFFICE OF THE ASSESSOR OF THE COUNTY OF EL DORADO FOR A DETAILED DESCRIPTION OF THE LINES AND DIMENSIONS OF ANY PARCELS SHOWN HEREIN. THOSE MAPS SHALL GOVERN FOR ALL DETAILS CONCERNING THE LINES AND DIMENSIONS OF SUCH PARCELS. EACH PARCEL IS IDENTIFIED IN SAID MAPS BY ITS DISTINCTIVE ASSESSOR'S PARCEL NUMBER.

County of El Dorado
Carson Crossing Drainage
Zone of Benefit 98310
Assessment Diagram

(THIS PAGE INTENTIONALLY LEFT BLANK.)

APPENDIX A - ASSESSMENT ROLL

Assessments shown below reflect the number of lots shown on Final Maps filed for Carson Creek Unit 1-Phase A and Carson Creek Unit 1-Phase B (for parent APNs 117-570-01 and -02) and single lots for other unmapped parcels. All lots are assessed at the current configuration and unimproved rate. Future levies will be based on the status (configuration and level of improvement) of each parcel at the time they are set.

Each assessor parcel number (APN) listed on the Assessment Roll is shown and illustrated on the latest County Assessor's records, or as amended per recorded final maps. These records are, by reference made part of this report, and govern for all details concerning the description of the lots or parcels.

Non-assessable lots or parcels include government owned land and public utility owned property.

APN	Asmt	Owner Name
117-570-14	$ 4.74	LENNAR HOMES OF CA A CA CORP
117-580-04	4.74	LENNAR HOMES OF CA A CA CORP
117-580-05	4.74	LENNAR HOMES OF CA A CA CORP
117-580-06	4.74	LENNAR HOMES OF CA A CA CORP
117-580-07	4.74	LENNAR HOMES OF CA A CA CORP
117-580-08	4.74	LENNAR HOMES OF CA A CA CORP
117-580-09	4.74	LENNAR HOMES OF CA A CA CORP
117-580-10	4.74	LENNAR HOMES OF CA A CA CORP
117-580-11	4.74	LENNAR HOMES OF CA A CA CORP
117-580-12	4.74	LENNAR HOMES OF CA A CA CORP
117-580-17	105.48	LENNAR HOMES OF CA A CA CORP
117-590-01	4.74	LENNAR HOMES OF CA A CA CORP
117-590-02	4.74	LENNAR HOMES OF CA A CA CORP
117-590-03	4.74	LENNAR HOMES OF CA A CA CORP
117-590-04	4.74	LENNAR HOMES OF CA A CA CORP
117-590-05	4.74	LENNAR HOMES OF CA A CA CORP
117-590-06	4.74	LENNAR HOMES OF CA A CA CORP
117-590-07	4.74	LENNAR HOMES OF CA A CA CORP
117-590-08	4.74	LENNAR HOMES OF CA A CA CORP
117-590-09	4.74	LENNAR HOMES OF CA A CA CORP
117-590-10	4.74	LENNAR HOMES OF CA A CA CORP
117-590-11	4.74	LENNAR HOMES OF CA A CA CORP
117-590-12	4.74	LENNAR HOMES OF CA A CA CORP

APN	Asmt	Owner Name
117-590-13	$ 4.74	LENNAR HOMES OF CA A CA CORP
117-590-14	4.74	LENNAR HOMES OF CA A CA CORP
117-590-15	4.74	LENNAR HOMES OF CA A CA CORP
117-590-16	4.74	LENNAR HOMES OF CA A CA CORP
117-590-17	4.74	LENNAR HOMES OF CA A CA CORP
117-590-18	4.74	LENNAR HOMES OF CA A CA CORP
117-590-19	4.74	LENNAR HOMES OF CA A CA CORP
117-590-20	4.74	LENNAR HOMES OF CA A CA CORP
117-590-21	4.74	LENNAR HOMES OF CA A CA CORP
117-590-22	4.74	LENNAR HOMES OF CA A CA CORP
117-590-23	4.74	LENNAR HOMES OF CA A CA CORP
117-590-24	4.74	LENNAR HOMES OF CA A CA CORP
117-590-25	4.74	LENNAR HOMES OF CA A CA CORP
117-590-26	4.74	LENNAR HOMES OF CA A CA CORP
117-590-27	4.74	LENNAR HOMES OF CA A CA CORP
117-590-28	4.74	LENNAR HOMES OF CA A CA CORP
117-590-29	4.74	LENNAR HOMES OF CA A CA CORP
117-590-30	4.74	LENNAR HOMES OF CA A CA CORP
117-590-31	4.74	LENNAR HOMES OF CA A CA CORP
117-590-32	4.74	LENNAR HOMES OF CA A CA CORP
117-590-33	4.74	LENNAR HOMES OF CA A CA CORP
117-590-34	4.74	LENNAR HOMES OF CA A CA CORP
117-590-35	4.74	LENNAR HOMES OF CA A CA CORP
117-590-36	4.74	LENNAR HOMES OF CA A CA CORP
117-590-37	4.74	LENNAR HOMES OF CA A CA CORP
117-590-38	4.74	LENNAR HOMES OF CA A CA CORP
117-590-39	4.74	LENNAR HOMES OF CA A CA CORP
117-590-40	4.74	LENNAR HOMES OF CA A CA CORP
117-590-41	4.74	LENNAR HOMES OF CA A CA CORP
117-590-42	4.74	LENNAR HOMES OF CA A CA CORP
117-590-43	4.74	LENNAR HOMES OF CA A CA CORP
117-590-44	4.74	LENNAR HOMES OF CA A CA CORP
117-590-45	4.74	LENNAR HOMES OF CA A CA CORP
117-590-46	4.74	LENNAR HOMES OF CA A CA CORP
117-590-47	4.74	LENNAR HOMES OF CA A CA CORP
117-590-48	4.74	LENNAR HOMES OF CA A CA CORP
117-590-49	4.74	LENNAR HOMES OF CA A CA CORP
117-590-50	4.74	LENNAR HOMES OF CA A CA CORP
117-590-51	4.74	LENNAR HOMES OF CA A CA CORP
117-600-01	4.74	LENNAR HOMES OF CA A CA CORP

APN	Asmt	Owner Name
117-600-02	$ 4.74	LENNAR HOMES OF CA A CA CORP
117-600-03	4.74	LENNAR HOMES OF CA A CA CORP
117-600-04	4.74	LENNAR HOMES OF CA A CA CORP
117-600-05	4.74	LENNAR HOMES OF CA A CA CORP
117-600-06	4.74	LENNAR HOMES OF CA A CA CORP
117-600-07	4.74	LENNAR HOMES OF CA A CA CORP
117-600-08	4.74	LENNAR HOMES OF CA A CA CORP
117-600-09	4.74	LENNAR HOMES OF CA A CA CORP
117-600-10	4.74	LENNAR HOMES OF CA A CA CORP
117-600-11	4.74	LENNAR HOMES OF CA A CA CORP
117-600-12	4.74	LENNAR HOMES OF CA A CA CORP
117-600-13	4.74	LENNAR HOMES OF CA A CA CORP
117-600-14	4.74	LENNAR HOMES OF CA A CA CORP
117-600-15	4.74	LENNAR HOMES OF CA A CA CORP
117-600-16	4.74	LENNAR HOMES OF CA A CA CORP
117-600-17	4.74	LENNAR HOMES OF CA A CA CORP
117-600-18	4.74	LENNAR HOMES OF CA A CA CORP
117-600-19	4.74	LENNAR HOMES OF CA A CA CORP
117-600-20	4.74	LENNAR HOMES OF CA A CA CORP
117-600-21	4.74	LENNAR HOMES OF CA A CA CORP
117-600-22	4.74	LENNAR HOMES OF CA A CA CORP
117-600-23	4.74	LENNAR HOMES OF CA A CA CORP
117-600-24	4.74	LENNAR HOMES OF CA A CA CORP
117-600-25	4.74	LENNAR HOMES OF CA A CA CORP
117-600-26	4.74	LENNAR HOMES OF CA A CA CORP
117-600-27	4.74	LENNAR HOMES OF CA A CA CORP
117-600-28	4.74	LENNAR HOMES OF CA A CA CORP
117-600-29	4.74	LENNAR HOMES OF CA A CA CORP
117-600-30	4.74	LENNAR HOMES OF CA A CA CORP
117-600-31	4.74	LENNAR HOMES OF CA A CA CORP
117-600-32	4.74	LENNAR HOMES OF CA A CA CORP
117-600-33	4.74	LENNAR HOMES OF CA A CA CORP
117-600-34	4.74	LENNAR HOMES OF CA A CA CORP
117-600-35	4.74	LENNAR HOMES OF CA A CA CORP
117-600-36	4.74	LENNAR HOMES OF CA A CA CORP
117-600-37	4.74	LENNAR HOMES OF CA A CA CORP
117-600-38	4.74	LENNAR HOMES OF CA A CA CORP
117-600-39	4.74	LENNAR HOMES OF CA A CA CORP
117-600-40	4.74	LENNAR HOMES OF CA A CA CORP
117-600-41	4.74	LENNAR HOMES OF CA A CA CORP

APN	Asmt	Owner Name
117-600-42	$ 4.74	LENNAR HOMES OF CA A CA CORP
117-600-43	4.74	LENNAR HOMES OF CA A CA CORP
117-600-44	4.74	LENNAR HOMES OF CA A CA CORP
117-600-45	4.74	LENNAR HOMES OF CA A CA CORP
117-600-46	4.74	LENNAR HOMES OF CA A CA CORP
117-600-47	4.74	LENNAR HOMES OF CA A CA CORP
117-600-48	4.74	LENNAR HOMES OF CA A CA CORP
117-600-49	4.74	LENNAR HOMES OF CA A CA CORP
117-600-50	4.74	LENNAR HOMES OF CA A CA CORP
117-600-51	4.74	LENNAR HOMES OF CA A CA CORP
117-600-52	4.74	LENNAR HOMES OF CA A CA CORP
117-600-53	4.74	LENNAR HOMES OF CA A CA CORP
117-600-54	4.74	LENNAR HOMES OF CA A CA CORP
117-600-55	4.74	LENNAR HOMES OF CA A CA CORP
117-600-56	4.74	LENNAR HOMES OF CA A CA CORP
117-600-57	4.74	LENNAR HOMES OF CA A CA CORP
117-600-58	4.74	LENNAR HOMES OF CA A CA CORP
117-600-59	4.74	LENNAR HOMES OF CA A CA CORP
117-600-60	4.74	LENNAR HOMES OF CA A CA CORP
117-600-61	4.74	LENNAR HOMES OF CA A CA CORP
117-600-62	4.74	LENNAR HOMES OF CA A CA CORP
117-600-63	4.74	LENNAR HOMES OF CA A CA CORP
117-600-64	4.74	LENNAR HOMES OF CA A CA CORP
117-600-65	4.74	LENNAR HOMES OF CA A CA CORP
117-600-66	4.74	LENNAR HOMES OF CA A CA CORP
117-600-67	4.74	LENNAR HOMES OF CA A CA CORP
117-600-68	4.74	LENNAR HOMES OF CA A CA CORP
117-600-69	4.74	LENNAR HOMES OF CA A CA CORP
117-600-70	4.74	LENNAR HOMES OF CA A CA CORP
117-600-71	4.74	LENNAR HOMES OF CA A CA CORP
117-600-72	4.74	LENNAR HOMES OF CA A CA CORP
117-600-73	4.74	LENNAR HOMES OF CA A CA CORP
117-600-74	4.74	LENNAR HOMES OF CA A CA CORP
117-600-75	4.74	LENNAR HOMES OF CA A CA CORP
117-600-76	4.74	LENNAR HOMES OF CA A CA CORP
117-600-77	4.74	LENNAR HOMES OF CA A CA CORP
117-600-78	4.74	LENNAR HOMES OF CA A CA CORP
117-600-79	4.74	LENNAR HOMES OF CA A CA CORP
117-600-80	4.74	LENNAR HOMES OF CA A CA CORP
117-600-81	4.74	LENNAR HOMES OF CA A CA CORP

APN	Asmt	Owner Name
117-600-82	$ 4.74	LENNAR HOMES OF CA A CA CORP
117-600-83	4.74	LENNAR HOMES OF CA A CA CORP
117-610-01	4.74	LENNAR HOMES OF CA A CA CORP
117-610-02	4.74	LENNAR HOMES OF CA A CA CORP
117-610-03	4.74	LENNAR HOMES OF CA A CA CORP
117-610-04	4.74	LENNAR HOMES OF CA A CA CORP
117-610-05	4.74	LENNAR HOMES OF CA A CA CORP
117-610-06	4.74	LENNAR HOMES OF CA A CA CORP
117-610-07	4.74	LENNAR HOMES OF CA A CA CORP
117-610-08	4.74	LENNAR HOMES OF CA A CA CORP
117-610-09	4.74	LENNAR HOMES OF CA A CA CORP
117-610-10	4.74	LENNAR HOMES OF CA A CA CORP
117-610-11	4.74	LENNAR HOMES OF CA A CA CORP
117-610-12	4.74	LENNAR HOMES OF CA A CA CORP
117-610-13	4.74	LENNAR HOMES OF CA A CA CORP
117-610-14	4.74	LENNAR HOMES OF CA A CA CORP
117-610-15	4.74	LENNAR HOMES OF CA A CA CORP
117-610-16	4.74	LENNAR HOMES OF CA A CA CORP
117-610-17	4.74	LENNAR HOMES OF CA A CA CORP
117-610-18	4.74	LENNAR HOMES OF CA A CA CORP
117-610-19	4.74	LENNAR HOMES OF CA A CA CORP
117-610-20	4.74	LENNAR HOMES OF CA A CA CORP
117-610-21	4.74	LENNAR HOMES OF CA A CA CORP
117-610-22	4.74	LENNAR HOMES OF CA A CA CORP
117-610-23	4.74	LENNAR HOMES OF CA A CA CORP
117-610-24	4.74	LENNAR HOMES OF CA A CA CORP
117-610-25	4.74	LENNAR HOMES OF CA A CA CORP
117-610-26	4.74	LENNAR HOMES OF CA A CA CORP
117-610-27	4.74	LENNAR HOMES OF CA A CA CORP
117-610-28	4.74	LENNAR HOMES OF CA A CA CORP
117-610-29	4.74	LENNAR HOMES OF CA A CA CORP
117-610-30	4.74	LENNAR HOMES OF CA A CA CORP
117-610-31	4.74	LENNAR HOMES OF CA A CA CORP
117-610-32	4.74	LENNAR HOMES OF CA A CA CORP
117-610-33	4.74	LENNAR HOMES OF CA A CA CORP
117-610-34	4.74	LENNAR HOMES OF CA A CA CORP
117-610-35	4.74	LENNAR HOMES OF CA A CA CORP
117-610-36	4.74	LENNAR HOMES OF CA A CA CORP
117-610-37	4.74	LENNAR HOMES OF CA A CA CORP
117-610-38	4.74	LENNAR HOMES OF CA A CA CORP

APN	Asmt	Owner Name
117-610-39	$ 4.74	LENNAR HOMES OF CA A CA CORP
117-610-40	4.74	LENNAR HOMES OF CA A CA CORP
117-610-41	4.74	LENNAR HOMES OF CA A CA CORP
117-610-42	4.74	LENNAR HOMES OF CA A CA CORP
117-610-43	4.74	LENNAR HOMES OF CA A CA CORP
117-610-44	4.74	LENNAR HOMES OF CA A CA CORP
117-610-45	4.74	LENNAR HOMES OF CA A CA CORP
117-610-46	4.74	LENNAR HOMES OF CA A CA CORP
117-610-47	4.74	LENNAR HOMES OF CA A CA CORP
TOTAL	**$1,010.82**	

The following parcels are not subject to assessment in accordance with the methodology outlined in the Engineer's Report. They are listed here in order to complete the inventory of lots listed and shown in the most recent title report issued by North American Title Company dated December 30, 2015 at 7:30am. This list also includes lots within the Zone of Benefit that are owned by certain public entities.

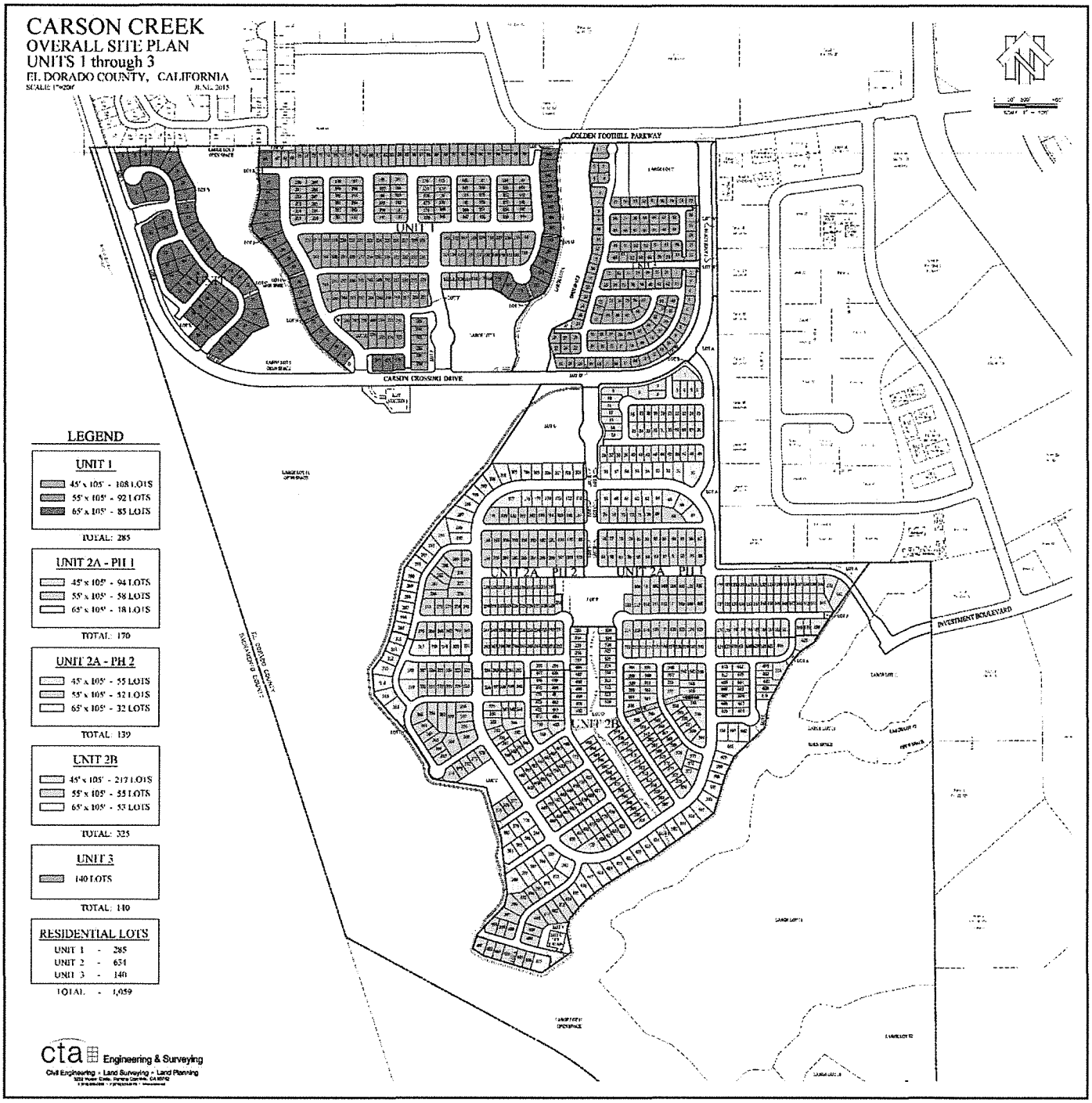
APN	Asmt	Owner Name
117-570-19	-	EL DORADO IRRIGATION DISTRICT
117-570-20	-	LENNAR HOMES OF CA A CA CORP
117-580-14	-	LENNAR HOMES OF CA A CA CORP
117-580-15	-	LENNAR HOMES OF CA A CA CORP
117-580-16	-	LENNAR HOMES OF CA A CA CORP
117-580-18	-	LENNAR HOMES OF CA A CA CORP
117-580-19	-	LENNAR HOMES OF CA A CA CORP
117-580-20	-	LENNAR HOMES OF CA A CA CORP
117-580-21	-	LENNAR HOMES OF CA A CA CORP
117-580-22	-	LENNAR HOMES OF CA A CA CORP
117-580-23	-	LENNAR HOMES OF CA A CA CORP
117-580-24	-	LENNAR HOMES OF CA A CA CORP
117-580-25	-	LENNAR HOMES OF CA A CA CORP
117-580-26	-	LENNAR HOMES OF CA A CA CORP
117-580-27	-	LENNAR HOMES OF CA A CA CORP
117-580-28	-	LENNAR HOMES OF CA A CA CORP

APN	Asmt	Owner Name
117-610-48	-	LENNAR HOMES OF CA A CA CORP
117-610-49	-	LENNAR HOMES OF CA A CA CORP
117-610-50	-	LENNAR HOMES OF CA A CA CORP
117-610-51	-	LENNAR HOMES OF CA A CA CORP
117-610-52	-	LENNAR HOMES OF CA A CA CORP
117-610-53	-	LENNAR HOMES OF CA A CA CORP

The following parcels are listed in the Title Report, but fall outside the boundaries of the Zone of Benefit: 117-570-10, 12 and 13, and 117-570-15 through 18, inclusive, and 117-580-13.

(THIS PAGE INTENTIONALLY LEFT BLANK.)

APPENDIX B – OVERALL SITE PLAN, UNITS 1 THROUGH 3



(THIS PAGE INTENTIONALLY LEFT BLANK.)

APPENDIX C – TRAFFIC STUDY

On the following pages is a copy of the June 7, 2012 Fehr and Peers memorandum, *Latrobe Road Connector Study – Alternatives Evaluation.*

FEHR & PEERS

MEMORANDUM

Date: June 7, 2012

To: El Dorado County Department of Transportation

Cc: Larry Ito, Ardor Consulting
Derek Minnema, Mark Thomas & Company

From: David B Robinson - Fehr & Peers
Kwasi Donkor - Fehr & Peers

Subject: Latrobe Road Connector Study – Alternatives Evaluation

RS06-2336

Fehr & Peers has completed a summary of transportation-related measures of effectiveness for the Latrobe Road Connector project Alternatives Evaluation Matrix. The measures presented in the matrix are based on previous analysis conducted for this project and are intended to help with the selection of a preferred alternative. The Latrobe Road Connector Study is required as a Condition of Approval (No. 27) of TM99-1359 for the West Valley Tentative Map, which is located in the Valley View Specific Plan.

This memorandum provides background on previous work completed for the Latrobe Road Connector Study and summarizes the model development; including refinements to the traffic analysis zones (TAZ), land use, and roadway network, and summarizes transportation-related performance measures of effectiveness.

BACKGROUND

The goal of the Latrobe Road Connector Study is to provide to El Dorado County a ranking of the four connection alternatives relative to their ability to provide acceptable level of service based on General Plan policy. As defined in Policy TC-Xd of the 2004 General Plan (Amended January 2009), LOS E or better is considered acceptable in the Community Regions, which includes the Latrobe Road/White Rock Road intersection. Therefore, LOS E will be used as an evaluation criterion for the four connection alternatives.

Previous Work Efforts

Under a separate work order, Fehr & Peers produced four technical memorandums between September 2006 and June 2007, covering the development of traffic volume forecast and operations analysis for the connector study.

Developed for the analysis of the General Plan, the 2004 El Dorado County General Plan Traffic Model was not used for the analysis of the Latrobe Road Connector Study, because it lacked sufficient detail in the study area and connectivity to developing areas in Sacramento County. The 2004 El Dorado General Plan model only includes roadways in El Dorado County with areas

2990 Lava Ridge Court, #200 Roseville, CA 95661 (916) 773-1900 Fax (916) 773-2015
www.fehrandpeers.com

outside the county represented by TAZs at the gateway roadways like US 50 and White Rock Road.

At that time, there were several travel demand forecasting models available to develop forecasts for the connector study. However, the variation in inputs resulted in large variation in forecasts in the study area. The available models included the following:

- 2004 El Dorado County General Plan Model
- SACOG's SACMET Regional Travel Demand Model
- Silva Valley Parkway Interchange Model
- Highway 50 Corridor Mobility Partnership Model

Based on County direction at the time, the traffic volume forecasts were developed using a modified version of the SACMET Regional Travel Demand Model. Consistent with California Transportation Commission (CTC) guidelines, sub-area refinements were made to the model to better reflect roadway network and TAZ detail in the study area and connectivity to areas in Sacramento County like the Folsom SOI amendment area and the planned US 50/Empire Ranch interchange.

August 2011, Initial Screening Memorandum

In August 2011 Fehr & Peers collaborated with Mark Thomas & Company to prepare an initial screening memorandum for the Latrobe Road Connector Study. The purpose of the initial screening memorandum was to narrow down 10 alternatives to four alternatives before performing focused traffic analysis. The following alternatives were chosen as part of that initial screening:

- Alternative 1
- Alternative 2
- Alternative 2A
- Alternative 5

The alternatives screening included the analysis of year 2032 AM and PM peak hour intersection operations at the Latrobe Road/White Rock Road intersection using the modified version of the SACMET Regional Travel Demand Model described above. This work effort was developed under a separate work order.

New Traffic Model Since 2007

Since 2007, another modified version of the SACMET Regional Travel Demand Model was developed for the analysis of the Capital Southeast Connector. Since this model was developed for a regional connector project, it reflects input from the JPA partners including the City of Elk Grove, Folsom, and Rancho Cordova, as well as El Dorado and Sacramento County. Consequently, County staff directed that the forecasts for the focused analysis of the four recommended alternatives be developed using the Capital Southeast Connector JPA model. While there is agreement on the regional-level model inputs, additional refinement in the study area is needed to match the scale of the analysis for the Latrobe Road Connector Study.

November 3, 2011 Meeting with El Dorado County

On November 3rd, Fehr & Peers attended a coordination meeting with El Dorado County to review the Capital Southeast Connector JPA model and receive direction on additional study area refinements. El Dorado County provided the following direction:

- Update the TAZs in the study area to match the recent traffic analysis zones developed by the county.
- Update the study area land use to match control totals from the 2004 El Dorado County General Plan. This is consistent with the intent of the condition of approval.
- Update the traffic model roadway network to be consistent with existing and planned roadways and the updated traffic analysis zone structure.

The evaluation of the four recommended alternatives was conducted using the year 2025 land use and roadway network inputs consistent with the 2004 El Dorado County General Plan.

Once the project moves into a project development and environmental documentation phase, additional analysis to demonstrate consistency with the El Dorado County General Plan will be performed as required by CEQA, using the analysis methods from the General Plan.

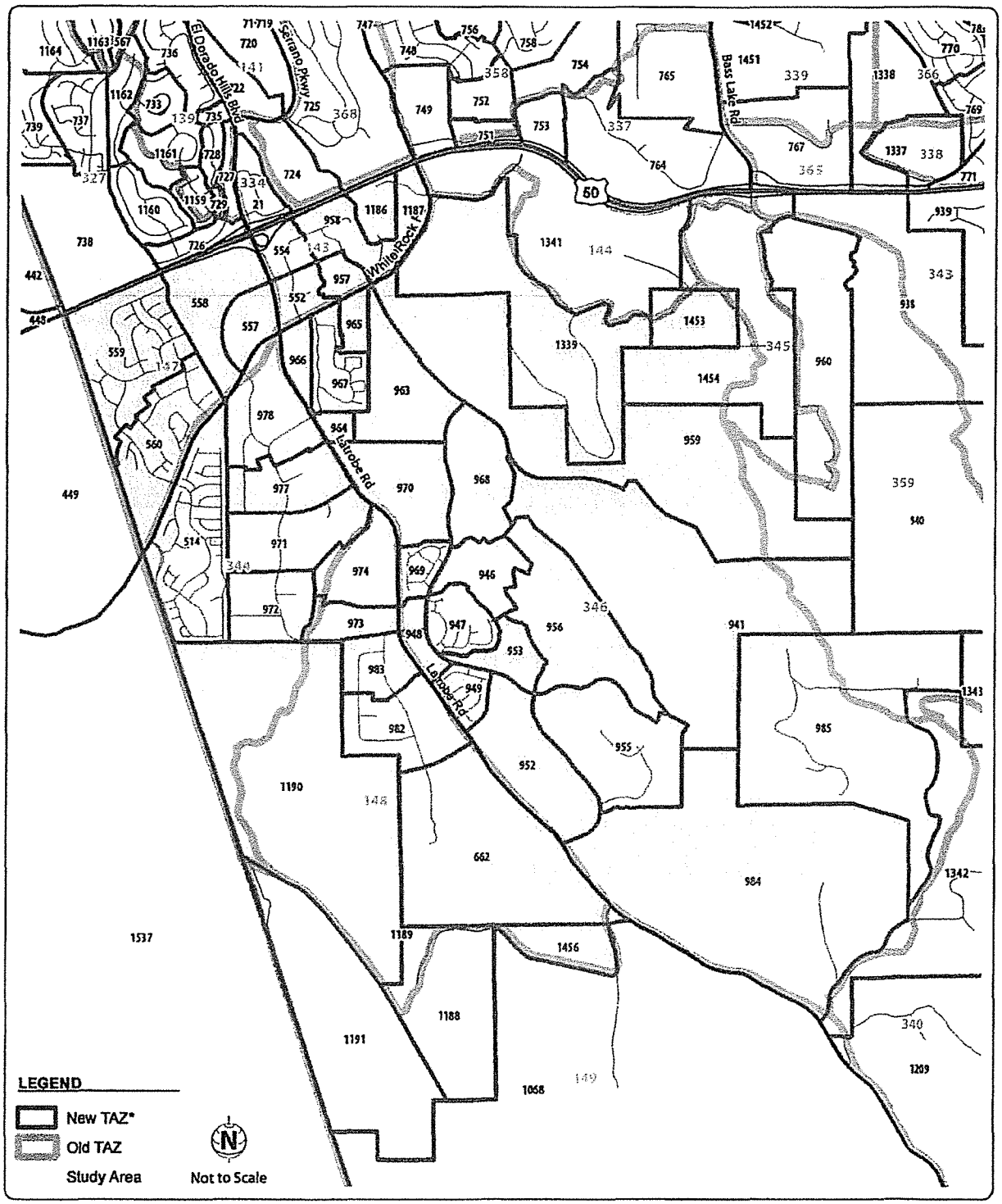
For clarity, the refined version of the Capital Southeast Connector JPA model is referred to as the Latrobe Road Connector Model. The following summarizes the development of the Latrobe Road Connector Model, including TAZ, land use, and roadway network refinements. The refinements outlined below are needed to provide sufficient detail in the study area to match the scale of the Latrobe Road connector project, which is a minor connection relative to the regional roadway system. However, additional TAZ and roadway network detail in the study area is necessary to develop accurate peak hour intersection turning movement forecasts.

TRAFFIC ANALYSIS ZONE REFINEMENTS

The first step in the development of the Latrobe Road Connector Model was to refine the study area TAZs. The study area, which is shown on Figure 1, is generally bounded by US 50 to the north, Wetsel-Oviatt Road to the south, Valley View Parkway/Blackstone Parkway to the east and future Empire Ranch Road to the west.

The study area was selected because it represents the land use and associated trips that will be affected by the Latrobe Road Connector.

The number of TAZs is increased from 5 to 39 in the study area compared to the 2004 General Plan Model with the refined TAZ system developed by El Dorado County. Figure 1 shows the updated TAZ system.



*New TAZs were created to refine input for the sub-area model. The New TAZs have not been adopted by El Dorado County.

FEHR & PEERS

Path: N:\2006Projects\2336_Latrobe_Road_Connector\GIS\StudyArea.mxd

UPDATED TRAFFIC ANALYSIS ZONES

FIGURE 1

LAND USE REFINEMENTS

The second step in the development of the Latrobe Road Connector Model was to refine the study area land use. The land use in the study area was modified to match the year 2025 control totals from the 2004 El Dorado County General Plan and disaggregated to the refined TAZs. The following tables are provided to illustrate the progression of the TAZ and land use refinement process from the 2004 El Dorado County General Plan model TAZ system and land use input categories to the refined Latrobe Road Connector Model TAZ system and land use categories.

- Table 1A – Summarizes 2025 General Plan Land Use allocated to the TAZs and land use categories used by the 2004 El Dorado County General Plan model.
- Table 2A – Summarizes 2025 General Plan Land Use allocated to the land use categories used by the 2004 El Dorado County General Plan, but disaggregated based on the refined TAZ system shown in Figure 1.

  NOTE: The land uses allocated to the refined TAZ system aggregate to the control totals for each of the 2004 El Dorado County General Plan model TAZs. For example, the subtotal for TAZ 346 (i.e., the "Old TAZ" column in the table) will match the total for TAZ 346 in Table 1A.
- Table 1B - Summarizes 2025 General Plan Land Use allocated to the TAZs used by the 2004 El Dorado County General Plan model, but disaggregated into the expanded land use categories used by the Latrobe Road Connector model.
- Table 2B – Summarizes the final 2025 General Plan Land Use allocated to the TAZs and land use categories used by the Latrobe Road Connector model. This includes refinements to the allocations based on existing and approved land uses in the study area.

  NOTE: While the land uses are allocated to the refined TAZ system, the overall control total (i.e., General Plan Land Use Control Totals) for the 2004 El Dorado County General Plan model is retained for major land use categories such as total residential dwelling units, retail employment, and non-retail employment. However, the subtotal allocations to the old TAZs may not be the same due to refinements made to reflect existing and planned development. For example, the subtotal for TAZ 344 (i.e., the "Old TAZ" column in the table) does not match the total for TAZ 344 in Table 1B due to these refinements.

The Latrobe Road Connector model based on the Table 2B inputs was used to develop traffic volume forecasts for the evaluation of traffic operations at the Latrobe Road/White Rock Road intersection with Alternatives 1, 2, 2A, and 5.

Table 1A
2025 General Plan Land Use (General Plan Model Land Use Categories)

TAZ	Residential [Dwelling Units]			Employment			
					Non-Retail		
	Total	Single Family	Multi-Family	Retail	Total	Service	Other
143	1	1	-	554	2,086	1,293	793
147	823	490	333	40	4,033	2,005	2,028
148	798	781	17	1,184	5,780	3,900	1,880
344	866	847	19	616	2,465	1,510	955
346	3,182	3,012	170	80	321	202	119
GP LU Control Totals	5,670	5,131	539	2,474	14,685	8,910	5,775

Source: Fehr & Peers, 2012

Table 1B
Consistent With 2025 General Plan Land Use (Latrobe Road Connector Model Land Use Categories)

TAZ	Residential [Dwelling Units]				Employment						Enrollment [Students]	
						Non-Retail						
	Total	Single Family	Multi-Family	Multi-Family (High)	Retail	Total	Office	Medical	Education	M & O	College	K-12
143	1	1	-	-	554	2,086	1,875	63	-	148	-	-
147	823	490	333	-	40	4,033	3,549	29	-	455	-	-
148	798	781	17	-	1,184	5,780	3,915	364	21	1,480	-	-
344	866	847	19	-	616	2,465	1,618	156	14	677	-	-
346	3,182	3,012	170	-	80	321	220	40	20	41	-	-
GP LU Control Totals	5,670	5,131	539	-	2,474	14,685	11,177	652	55	2,801	-	-

Source: Fehr & Peers, 2012
M&O - Manufacturing & Other
Note: For this study area, buildout of the 2004 General Plan included the following land use input assumpations:
6,084 Dwelling Units, 5,961 Retail Employees, and 29,824 Non-Retail Employees.

Table 2A
2025 General Plan Land Use (General Plan Model Land Use Categories_Allocation to New TAZ)

Old TAZ	Development in the TAZ	Category	New TAZ	Residential [Dwelling Units]			Employment			
				Total	Single Family	Multi-Family	Retail	Non-Retail		
								Total	Service	Other
143	R&D/Com	R&D/Com	1186	1	1	-	-	32	20	12
			1187	-	-	-	-	42	26	16
	Town Center	Commercial	552	-	-	-	73	750	465	285
			554	-	-	-	139	563	349	214
			957	-	-	-	277	251	156	95
			958	-	-	-	65	448	278	170
Subtotal				**1**	**1**	**-**	**554**	**2,086**	**1,293**	**793**
147	Town Center	R&D/Com	557	-	-	-	20	1,520	756	764
			558	-	-	-	20	2,513	1,249	1,264
	Stonebriar & MF	SF & MF	559	458	273	185	-	-	-	-
			560	365	217	148	-	-	-	-
Subtotal				**823**	**490**	**333**	**40**	**4,033**	**2,005**	**2,028**
148	Carson Creek	R&D/SF	1190 (Portion)	798	781	17	-	-	-	-
	EDHBP	Indust/Comm/ R&D	662	-	-	-	414	2,172	1,465	707
			973	-	-	-	237	744	502	242
			974	-	-	-	355	786	530	256
			982	-	-	-	118	1,053	710	343
			983	-	-	-	60	1,025	692	333
	Not EDHBP	Indust	1189	-	-	-	-	-	-	-
	Not EDHBP	RA-80/HS	1456	-	-	-	-	-	-	-
Subtotal				**798**	**781**	**17**	**1,184**	**5,780**	**3,900**	**1,880**
344	Four Season (Portion of 1190 Carson Creek)	SF	514	866	847	19	-	-	-	-
	EDHBP	Indust/Com/R&D	971	-	-	-	75	775	475	300
			972	-	-	-	102	162	99	63
			977	-	-	-	199	721	442	279
			978	-	-	-	240	807	494	313
Subtotal				**866**	**847**	**19**	**616**	**2,465**	**1,510**	**955**

Table 2A
2025 General Plan Land Use (General Plan Model Land Use Categories_Allocation to New TAZ)

Old TAZ	Development in the TAZ	Category	New TAZ	Residential [Dwelling Units]			Employment			
				Total	Single Family	Multi-Family	Retail	Non-Retail		
								Total	Service	Other
346	Valley View Specific Plan	Single Family	941	352	333	19	-	-	-	-
			946	64	61	3	-	-	-	-
			947	176	167	9	-	-	-	-
			949	105	99	6	-	-	-	-
			952	230	218	12	3	100	63	37
			955	345	327	18	-	-	-	-
			956	228	216	12	-	-	-	-
			959	300	284	16	-	-	-	-
			968	111	105	6	-	-	-	-
			969	107	101	6	-	-	-	-
			1453	8	8	0	-	-	-	-
			1454	66	62	4	-	-	-	-
		SF/Com	948	80	76	4	36	80	50	30
		School	953	-	-	-	-	20	13	7
		MF/MOS	963	668	632	36	-	-	-	-
	Trailor Park/Creekside Greens/U Haul	Mobile Homes	965	131	124	7	-	-	-	-
		SF	967	174	165	9	-	-	-	-
		U-Haul	964	-	-	-	-	10	6	4
	Corner Comm	Com.	966	-	-	-	41	81	51	30
	Deer Creek	SF 10/40 acre	984	-	-	-	-	-	-	-
			985	37	35	2	-	-	-	-
	EID	WW Plant	970	-	-	-	-	30	19	11
	Remainder	Does not Access WRR	1339	-	-	-	-	-	-	-
	Unknown		1342	-	-	-	-	-	-	-
Subtotal				**3,182**	**3,012**	**170**	**80**	**321**	**202**	**119**
GP LU Control Totals				**5,670**	**5,131**	**539**	**2,474**	**14,685**	**8,910**	**5,775**

Source: Fehr & Peers, 2012

Table 2B
Consistent With 2025 General Plan Land Use (Latrobe Road Connector Model Land Use Categories_Allocation to New TAZ)

Old TAZ	Development in the TAZ	Category	Existing & Approved Allocations	New TAZ	Residential				Employment						Enrollment [Students]	
					Total	Single Family	Multi-Family	Multi-Family (High)	Retail	Non-Retail Total	Non-Retail Office	Non-Retail Medical	Non-Retail Education	Non-Retail Manufacturing Other	College	K-12
143	R&D/Com	R&D/Com	1 sf/R&D/Com	1186	1	1	-	-	-	32	29	1	-	2	-	-
			R&D/Com	1187	-	-	-	-	-	42	38	1	-	3	-	-
	Town Center	Commercial		552	-	-	-	-	73	750	674	23	-	53	-	-
				554	-	-	-	-	139	563	506	17	-	40	-	-
				957	-	-	-	-	277	251	226	8	-	18	-	-
				958	-	-	-	-	65	448	403	14	-	32	-	-
Subtotal					1	1	-	-	554	2,086	1,875	63	-	148	-	-
147	Town Center	R&D/Com		557	-	-	-	-	20	1,520	1,338	11	-	171	-	-
				558	-	-	-	-	20	2,513	2,211	18	-	283	-	-
	Stonebriar & MF	SF & MF	350 sf/23 acres mf assign 365 mf units here	559	350	350	-	-	-	-	-	-	-	-	-	-
				560	365	-	365	-	-	-	-	-	-	-	-	-
Subtotal					715	350	365	-	40	4,033	3,549	29	-	455	-	-
148	Carson Creek	R&D/SF	1249 sf/ 40,000 sq ft Community Center/ 3.3 Parks/59.7 Indust/34.4 acre R&D/30 acre park	1190	1,249	1,249	-	-	-	1,801	1,220	113	6	461	-	-
	EDHBP	Indust/Comm/R&D	Per GP policy TC-1y 10,045 full time employee cap in the EDHBp	662	-	-	-	-	414	1,375	931	87	5	352	-	-
				973	-	-	-	-	237	471	319	30	2	121	-	-
				974	-	-	-	-	355	497	337	31	2	127	-	-
				982	-	-	-	-	118	666	451	42	2	171	-	-
				983	-	-	-	-	60	649	440	41	2	166	-	-
	Not EDHBP	Indust		1189	-	-	-	-	-	-	-	-	-	-	-	-
	Not EDHBP	RA-80/HS		1456	-	-	-	-	-	321	-	-	321	-	-	3,048
Subtotal					1,249	1,249	-	-	1,184	5,780	3,697	344	341	1,398	-	3,048
344	Four Season	SF	460 sf/4.6 acres comm/20,000 sf Community Center	514	450	450	10	-	40	40	30	10	0	-	-	-
	EDHBP	Indust/Com/R&D	Per GP policy TC-1y 10,045 full time employee cap in the EDHBp	971	-	-	-	-	75	775	509	49	4	213	-	-
				972	-	-	-	-	102	162	106	10	1	44	-	-
				977	-	-	-	-	199	721	473	46	4	198	-	-
				978	-	-	-	-	200	767	503	49	4	211	-	-
Subtotal					450	450	10	-	616	2,465	1,622	164	14	666	-	-

Table 2B
Consistent With 2025 General Plan Land Use (Latrobe Road Connector Model Land Use Categories_Allocation to New TAZ)

Old TAZ	Development in the TAZ	Category	Existing & Approved Allocations	New TAZ	Residential				Employment						Enrollment [Students]	
										Non-Retail							
					Total	Single Family	Multi-Family	Multi-Family (High)	Retail	Total	Office	Medical	Education	Manufacturing Other	College	K-12
346	Valley View Specific Plan	Single Family	+/-352 sf	941	352	352	-	-	-	-	-	-	-	-	-	-
			64 sf	946	64	64	-	-	-	-	-	-	-	-	-	-
			176 sf/rec	947	176	176	-	-	-	-	-	-	-	-	-	-
			105 sf	949	105	105	-	-	-	-	-	-	-	-	-	-
			118 sf/112 live work	952	230	230	-	-	3	100	69	12	6	13	-	-
			345 sf	955	345	345	-	-	-	-	-	-	-	-	-	-
			228 sf	956	228	228	-	-	-	-	-	-	-	-	-	-
			+/-300 sf	959	300	300	-	-	-	-	-	-	-	-	-	-
			111 sf	988	111	111	-	-	-	-	-	-	-	-	-	-
			107 sf	969	107	107	-	-	-	-	-	-	-	-	-	-
			+/-8 sf	1453	8	8	-	-	-	-	-	-	-	-	-	-
			+/-66 sf	1454	66	66	-	-	-	-	-	-	-	-	-	-
		SF/Com	80sf/+/-12 acre comm	948	80	80	-	-	36	60	55	10	5	10	-	-
		School	school	953	-	-	-	-	-	20	-	-	20	-	-	600
		MF/MOS	668mf/mos	963	668	-	668	-	-	-	-	-	-	-	-	-
	Trailor Park/Creekside Greens/U Haul	Mobile Homes	131 units	965	131	-	131	-	-	-	-	-	-	-	-	-
		SF	174 sf	967	174	174	-	-	-	-	-	-	-	-	-	-
		U-Haul	U-haul	964	-	-	-	-	-	10	7	1	1	1	-	-
	Corner Comm	Com.	com	966	-	-	-	-	41	81	56	10	5	10	-	-
	Deer Creek	SF 10/40 acre	60 sf	984	60	60	-	-	-	-	-	-	-	-	-	-
			41 sf	985	40	40	-	-	-	-	-	-	-	-	-	-
	EID	WW Plant	WW plant	970	-	-	-	-	-	30	21	4	2	4	-	-
	Remainder	Does not Access WRR	?	1339	-	-	-	-	-	-	-	-	-	-	-	-
	Unknown		?	1342	-	-	-	-	-	-	-	-	-	-	-	-
			Subtotal		3,245	2,446	799	-	80	321	206	38	39	38	-	600
			GP LU Control Totals		5,670	4,496	1,174	0	2,474	14,685	10,949	637	393	2,705	0	3,648

Source: Fehr & Peers, 2012

ROADWAY NETWORK REFINEMENTS

The final step in the development of the Latrobe Road Connector Model was to refine the study area roadway network.

Fehr & Peers refined the roadway network based on current mapping of the existing roadways in the study area and approved planned roadways in the study area. The roadway lane assumptions are consistent with the year 2025 circulation element of 2004 El Dorado County General Plan. The roadway network also includes the planned US 50/Empire Ranch Interchange in Sacramento County.

Another important refinement was to provide accurate loading of the TAZs to the roadway network so that the distribution of trips in the study area is accurate and reflects planned site-specific development access assumptions. For example, the trips generated by development in the Marble Valley area will not have access to Latrobe Road. Likewise, trips generated by development in the Valley View area will not have access to Bass Lake Road. These types of access issues occurred with the large TAZ size of the 2004 El Dorado County General Plan model.

To illustrate the level of detail added to the network, roadway lane miles in the study area, which are the number of directional travel lanes multiplied by the network distance (in miles), were increased from about 42 miles in the 2004 El Dorado County General Plan model to about 56 miles in the refined Latrobe Road Connector model.

Figure 2 shows the roadway network from the 2004 El Dorado County General Plan model. Figure 3 shows the updated roadway network developed for the Latrobe Road Connector model. Alternative-specific roadway networks were developed for the four alternatives screened for focused evaluation.

TRAFFIC VOLUME FORECASTS FOR ANALYSIS

Fehr & Peers refined the Latrobe Road Connector model to develop traffic volume forecast for the evaluation of the Latrobe Road Connector Alternatives. Table 3 compares daily roadway segment traffic volumes (two-way total) for the no project and project alternatives.

Table 3
Year 2025 Daily Traffic Volume Forecasts - Latrobe Road Connector Alternatives

Roadway	Segment	Alternative				
		No Project	1	2	2A	5
White Rock Road	West of Latrobe Road	19,100	14,000	15,300	14,000	15,100
	East of Latrobe Road	21,400	22,200	22,700	22,300	22,000
Latrobe Road	North of White Rock Road	48,200	40,300	41,000	39,200	34,700
	South of White Rock Road	48,500	36,700	38,300	35,600	30,100
Connector	East of White Rock Road	-	22,400	19,200	23,700	30,400

Source: Fehr & Peers, 2012

As shown in Table 3, daily traffic volumes would decrease on most of the roadway segment in Table 3 compared to the No Project alternative. The daily traffic volume on the segment of White Rock Road east of Latrobe Road would increase with all of the alternatives. The traffic volume forecasts for the connector are shown just east of White Rock Road and are generally highest in this location. The traffic volumes vary due to the location of the connection to Latrobe Road and whether they include a connection to Golden Foothill Parkway.

All of the connector alternatives improve accessibility for development south of White Rock Road to White Rock Road (to the west) and US 50 by way of the planned Empire Ranch interchange.

The traffic volume forecasts presented in Table 3 have been adjusted using the difference method approach, which adds the growth between the base and future year model to existing counts. Attachment A includes traffic model network plots showing daily traffic volume forecasts (two-way total) on study area roadway. Please note that these plots have not been adjusted, so there will be differences when comparing the volumes in Table 3 to the plots. However, the plots are useful for comparing the change in traffic flow in the study area between the alternatives, and were not used in the analysis.

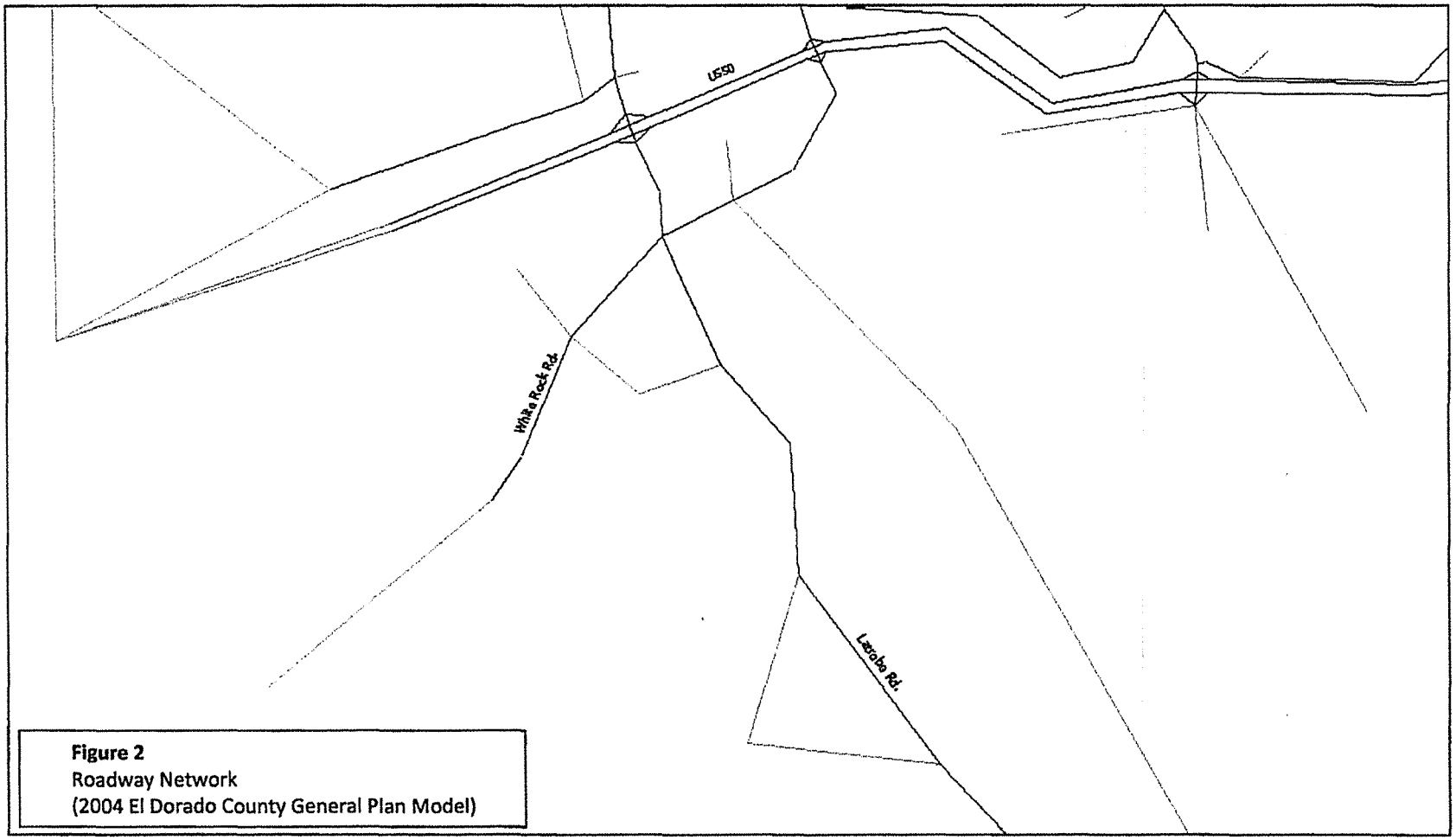


Figure 2
Roadway Network
(2004 El Dorado County General Plan Model)

Figure 3
Roadway Network
(Latrobe Road Connector Model)

ALTERNATIVES EVALUATION

The alternatives were evaluated against transportation criteria related to traffic operations at the White Rock Road/Latrobe Road intersection and consistency with the Sacramento County General Plan and the Folsom Sphere of Influence (SOI). This memorandum describes these criteria and the assumptions and methodology used to complete the Alternatives Evaluation Matrix as shown in Attachment B.

White Rock Road/Latrobe Road Intersection Fix (Yes/No)

White Rock Road/Latrobe Road Intersection Fix – this criterion identifies if the subject alternative improves traffic operations at the White Rock Road/Latrobe Road intersection compared to the No Project alternative. "Yes" was assigned for improved traffic operations (i.e., during the AM and PM peak hour). If only one peak hour was improved, "No" was assigned.

Consistent with Sacramento County GP (Yes/No)

Consistent with Sacramento County GP – this criterion identifies if the subject alternative is consistent with the Sacramento County General Plan circulation map (see attachment), which includes an arterial roadway connection between the planned Empire Ranch interchange on U.S. 50 and White Rock Road. Therefore, an alternative was considered to be consistent (i.e., assigned "Yes") if it had a similar roadway connection to the Empire Ranch interchange. Alternatives with the Payen Road connection were listed as not consistent (i.e., assigned "No"), since the Sacramento County General plan does not identify improvements to Payen Road.

Consistent with Folsom SOI (Yes/No)

Consistent with Folsom SOI - this criterion identifies if the subject alternative is consistent with the Folsom SOI Cumulative Plus Project circulation map or the Cumulative Plus Project With Mitigation circulation map. The Cumulative Plus Project circulation map includes an arterial roadway connection between Latrobe Road and White Rock Road. The Cumulative Plus Project With Mitigation circulation map includes an arterial roadway connection between White Rock Road and the planned Empire Ranch Road interchange on U.S. 50. Therefore, an alternative was considered to be consistent with the Cumulative Plus Project circulation map (i.e., assigned "Yes") if it had a similar roadway connection between Latrobe Road and White Rock Road and was considered to be consistent with the Cumulative Plus Project With Mitigation circulation map if it had a similar roadway connection from White Rock Road to the Empire Ranch interchange.

White Rock Road/Latrobe Road Intersection LOS at 2025

As defined in Policy TC-Xd of the 2004 General Plan (Amended January 2009), LOS E or better is considered acceptable in the Community Regions, which includes the Latrobe Road/White Rock Road intersection. Therefore, LOS E will be used as an evaluation criterion for the four connection alternatives.

White Rock Road/Latrobe Road Intersection LOS at 2025 – this criterion identifies the subject alternative LOS at the White Rock Road/Latrobe Road intersection under 2025 conditions. LOS is given for the ultimate lane configurations. With the No Project alternative, the White Rock Road/Latrobe Road intersection will operate at LOS E (nearly LOS F), which as described in the background is acceptable. **A three percent increase in volume through the intersection, or about two years of growth (i.e., 2027 conditions), would result in LOS F operations.** All of the alternatives would improve operations at the White Rock Road/Latrobe Road intersection compared to no project conditions.

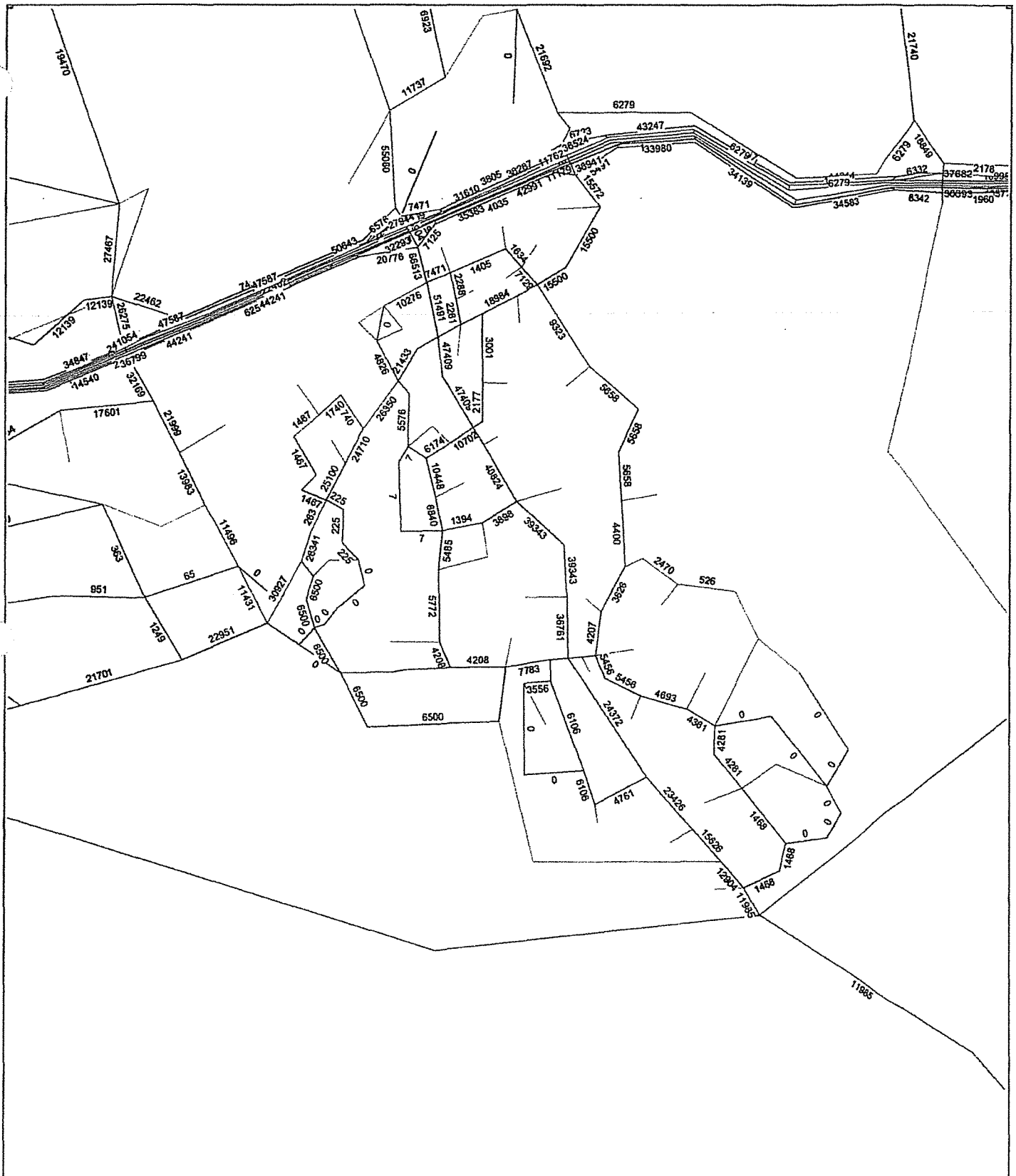
We used a similar approach to evaluate how long the White Rock Road/Latrobe Road intersection would continue to provide acceptable operations with the Latrobe Road connector. For this evaluation, we used the Alternative 2 traffic, because it resulted in the lowest delay at the intersection. A 30 percent increase in volume through the intersection would result in LOS F operations, which would be about 20 years of growth, representing conditions through 2045, assuming annual regional growth projections.

Detailed AM and PM peak hour intersection operations analysis is included in Attachment C

We look forward to further coordination. Please contact David Robinson at (916) 773-1900 if you have any questions.

Attachment A

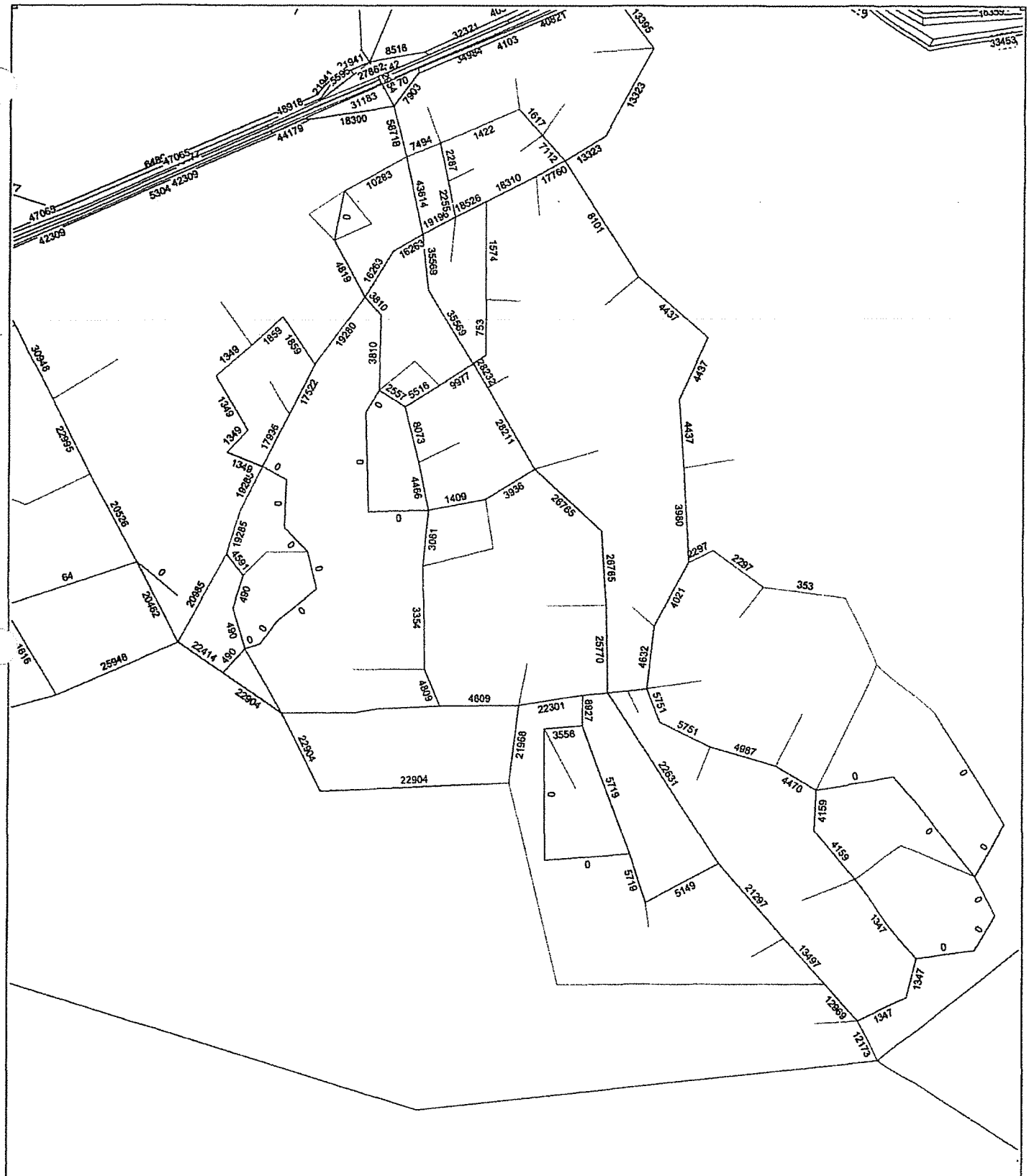
Traffic Model Plots



Latrobe Road Connector
2025 Daily Traffic Volumes (Two-Way Total)
No Project

cube

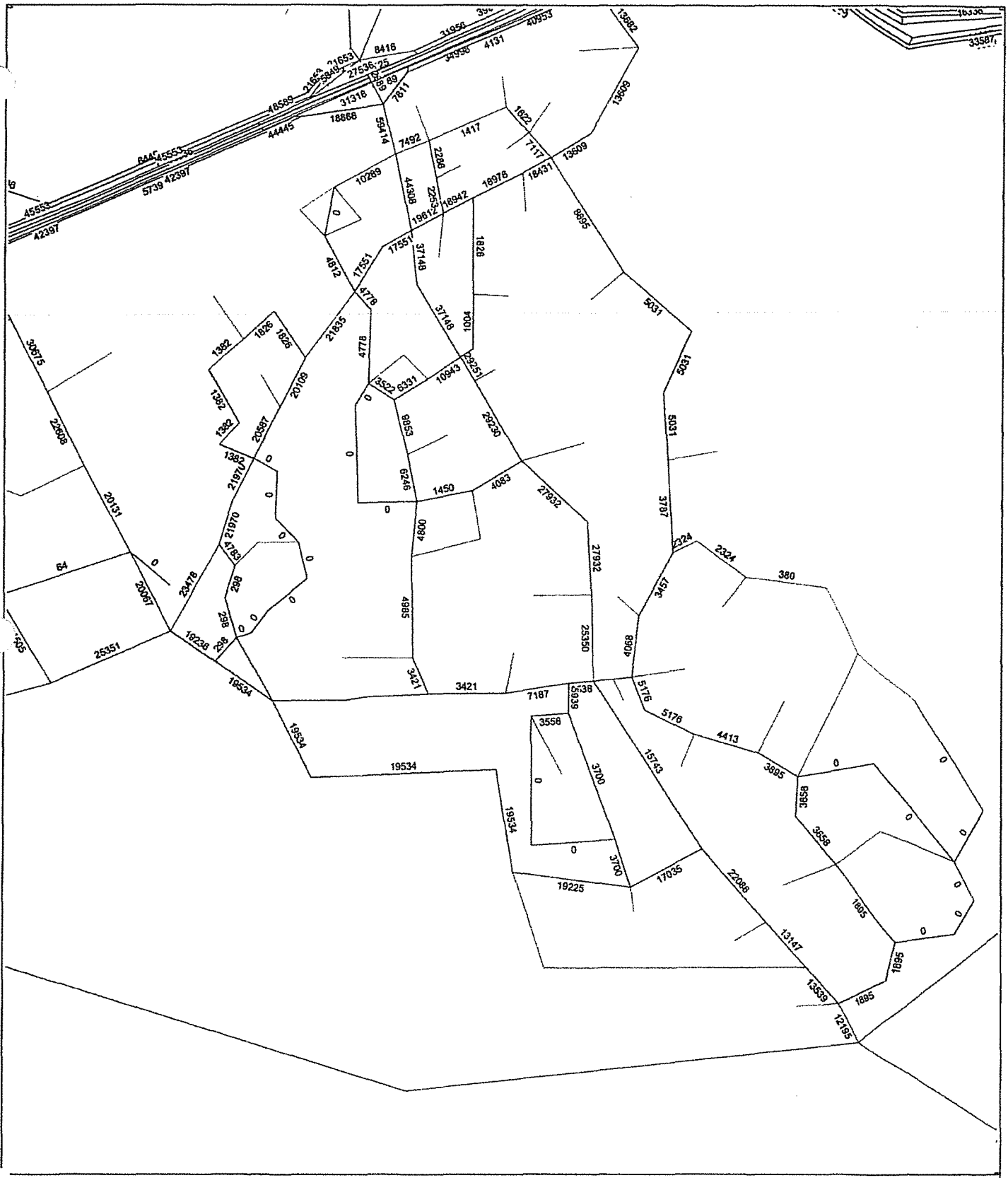
Licensed to Fehr & Peers



Latrobe Road Connector
2025 Daily Traffic Volumes (Two-Way Total)
Alternative 1

cube

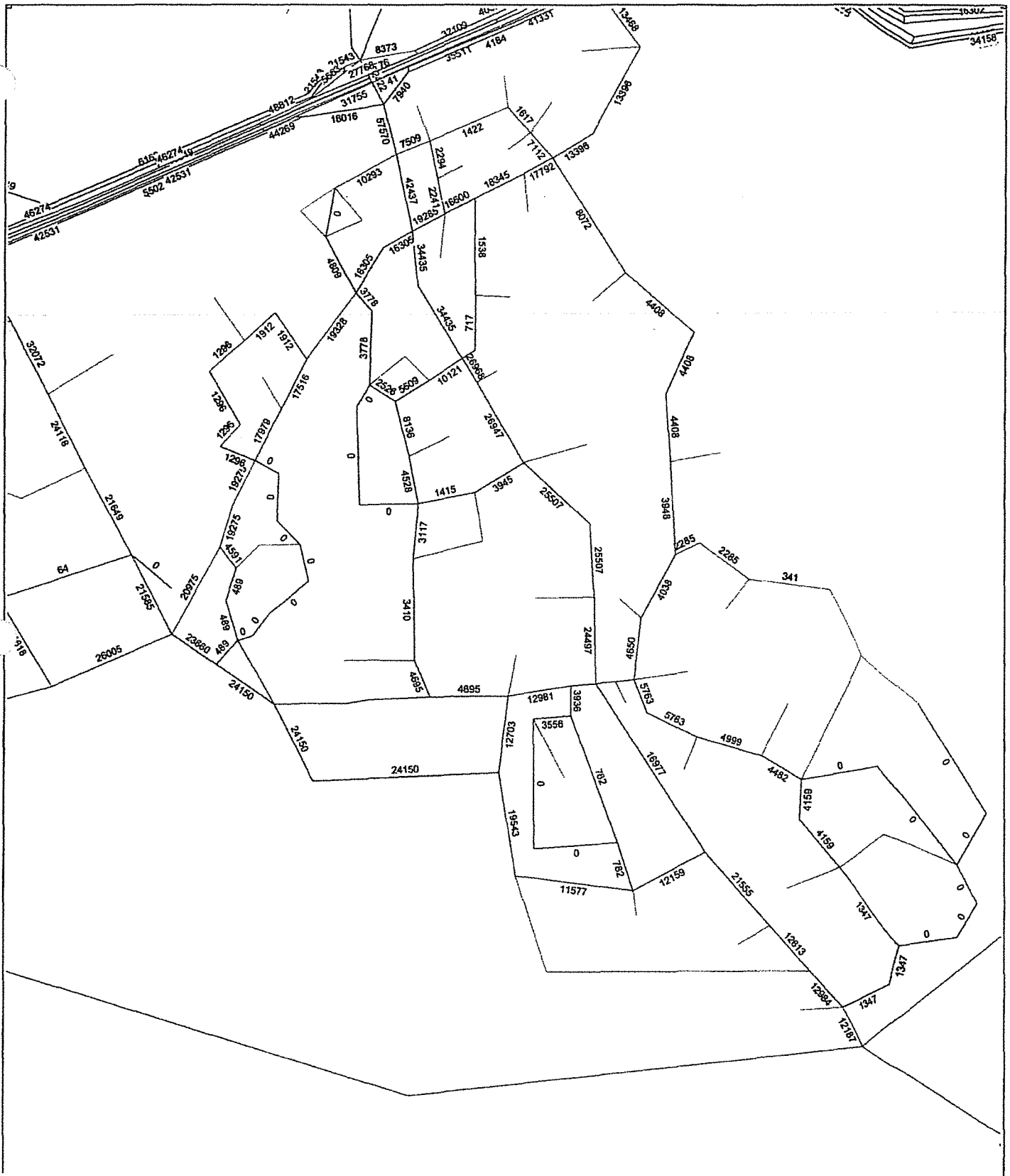
Licensed to Fehr & Peers



Latrobe Road Connector
2025 Daily Traffic Volumes (Two-Way Total)
Alternative 2

cube

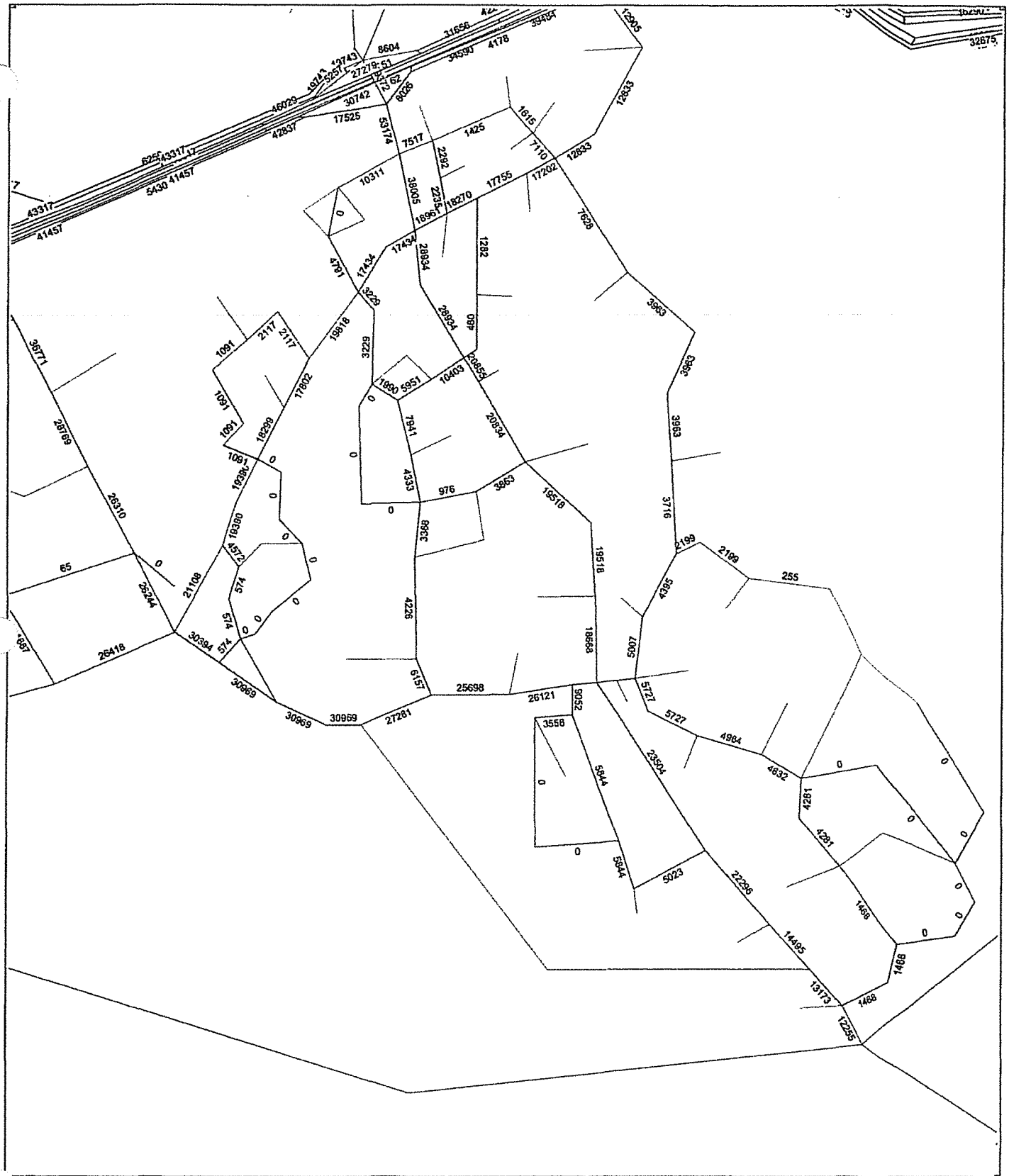
Licensed to Fehr & Peers



Latrobe Road Connector
2025 Daily Traffic Volumes (Two-Way Total)
Alternative 2A

cube

Licensed to Fehr & Peers



Latrobe Road Connector
2025 Daily Traffic Volumes (Two-Way Total)
Alternative 5

cube

Licensed to Fehr & Peers

Attachment B

Alternatives Evaluation Matrix

Alternative #	Description/Notes	CRITICAL					
		White Rock/Latrobe Road Intersection Fix	Consistent with Sacramento County GP[1]	Consistent with Folsom SOI[2]	White Rock/Latrobe Road Intersection LOS at 2025		
		Yes - No	Yes - No	Yes - No	Ultimate Lane Configurations[3]	Comments	Rating
No Project	It is assumed that White Rock Road is six lanes in Sacramento County, transitions to four lanes in El Dorado County, and is six lanes east of Latrobe Road.	No	N/A	N/A	74 - E (39 - D)		
Alternative 1	It is assumed that White Rock Road is six lanes in Sacramento County, transitions to four lanes in El Dorado County, and is six lanes east of Latrobe Road. Consists of a four (4) lane Carson Crossing Drive connection from White Rock Road to Golden Foothill Parkway. Carson Crossing Drive would cross into Sacramento County west of the intersection of existing Four Seasons Drive. Assumes an existing four (4) to six (6) lane Empire Ranch Road connection to the Empire Ranch Interchange and a six (6) lane White Rock Road at the connector intersection (i.e., widening at the intersection).	Yes	Yes	Yes	52 - D (33 - C)	The No Project operates near LOS F. A three percent increase in volume through the intersection, or about two years of growth (i.e., 2027 conditions), would result in LOS F operations. Ultimate Lane Configurations: NB - One left-turn lane, four through lanes, and a right-turn lane. SB - Two left-turn lanes, three through lanes, and a right-turn lane. EB - Two left-turn lanes, two through lane, and a right-turn lane. WB - Two left-turn lanes, two through lanes, and a right-turn lane. The White Rock Road/Latrobe Road intersection would continue to provide acceptable operations with the Latrobe Road connector with a 30 percent increase in volume through the intersection, which would be about 20 years of growth (i.e., 2045 conditions) assuming annual regional growth projections.	
Alternative 2	It is assumed that White Rock Road is six lanes in Sacramento County, transitions to four lanes in El Dorado County, and is six lanes east of Latrobe Road. Consists of a four (4) lane Carson Crossing Drive connection from White Rock Road to the existing Investment Boulevard. Existing Investment Boulevard currently connects to existing Latrobe Road. Carson Crossing Drive would cross into Sacramento County west of the intersection of existing Four Seasons Drive. Assumes an existing four (4) to six (6) lane Empire Ranch Road connection to the Empire Ranch Interchange and a six (6) lane White Rock Road at the connector intersection (i.e., widening at the intersection).	Yes	Yes	Yes	44 - D (30 - C)		
Alternative 2A	It is assumed that White Rock Road is six lanes in Sacramento County, transitions to four lanes in El Dorado County, and is six lanes east of Latrobe Road. Consists of a four (4) lane Carson Crossing Drive connection from White Rock Road to a proposed intersection located within the Carson Creek Specific Plan where the four (4) lanes would intersect at a two (2) lane Golden Foothill Parkway connection and a two (2) lane extension of existing Investment Boulevard (connecting to Latrobe Road). Carson Crossing Drive would cross into Sacramento County west of the intersection of existing Four Seasons Drive. Assumes an existing four (4) to six (6) lane Empire Ranch Road connection to the Empire Ranch Interchange and a six (6) lane White Rock Road at the connector intersection (i.e., widening at the intersection).	Yes	Yes	Yes	46 - D (33 - C)		
Alternative 5	It is assumed that White Rock Road is six lanes in Sacramento County, transitions to four lanes in El Dorado County, and is six lanes east of Latrobe Road. Consists of a four (4) lane Carson Crossing Drive connection to from White Rock Road to Golden Foothill Parkway. Carson Crossing Drive would cross into Sacramento County west of the intersection of existing Four Seasons Drive. This is similar to Alternative 1 with the exception Carson Crossing Drive would be located along the southern boundary of the existing Four Seasons age restricted subdivision where it will connect to existing Golden Foothills Parkway, a tee intersection would be proposed and existing Golden Foothill Parkway would be become a four (4) lane roadway. Assumes an existing four (4) to six (6) lane Empire Ranch Road connection to the Empire Ranch Interchange and a six (6) lane White Rock Road at the connector intersection (i.e., widening at the intersection).	Yes	Yes	Yes	46 - D (32 - C)		

Notes:
1. Consistency with the Sacramento County General Plan was determined to exist if there was a road connection to Empire Ranch Road only.
2. Consistency with Folsom SOI Plus Project alternative was determined to exist if there was a road connection between Latrobe Road and White Rock Road not connected to an extension to the Empire Ranch interchange.
   Consistency with Folsom SOI Mitigation alternative was determined to exist if there was a road connection between Latrobe Road and White Rock Road that extended to the Empire Ranch interchange.
3. XX - X = Delay - LOS; XX (XX)= AM Peak Hour (PM Peak Hour)

FEHR & PEERS

Attachment B

Intersection LOS Analysis Worksheets

1: White Rock Road/Latrobe Road & No Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	470	230	200	270	770	250	300	1250	120	170	1620	360
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	250	217	293	837	272	326	1359	130	185	1761	391
RTOR Reduction (vph)	0	0	148	0	0	141	0	0	80	0	0	140
Lane Group Flow (vph)	511	250	69	293	837	131	326	1359	50	185	1761	251
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	15.1	41.3	41.3	13.1	39.3	39.3	18.1	51.8	51.8	11.5	45.2	45.2
Effective Green, g (s)	15.1	41.3	41.3	13.1	39.3	39.3	18.1	51.8	51.8	11.5	45.2	45.2
Actuated g/C Ratio	0.11	0.31	0.31	0.10	0.29	0.29	0.14	0.39	0.39	0.09	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	388	1093	489	336	1040	465	240	2483	613	295	1719	535
v/s Ratio Prot	c0.15	0.07		0.09	c0.24		c0.18	0.21		0.05	c0.35	
v/s Ratio Perm			0.04			0.08			0.03			0.16
v/c Ratio	1.32	0.23	0.14	0.87	0.80	0.28	1.36	0.55	0.08	0.63	1.02	0.47
Uniform Delay, d1	59.3	34.4	33.4	59.5	43.7	36.3	57.8	31.8	25.9	59.0	44.2	34.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	159.9	0.1	0.1	21.1	4.6	0.3	185.9	0.9	0.3	4.1	28.1	2.9
Delay (s)	219.2	34.5	33.5	80.6	48.3	36.7	243.7	32.7	26.2	63.2	72.4	37.7
Level of Service	F	C	C	F	D	D	F	C	C	E	E	D
Approach Delay (s)		130.8			52.8			70.1			65.9	
Approach LOS		F			D			E			E	

Intersection Summary			
HCM Average Control Delay	74.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	133.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	95.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

2: White Rock Road/Latrobe Road & Alternative 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	560	180	50	460	710	230	70	880	130	230	1200	420
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	609	196	54	500	772	250	76	957	141	250	1304	457
RTOR Reduction (vph)	0	0	38	0	0	87	0	0	92	0	0	208
Lane Group Flow (vph)	609	196	16	500	772	163	76	957	49	250	1304	249
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	19.2	34.5	34.5	19.2	34.5	34.5	7.1	41.4	41.4	8.1	42.4	42.4
Effective Green, g (s)	19.2	34.5	34.5	19.2	34.5	34.5	7.1	41.4	41.4	8.1	42.4	42.4
Actuated g/C Ratio	0.16	0.29	0.29	0.16	0.29	0.29	0.06	0.35	0.35	0.07	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	553	1024	458	553	1024	458	105	2226	550	233	1809	563
v/s Ratio Prot	c0.18	0.06		0.15	c0.22		0.04	0.15		c0.07	c0.26	
v/s Ratio Perm			0.01			0.10			0.03			0.16
v/c Ratio	1.10	0.19	0.03	0.90	0.75	0.36	0.72	0.43	0.09	1.07	0.72	0.44
Uniform Delay, d1	50.0	31.9	30.4	49.1	38.5	33.6	55.1	29.8	26.2	55.6	33.3	29.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	69.0	0.1	0.0	18.2	3.2	0.5	21.7	0.6	0.3	79.7	2.5	2.5
Delay (s)	119.0	31.9	30.4	67.2	41.7	34.0	76.8	30.5	26.5	135.2	35.8	31.9
Level of Service	F	C	C	E	D	C	E	C	C	F	D	C
Approach Delay (s)		93.5			48.8			33.0			47.3	
Approach LOS		F			D			C			D	

Intersection Summary			
HCM Average Control Delay	51.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	119.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

3: White Rock Road/Latrobe Road & Alternative 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	530	200	90	430	720	230	90	970	130	230	1230	440
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	576	217	98	467	783	250	98	1054	141	250	1337	478
RTOR Reduction (vph)	0	0	69	0	0	95	0	0	79	0	0	212
Lane Group Flow (vph)	576	217	29	467	783	155	98	1054	62	250	1337	266
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	19.4	33.8	33.8	19.4	33.8	33.8	8.2	36.6	36.6	9.2	37.6	37.6
Effective Green, g (s)	19.4	33.8	33.8	19.4	33.8	33.8	8.2	36.6	36.6	9.2	37.6	37.6
Actuated g/C Ratio	0.17	0.29	0.29	0.17	0.29	0.29	0.07	0.32	0.32	0.08	0.33	0.33
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	579	1040	465	579	1040	465	126	2039	504	275	1663	518
v/s Ratio Prot	c0.17	0.06		0.14	c0.22		0.06	0.16		c0.07	c0.26	
v/s Ratio Perm			0.02			0.10			0.04			0.17
v/c Ratio	0.99	0.21	0.06	0.81	0.75	0.33	0.78	0.52	0.12	0.91	0.80	0.51
Uniform Delay, d1	47.7	30.5	29.2	46.0	36.8	31.8	52.5	32.0	27.8	52.5	35.3	31.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	35.9	0.1	0.1	8.1	3.1	0.4	25.4	0.2	0.1	31.2	2.9	0.9
Delay (s)	83.6	30.6	29.3	54.1	39.9	32.2	77.9	32.2	27.9	83.7	38.3	32.2
Level of Service	F	C	C	D	D	C	E	C	C	F	D	C
Approach Delay (s)		64.7			43.0			35.2			42.3	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM Average Control Delay	44.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	115.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

4: White Rock Road/Latrobe Road & Alternative 2A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	540	180	50	460	690	240	70	880	130	230	1180	460
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	587	196	54	500	750	261	76	957	141	250	1283	500
RTOR Reduction (vph)	0	0	39	0	0	109	0	0	92	0	0	211
Lane Group Flow (vph)	587	196	15	500	750	152	76	957	49	250	1283	289
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	19.2	33.5	33.5	19.2	33.5	33.5	7.1	41.3	41.3	9.1	43.3	43.3
Effective Green, g (s)	19.2	33.5	33.5	19.2	33.5	33.5	7.1	41.3	41.3	9.1	43.3	43.3
Actuated g/C Ratio	0.16	0.28	0.28	0.16	0.28	0.28	0.06	0.35	0.35	0.08	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	553	995	445	553	995	445	106	2222	549	262	1849	576
v/s Ratio Prot	c0.17	0.06		0.15	c0.21		0.04	0.15		c0.07	c0.25	
v/s Ratio Perm			0.01			0.10			0.03			0.18
v/c Ratio	1.06	0.20	0.03	0.90	0.75	0.34	0.72	0.43	0.09	0.95	0.69	0.50
Uniform Delay, d1	49.9	32.6	31.1	49.0	39.0	34.0	55.0	29.9	26.2	54.8	32.3	29.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	55.6	0.1	0.0	18.2	3.3	0.5	20.5	0.6	0.3	42.8	2.2	3.1
Delay (s)	105.6	32.7	31.1	67.2	42.3	34.5	75.5	30.5	26.5	97.6	34.4	32.6
Level of Service	F	C	C	E	D	C	E	C	C	F	C	C
Approach Delay (s)		83.7			49.2			32.9			41.7	
Approach LOS		F			D			C			D	

Intersection Summary			
HCM Average Control Delay	48.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	119.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	580	180	50	520	680	230	70	750	130	220	1020	470
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	630	196	54	565	739	250	76	815	141	239	1109	511
RTOR Reduction (vph)	0	0	38	0	0	103	0	0	97	0	0	261
Lane Group Flow (vph)	630	196	16	565	739	147	76	815	44	239	1109	250
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	27.6	37.9	37.9	24.9	35.2	35.2	7.0	40.2	40.2	11.1	44.3	44.3
Effective Green, g (s)	27.6	37.9	37.9	24.9	35.2	35.2	7.0	40.2	40.2	11.1	44.3	44.3
Actuated g/C Ratio	0.21	0.29	0.29	0.19	0.27	0.27	0.05	0.31	0.31	0.09	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	728	1031	461	657	958	428	95	1980	489	293	1731	539
v/s Ratio Prot	c0.18	c0.06		0.16	c0.21		0.04	0.13		c0.07	c0.22	
v/s Ratio Perm			0.01			0.09			0.03			0.16
v/c Ratio	0.87	0.19	0.03	0.86	0.77	0.34	0.80	0.41	0.09	0.82	0.64	0.46
Uniform Delay, d1	49.5	34.6	33.0	50.9	43.7	38.2	60.9	35.6	31.9	58.5	36.2	33.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.5	0.1	0.0	10.9	3.9	0.5	36.6	0.6	0.4	15.9	1.8	2.9
Delay (s)	60.0	34.7	33.0	61.8	47.6	38.6	97.5	36.2	32.3	74.4	38.0	36.4
Level of Service	E	C	C	E	D	D	F	D	C	E	D	D
Approach Delay (s)		52.7			51.3			40.2			42.3	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	46.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	130.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

1: White Rock Road/Latrobe Road & No Project

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	150	460	250	210	460	210	290	1780	340	260	1350	350
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	500	272	228	500	228	315	1935	370	283	1467	380
RTOR Reduction (vph)	0	0	212	0	0	176	0	0	142	0	0	169
Lane Group Flow (vph)	163	500	60	228	500	52	315	1935	228	283	1467	211
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.9	26.8	26.8	10.1	28.0	28.0	26.3	54.9	54.9	13.9	42.5	42.5
Effective Green, g (s)	8.9	26.8	26.8	10.1	28.0	28.0	26.3	54.9	54.9	13.9	42.5	42.5
Actuated g/C Ratio	0.07	0.22	0.22	0.08	0.23	0.23	0.22	0.45	0.45	0.11	0.35	0.35
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	251	779	349	285	814	364	383	2891	714	392	1776	553
v/s Ratio Prot	0.05	c0.14		c0.07	0.14		c0.18	0.30		0.08	c0.29	
v/s Ratio Perm			0.04			0.03			0.14			0.13
v/c Ratio	0.65	0.64	0.17	0.80	0.61	0.14	0.82	0.67	0.32	0.72	0.83	0.38
Uniform Delay, d1	54.9	43.1	38.5	54.8	42.0	37.3	45.5	26.3	21.4	52.0	36.2	29.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.7	1.8	0.2	14.8	1.4	0.2	13.3	1.2	1.2	6.4	4.5	2.0
Delay (s)	60.6	44.9	38.7	69.6	43.4	37.5	58.8	27.5	22.6	58.5	40.8	31.7
Level of Service	E	D	D	E	D	D	E	C	C	E	D	C
Approach Delay (s)		45.8			48.2			30.6			41.5	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	38.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	121.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

2: White Rock Road/Latrobe Road & Alternative 1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	200	380	50	280	380	260	90	1420	550	310	970	420
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	217	413	54	304	413	283	98	1543	598	337	1054	457
RTOR Reduction (vph)	0	0	42	0	0	122	0	0	217	0	0	221
Lane Group Flow (vph)	217	413	12	304	413	161	98	1543	381	337	1054	236
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.2	21.4	21.4	9.2	21.4	21.4	8.2	41.0	41.0	9.2	42.0	42.0
Effective Green, g (s)	9.2	21.4	21.4	9.2	21.4	21.4	8.2	41.0	41.0	9.2	42.0	42.0
Actuated g/C Ratio	0.10	0.22	0.22	0.10	0.22	0.22	0.08	0.42	0.42	0.10	0.43	0.43
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	326	782	350	326	782	350	150	2714	670	326	2206	687
v/s Ratio Prot	0.06	c0.12		c0.09	0.12		0.06	0.24		c0.10	0.21	
v/s Ratio Perm			0.01			0.10			c0.24			0.15
v/c Ratio	0.67	0.53	0.03	0.93	0.53	0.46	0.65	0.57	0.57	1.03	0.48	0.34
Uniform Delay, d1	42.3	33.2	29.6	43.5	33.2	32.7	42.9	21.2	21.2	43.8	19.6	18.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	0.6	0.0	32.6	0.6	1.0	9.8	0.9	3.5	58.8	0.7	1.4
Delay (s)	47.4	33.9	29.6	76.1	33.9	33.7	52.7	22.1	24.7	102.6	20.3	19.6
Level of Service	D	C	C	E	C	C	D	C	C	F	C	B
Approach Delay (s)		37.8			46.7			24.1			35.1	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	33.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	96.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

3: White Rock Road/Latrobe Road & Alternative 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	230	380	90	260	380	250	130	1490	470	320	1040	430
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	250	413	98	283	413	272	141	1620	511	348	1130	467
RTOR Reduction (vph)	0	0	76	0	0	147	0	0	186	0	0	223
Lane Group Flow (vph)	250	413	22	283	413	125	141	1620	325	348	1130	244
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.4	20.2	20.2	8.4	21.2	21.2	10.5	34.8	34.8	10.5	34.8	34.8
Effective Green, g (s)	7.4	20.2	20.2	8.4	21.2	21.2	10.5	34.8	34.8	10.5	34.8	34.8
Actuated g/C Ratio	0.08	0.22	0.22	0.09	0.24	0.24	0.12	0.39	0.39	0.12	0.39	0.39
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	283	795	356	321	835	373	207	2481	613	401	1968	613
v/s Ratio Prot	0.07	c0.12		c0.08	0.12		0.08	c0.25		c0.10	0.22	
v/s Ratio Perm			0.01			0.08			0.21			0.15
v/c Ratio	0.88	0.52	0.06	0.88	0.49	0.34	0.68	0.65	0.53	0.87	0.57	0.40
Uniform Delay, d1	40.8	30.6	27.4	40.3	29.7	28.5	38.1	22.6	21.2	39.0	21.7	20.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.0	0.6	0.1	23.4	0.5	0.5	8.9	0.6	0.8	17.6	0.4	0.4
Delay (s)	66.8	31.2	27.5	63.7	30.2	29.0	47.0	23.2	22.1	56.7	22.1	20.4
Level of Service	E	C	C	E	C	C	D	C	C	E	C	C
Approach Delay (s)		42.4			39.7			24.4			27.9	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	30.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	89.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

4: White Rock Road/Latrobe Road & Alternative 2A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	210	400	50	280	350	260	90	1390	560	310	970	420
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	228	435	54	304	380	283	98	1511	609	337	1054	457
RTOR Reduction (vph)	0	0	42	0	0	121	0	0	208	0	0	236
Lane Group Flow (vph)	228	435	12	304	380	162	98	1511	401	337	1054	221
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.2	21.5	21.5	9.2	21.5	21.5	8.2	41.0	41.0	9.2	42.0	42.0
Effective Green, g (s)	9.2	21.5	21.5	9.2	21.5	21.5	8.2	41.0	41.0	9.2	42.0	42.0
Actuated g/C Ratio	0.09	0.22	0.22	0.09	0.22	0.22	0.08	0.42	0.42	0.09	0.43	0.43
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	326	785	351	326	785	351	150	2711	670	326	2204	686
v/s Ratio Prot	0.07	c0.12		c0.09	0.11		0.06	0.24		c0.10	0.21	
v/s Ratio Perm			0.01			0.10			c0.25			0.14
v/c Ratio	0.70	0.55	0.03	0.93	0.48	0.46	0.65	0.56	0.60	1.03	0.48	0.32
Uniform Delay, d1	42.5	33.4	29.6	43.5	32.9	32.7	43.0	21.1	21.6	43.9	19.6	18.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.4	0.9	0.0	32.6	0.5	1.0	9.8	0.8	3.9	58.8	0.7	1.2
Delay (s)	48.9	34.3	29.6	76.2	33.3	33.6	52.8	21.9	25.5	102.7	20.4	19.3
Level of Service	D	C	C	E	C	C	D	C	C	F	C	B
Approach Delay (s)		38.6			46.9			24.3			35.1	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	33.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	96.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

5: White Rock Road/Latrobe Road & Alternative 5

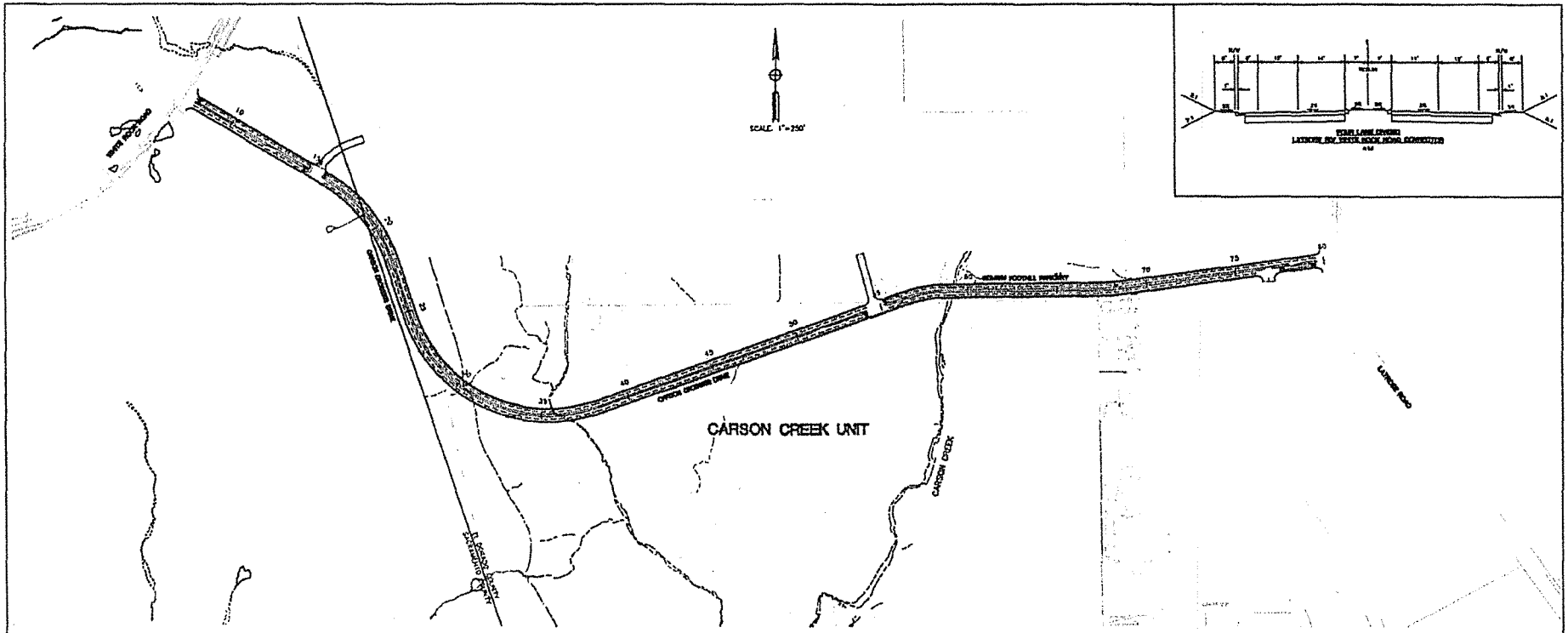
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	260	350	50	250	330	280	90	1280	570	290	810	510
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	283	380	54	272	359	304	98	1391	620	315	880	554
RTOR Reduction (vph)	0	0	42	0	0	121	0	0	231	0	0	245
Lane Group Flow (vph)	283	380	12	272	359	183	98	1391	389	315	880	309
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.2	21.0	21.0	9.2	21.0	21.0	8.2	41.0	41.0	9.2	42.0	42.0
Effective Green, g (s)	9.2	21.0	21.0	9.2	21.0	21.0	8.2	41.0	41.0	9.2	42.0	42.0
Actuated g/C Ratio	0.10	0.22	0.22	0.10	0.22	0.22	0.09	0.43	0.43	0.10	0.44	0.44
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	328	771	345	328	771	345	151	2725	673	328	2215	690
v/s Ratio Prot	c0.08	0.11		0.08	0.10		0.06	0.22		c0.09	0.17	
v/s Ratio Perm			0.01			c0.12			c0.25			0.20
v/c Ratio	0.86	0.49	0.03	0.83	0.47	0.53	0.65	0.51	0.58	0.96	0.40	0.45
Uniform Delay, d1	43.0	33.0	29.7	42.8	32.8	33.3	42.7	20.3	21.1	43.4	18.6	19.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	20.2	0.5	0.0	15.7	0.4	1.5	9.2	0.7	3.6	39.0	0.5	2.1
Delay (s)	63.2	33.5	29.7	58.6	33.3	34.8	52.0	21.0	24.7	82.5	19.1	21.2
Level of Service	E	C	C	E	C	C	D	C	C	F	B	C
Approach Delay (s)		44.9			41.1			23.5			31.2	
Approach LOS		D			D			C			C	

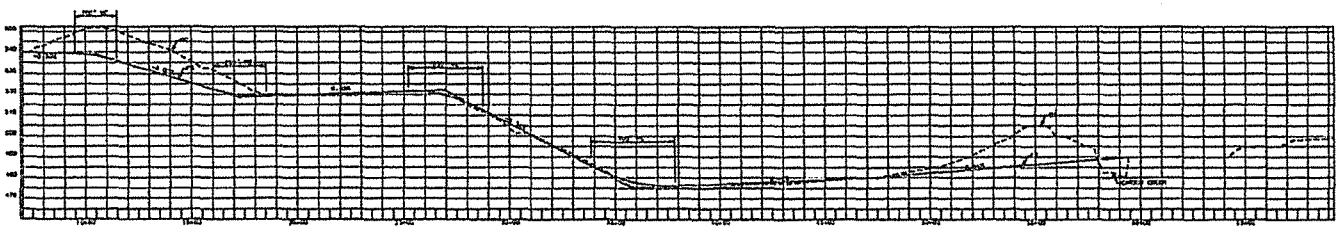
Intersection Summary			
HCM Average Control Delay	31.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	96.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

3: White Rock Road/Latrobe Road & Alternative 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.86	1.00	0.97	0.91	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3539	1583	3433	3539	1583	1770	6408	1583	3433	5085	1583
Volume (vph)	684	258	116	555	929	297	116	1251	168	297	1587	568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	743	280	126	603	1010	323	126	1360	183	323	1725	617
RTOR Reduction (vph)	0	0	80	0	0	89	0	0	76	0	0	215
Lane Group Flow (vph)	743	280	46	603	1010	234	126	1360	107	323	1725	402
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	24.1	47.4	47.4	24.1	47.4	47.4	8.0	41.1	41.1	13.0	46.1	46.1
Effective Green, g (s)	24.1	47.4	47.4	24.1	47.4	47.4	8.0	41.1	41.1	13.0	46.1	46.1
Actuated g/C Ratio	0.17	0.33	0.33	0.17	0.33	0.33	0.06	0.29	0.29	0.09	0.33	0.33
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	584	1185	530	584	1185	530	100	1860	459	315	1655	515
v/s Ratio Prot	c0.22	0.08		0.18	c0.29		c0.07	0.21		c0.09	c0.34	
v/s Ratio Perm			0.03			0.15			0.07			0.25
v/c Ratio	1.27	0.24	0.09	1.03	0.85	0.44	1.26	0.73	0.23	1.03	1.04	0.78
Uniform Delay, d1	58.8	34.0	32.3	58.8	43.8	36.8	66.8	45.3	38.3	64.3	47.8	43.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	135.5	0.1	0.1	45.9	6.1	0.6	175.2	1.5	0.3	57.4	34.0	7.5
Delay (s)	194.3	34.1	32.3	104.6	49.9	37.4	242.0	46.8	38.5	121.7	81.8	50.7
Level of Service	F	C	C	F	D	D	F	D	D	F	F	D
Approach Delay (s)		137.5			64.9			60.6			79.4	
Approach LOS		F			E			E			E	

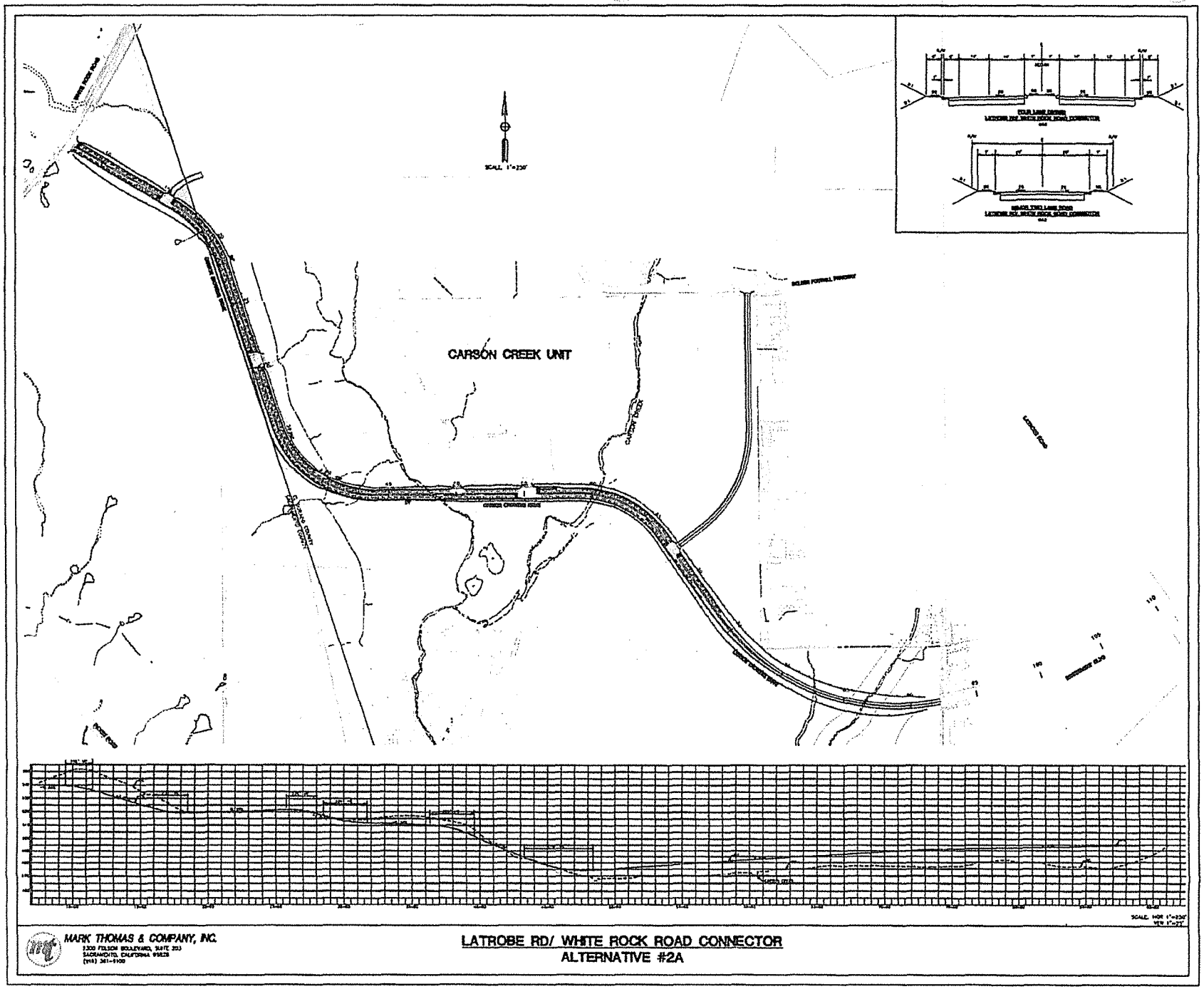
Intersection Summary			
HCM Average Control Delay	80.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	141.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



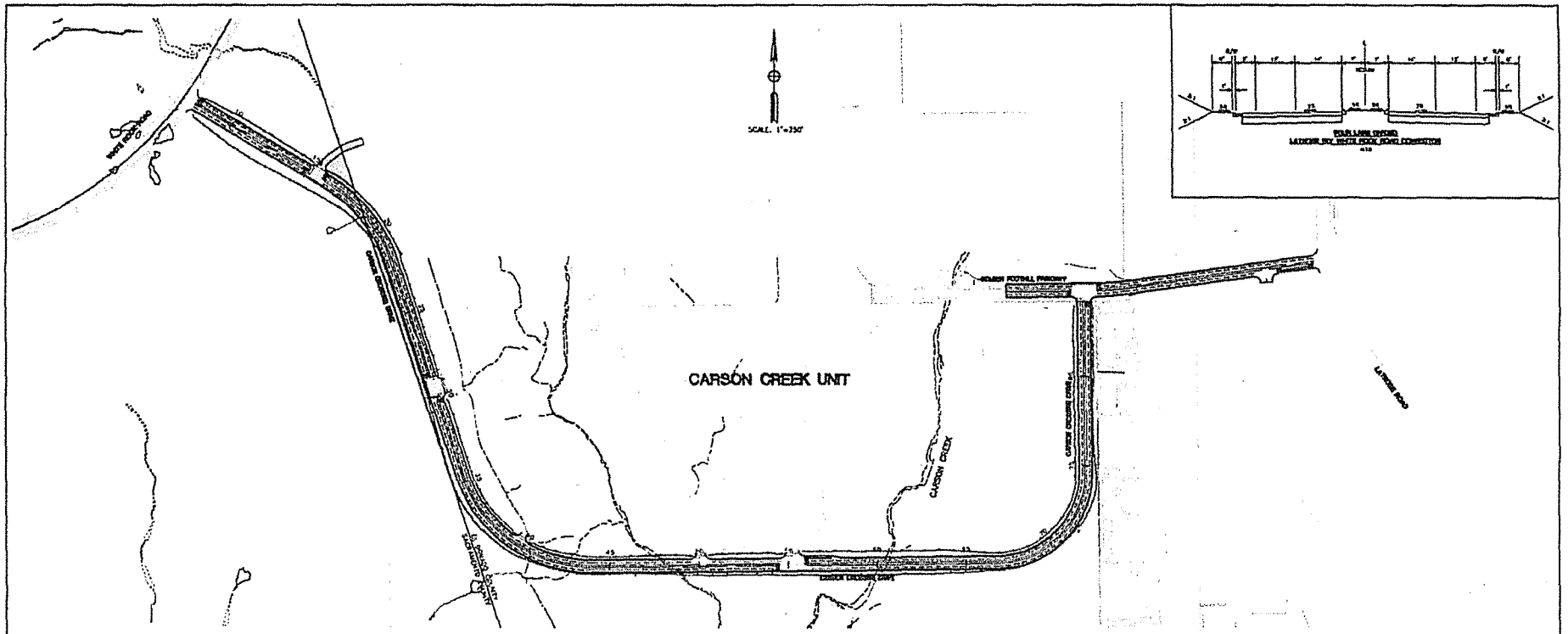


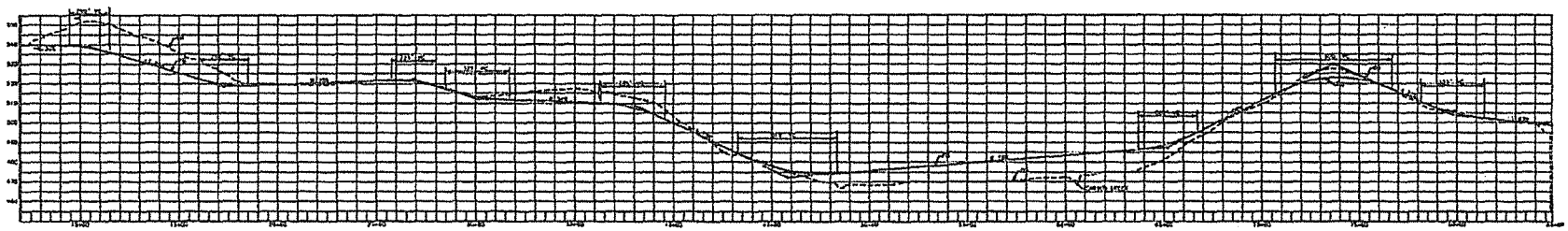
MARK THOMAS & COMPANY, INC.
7300 FOLSOM BOULEVARD, SUITE 203
SACRAMENTO, CALIFORNIA 95826
(916) 381-9100

LATROBE RD/ WHITE ROCK ROAD CONNECTOR
ALTERNATIVE #5


CARSON CREEK UNIT
MARK THOMAS & COMPANY, INC.
LATROBE RD/ WHITE ROCK ROAD CONNECTOR
ALTERNATIVE #2A


CARSON CREEK UNIT
LATROBE ROAD
CARSON CREEK
MARK THOMAS & COMPANY, INC.
LATROBE RD/ WHITE ROCK ROAD CONNECTOR
ALTERNATIVE #2





SCALE: HOR 1"=250'
VER 1"=25'

MARK THOMAS & COMPANY, INC.
7339 FOLSOM BOULEVARD, SUITE 203
SACRAMENTO, CALIFORNIA 95828
(916) 381-9100

LATROBE RD/ WHITE ROCK ROAD CONNECTOR
ALTERNATIVE #1