NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

Notice is hereby given that, as Lead Agency, the City of Roseville, Development Services Department, Planning Division has prepared an Initial Study leading to a **Mitigated Negative Declaration** for the project referenced below. This Mitigated Negative Declaration is available for public review and comment.

Project Title/File#: WRSP PCL F-31 – The Plaza at Blue Oaks; File #PL17-0368
Project Location: 1950 Blue Oaks Boulevard, Roseville, Placer County, CA; APN 017-117-093-000
Project Owner: Joe Zawidski, Signature Management Company
Project Applicant: Joe Zawidski, West Roseville Development Company, Inc.
Project Planner: Kinarik Shallow, Associate Planner

Project Description: The proposed project is a retail center consisting of a ±35,000 square-foot anchor grocery store, a 12-pump gas station with a ±3,500 square-foot convenience store and car wash, and seven additional buildings ranging in size from approximately 3,750 square feet to 9,750 square feet. The project includes a Design Review Permit to review the site design and proposed buildings, a Tree Permit to remove several native oak trees on the westerly portion of the site, and a Tentative Subdivision Map to subdivide the parcel into eight (8) lots.

Document Review and Availability: The public review and comment period begins on April 17, 2020 and ends on May 7, 2020. The **Mitigated Negative Declaration** may be reviewed online at

https://www.roseville.ca.us/cms/One.aspx?portalId=7964922&pageId=8774505

Written comments on the adequacy of the Mitigated Negative Declaration may be submitted to Kinarik Shallow, Associate Planner, at kshallow@roseville.ca.us and must be received no later than 5:00 pm on May 7, 2020. **Due to the currently in place Placer County Stay at Home Directive, physical correspondence will not be able to be considered during the review period.**

This project will be scheduled for a public hearing before the City's Planning Commission. At this hearing, the Planning Commission will consider the Mitigated Negative Declaration and associated project entitlements. The tentative hearing date is May 14, 2020.

Greg Bitter
Planning Manager

Dated: April 15, 2020

Publish: April 17, 2020

CITY OF ROSEVILLE CALIFORNIA

DEVELOPMENT SERVICES DEPARTMENT – PLANNING DIVISION
311 Vernon Street, Roseville, CA 95678 (916) 774-5276

MITIGATED NEGATIVE DECLARATION

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Project Location:	1950 Blue Oaks Boulevard, Roseville, Placer County, CA; APN 017-117-093-000
Project Applicant:	Joe Zawidski, Signature Management Company
Property Owner:	Joe Zawidski, West Roseville Development Company, Inc.
Lead Agency Contact Person:	Kinarik Shallow, Associate Planner - City of Roseville; (916) 746-1309
Date:	April 15, 2020

Project Description:

The proposed project is a retail center consisting of a ±35,000 square-foot anchor grocery store, a 12-pump gas station with a ±3,500 square-foot convenience store and car wash, and seven additional buildings ranging in size from approximately 3,750 square feet to 9,750 square feet. The project includes a Design Review Permit to review the site design and proposed buildings, a Tree Permit to remove several native oak trees on the westerly portion of the site, and a Tentative Subdivision Map to subdivide the parcel into eight (8) lots.

DECLARATION

The Planning Manager has determined that the above project will not have significant effects on the environment and therefore does not require preparation of an Environmental Impact Report. The determination is based on the attached initial study and the following findings:

A. The project will not have the potential to degrade the quality of the environment, substantially reduce the habitat of fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of an endangered, rare or threatened species, reduce the number or restrict the range of rare or endangered plants or animals or eliminate important examples of the major periods of California history or prehistory.

B. The project will not have the potential to achieve short-term, to the disadvantage of long-term, environmental goals.

C. The project will not have impacts, which are individually limited, but cumulatively considerable.

D. The project will not have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly.

E. No substantial evidence exists that the project may have a significant effect on the environment.

F. The project incorporates all applicable mitigation measures identified in the attached initial study.

G. This Mitigated Negative Declaration reflects the independent judgment of the lead agency.

CITY OF ROSEVILLE CALIFORNIA

DEVELOPMENT SERVICES DEPARTMENT–PLANNING DIVISION

311 Vernon St, Roseville, CA 95678 (916) 774-5276

INITIAL STUDY & ENVIRONMENTAL CHECKLIST

Project Title/File Number:	WRSP PCL F-31 – The Plaza at Blue Oaks; File #PL17-0368
Project Location:	1950 Blue Oaks Boulevard, Roseville, Placer County, CA; APN 017-117-093-000
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Project Applicant:	Joe Zawidski, Signature Management Company
Property Owner:	Joe Zawidski, West Roseville Development Company, Inc.
Lead Agency Contact:	Kinarik Shallow, Associate Planner; Phone (916) 746-1309

This initial study has been prepared to identify and assess the anticipated environmental impacts of the above described project application. The document relies on previous environmental documents (see Attachments) and site-specific studies prepared to address in detail the effects or impacts associated with the project. Where documents were submitted by consultants working for the applicant, City staff reviewed such documents in order to determine whether, based on their own professional judgment and expertise, staff found such documents to be credible and persuasive. Staff has only relied on documents that reflect their independent judgment, and has not accepted at face value representations made by consultants for the applicant.

This document has been prepared to satisfy the California Environmental Quality Act (CEQA), (Public Resources Code, Section 21000 et seq.) and the State CEQA Guidelines (14 CCR 15000 et seq.). CEQA requires that all state and local government agencies consider the environmental consequences of projects over which they have discretionary authority before acting on those projects.

The initial study is a public document used by the decision-making lead agency to determine whether a project may have a significant effect on the environment. If the lead agency finds substantial evidence that any aspect of the project, either individually or cumulatively, may have a significant effect on the environment, regardless of whether the overall effect of the project is adverse or beneficial, the lead agency is required to prepare an EIR. If the agency finds no substantial evidence that the project or any of its aspects may cause a significant effect on the environment, a negative declaration shall be prepared. If in the course of analysis, the agency recognizes that the project may have a significant impact on the environment, but that by incorporating specific mitigation measures to which the applicant agrees, the impact will be reduced to a less than significant effect, a mitigated negative declaration shall be prepared.

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PROJECT DESCRIPTION

Project Location

The 13.35-acre project site is located on Parcel F-31 of the West Roseville Specific Plan (WRSP), at the northeast corner of Blue Oaks Boulevard and Fiddyment Road (Figure 1). The address of the project site is 1950 Blue Oaks Boulevard.

Figure 1: Project Location

Background

The WRSP was approved by City Council in February 2004. The WRSP area includes 3,162 acres in the northwest portion of the City, west of Fiddyment Road and generally north of Pleasant Grove Boulevard. An Environmental Impact Report (EIR) was certified with the WRSP (State Clearinghouse #2002082057), which examined the impacts of Specific Plan buildout. This addressed the major cumulative impacts of developing the Specific Plan as a whole, including the subject property (Parcel F-31).

Environmental Setting

The project site is currently undeveloped and is comprised mostly of annual grasslands and several native oak trees. The site varies in grade, with a high point on the site at ±106 feet above sea level and the low point of the site at ±83 feet above sea level. The site generally slopes downward on the southwestern and northwestern corners of the site, where the oak trees are located, and then becomes level with the roadways. Streetlights are located along the roadway frontages and utility poles exist along Blue Oaks Boulevard. Curb and gutter improvements exist along the perimeter of the property. Sidewalks are fully constructed along Fiddyment Road,

while partial sidewalks exist along the remainder of the site. The corner of Blue Oaks Boulevard and Fiddyment Road consists of a neighborhood entry feature including hardscape elements such as pilasters, raised planters, and small accent trees. The site is adjacent to Harvey Way to the north with an undeveloped High Density Residential parcel beyond, Oak Meadow Drive to the east with Fiddyment Ranch Apartments beyond, Blue Oaks Boulevard to the south with single-family residential uses beyond, and Fiddyment Road to the west with a Community Commercial parcel beyond. Additionally, Pleasant Grove Creek is located approximately one mile north of the site.

Table 1: Adjacent Zoning and Land Use

Location	Zoning	General Plan Land Use	Actual Use of Property
Site	Community Commercial (CC)	Community Commercial (CC)	Vacant
North	Harvey Way with Attached Housing (R3) beyond	High Density Residential (HDR-24.8)	Vacant
South	Blue Oaks Boulevard with Residential Mixed Use/Special Area-Del Webb Specific Plan (RMU/SA-DW)	Low Density Residential (LDR-5)	Single-family residential
East	Oak Meadow Drive with R3 beyond	HDR-25	Apartment Complex
West	Fiddyment Road with CC beyond	CC	Medical Office

Proposed Project

The proposed project is a retail center consisting of a ±35,000 square-foot anchor grocery store, a 12-pump gas station with a ±3,500 square-foot convenience store and car wash, and seven additional buildings ranging in size from approximately 3,750 square feet to 9,750 square feet, as well as associated parking, lighting, and landscaping. The total building square footage will be approximately 82,100 square feet. The project includes a Design Review Permit to review the site design and proposed buildings, a Tree Permit to remove several native oak trees on the westerly portion of the site, and a Tentative Subdivision Map to subdivide the parcel into eight (8) lots. No building is being proposed on Lot 2 at this time, which will be located on the northeastern corner of the site and will consist of approximately 1.3 acres.

CITY OF ROSEVILLE MITIGATION ORDINANCES, GUIDELINES, AND STANDARDS

For projects that are consistent with the development density established by existing zoning, community plan, or general plan policies for which an EIR was certified, CEQA Guidelines section 15183(f)allows a lead agency to rely on previously adopted development policies or standards as mitigation for the environmental effects, when the standards have been adopted by the City, with findings based on substantial evidence, that the policies or standards will substantially mitigate environmental effects, unless substantial new information shows otherwise (CEQA Guidelines §15183(f)). The City of Roseville adopted CEQA Implementing Procedures (Implementing Procedures) which are consistent with this CEQA Guidelines section. The current version of the Implementing Procedures were adopted in April 2008, along with Findings of Fact, as Resolution 08-172. The below regulations and ordinances were found to provide uniform mitigating policies and standards, and are applicable

to development projects. The City's Mitigating Policies and Standards are referenced, where applicable, in the Initial Study Checklist.

- City of Roseville 2035 General Plan
- City of Roseville Zoning Ordinance (RMC Title 19)
- City of Roseville Improvement Standards (Resolution 02-37)
- City of Roseville Construction Standards (Resolution 01-208)
- Subdivision Ordinance (RMC Title 18)
- Noise Regulation (RMC Ch.9.24)
- Flood Damage Prevention Ordinance (RMC Ch.9.80)
- Drainage Fees (Dry Creek [RMC Ch.4.49] and Pleasant Grove Creek [RMC Ch.4.48])
- West Placer Stormwater Quality Design Manual (Resolution 16-152)
- Urban Stormwater Quality Management and Discharge Control Ordinance (RMC Ch. 14.20)
- Traffic Mitigation Fee (RMC Ch.4.44)
- Highway 65 Joint Powers Authority Improvement Fee (Resolution 2008-02)
- South Placer Regional Transportation Authority Transportation and Air Quality Mitigation Fee (Resolution 09-05)
- Tree Preservation Ordinance (RMC Ch.19.66)
- Community Design Guidelines (Resolution 95-347)
- Specific Plan Design Guidelines:
    - West Roseville Specific Plan and Design Guidelines (Resolution 04-40)

OTHER ENVIRONMENTAL DOCUMENTS RELIED UPON

- Amoruso Ranch Specific Plan Final Environmental Impact Report
- West Roseville Specific Plan Environmental Impact Report (SCH #2002082057)

Pursuant to CEQA Guidelines Section 15183, any project which is consistent with the development densities established by zoning, a Community Plan, or a General Plan for which an EIR was certified shall not require additional environmental review, except as may be necessary to examine whether there are project-specific significant effects which are peculiar to the project or its site. The Amoruso Ranch Specific Plan EIR updated the City's General Plan to 2035, and updated Citywide analyses of traffic, water supply, water treatment, wastewater treatment, and waste disposal. The proposed project is consistent with the adopted land use designations examined within the environmental documents listed above. This Initial Study focuses on effects particular to the specific project site, impacts which were not analyzed within the EIR, and impacts which may require revisiting due to substantial new information. When applicable, the topical sections within the Initial Study summarize the findings within the environmental documents listed above. The analysis, supporting technical materials, and findings of the environmental document are incorporated by reference, and are available for review at the Civic Center, 311 Vernon Street, Roseville, CA.

EXPLANATION OF INITIAL STUDY CHECKLIST

The California Environmental Quality Act (CEQA) Guidelines recommend that lead agencies use an Initial Study Checklist to determine potential impacts of the proposed project on the physical environment. The Initial Study Checklist provides a list of questions concerning a comprehensive array of environmental issue areas potentially affected by this project. This section of the Initial Study incorporates a portion of Appendix G Environmental

Checklist Form, contained in the CEQA Guidelines. Within each topical section (e.g. Air Quality) a description of the setting is provided, followed by the checklist responses, thresholds used, and finally a discussion of each checklist answer.

There are four (4) possible answers to the Environmental Impacts Checklist on the following pages. Each possible answer is explained below:

1) A "Potentially Significant Impact" is appropriate if there is enough relevant information and reasonable inferences from the information that a fair argument based on substantial evidence can be made to support a conclusion that a substantial, or potentially substantial, adverse change may occur to any of the physical conditions within the area affected by the project. When one or more "Potentially significant Impact" entries are made, an EIR is required.

2) A "Less Than Significant With Mitigation" answer is appropriate when the lead agency incorporates mitigation measures to reduce an impact from "Potentially Significant" to "Less than Significant." For example, floodwater impacts could be reduced from a potentially-significant level to a less-than-significant level by relocating a building to an area outside of the floodway. The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less-than-significant level. Mitigation measures are identified as MM followed by a number.

3) A "Less Than significant Impact" answer is appropriate if there is evidence that one or more environmental impacts may occur, but the impacts are determined to be less than significant, or the application of development policies and standards to the project will reduce the impact(s) to a less-than-significant level. For instance, the application of the City's Improvement Standards reduces potential erosion impacts to a less-than-significant level.

4) A "No Impact" answer is appropriate where it can be demonstrated that the impact does not have the potential to adversely affect the environment. For instance, a project in the center of an urbanized area with no agricultural lands on or adjacent to the project area clearly would not have an adverse effect on agricultural resources or operations. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources cited in the Initial Study. Where a "No Impact" answer is adequately supported by the information sources cited in the Initial Study, further narrative explanation is not required. A "No Impact" answer is explained when it is based on project-specific factors as well as generous standards.

All answers must take account of the whole action involved, including off- and on-site, indirect, direct, construction, and operation impacts, except as provided for under State CEQA Guidelines.

INITIAL STUDY CHECKLIST

I. Aesthetics

The project site is located in a typical urbanized setting within a commercially zoned area of the City and is adjacent to roadways on all four sides. Public views of the site are from Blue Oaks Boulevard and Fiddyment Road, both arterial roadways, and its adjacent sidewalks. Public views are also from Harvey Way and Oak Meadow Drive, which are considered primary residential streets. The site is undeveloped and contains several native oak trees with grasses and small annual plants. The project will allow construction of a commercial shopping center consisting of multiple buildings totaling approximately 82,100 square feet. Surrounding uses include an undeveloped High Density Residential parcel to the north, an apartment complex (currently under construction) to the east, a single-family subdivision to the south, and a medical office building to the west.

Except as provided in Public Resources Code Section 21099, would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?				X
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				X
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?			X	
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?			X	

Thresholds of Significance and Regulatory Setting:

The significance of an environmental impact cannot always be determined through the use of a specific, quantifiable threshold. CEQA Guidelines Section 15064(b) affirms this by the statement "an ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting." This is particularly true of aesthetic impacts. As an example, a proposed parking lot in a dense urban center would have markedly different visual effects than a parking lot in an open space area. For the purpose of this study, the significance thresholds are as stated in CEQA Guidelines Appendix G, as shown in a–d of the checklist below. The Findings of the Implementing Procedures indicate that compliance with the Zoning Ordinance (e.g. building height, setbacks, etc.), Subdivision Ordinance (RMC Ch. 18), Community Design Guidelines (Resolution 95-347), and applicable Specific Plan Policies and/or Specific Plan Design Guidelines will prevent significant impacts in urban settings as it relates to items a and b, below.

Discussion of Checklist Answers:

a–b) There are no designated or eligible scenic vistas or scenic highways within or adjacent to the City of Roseville.

c) The project site is in an urban setting and has street frontage on all four sides, with a future high density residential parcel to the north, a multi-family apartment complex to the east, low density residential uses to the south, and commercial uses to the west. The City of Roseville has adopted Community Design Guidelines (CDG) to establish common design elements and expectations for development within the City. The CDG includes provisions related to architectural design, site design and landscape design, to enhance the visual character of the urban environment. The CDG recommends preserving, to the extent feasible, visual resources such as native oak trees and creek or wetland resources. The site does not contain any creek or wetland resources; however, the project will require the removal of twenty-four (24) native oak trees on the project site, and therefore requires a Tree Permit. Consistent with the City's Tree Preservation ordinance (RMC Ch. 19.66), the Tree Permit would contain conditions of approval that include protective measures for the trees to remain on site, and mitigation measures that include payment of in-lieu mitigation fees to compensate for oak tree encroachment and removal. The project has been reviewed by City staff and was found to be consistent with the goals and policies of the CDG, the WRSP, and applicable zoning regulations. As such, impacts of the project related to this criterion are less than significant.

d) The project involves nighttime lighting to provide for the security and safety of project users. However, the project is already located within an urbanized setting with many existing lighting sources. Lighting for the project is conditioned to comply with City standards (i.e., Community Design Guidelines) to limit the height of light standards and to require cut-off lenses and glare shields to minimize light and glare impacts. The project will not create a new source of substantial light. None of the project elements are highly reflective, and therefore the project will not contribute to an increased source of glare. Impacts of the project are less than significant.

II. Agricultural & Forestry Resources

The State Department of Conservation oversees the Farmland Mapping and Monitoring Program, which was established to document the location, quality, and quantity of agricultural lands, and the conversion of those lands over time. The primary land use classifications on the maps generated through this program are: Urban and Built Up Land, Grazing Land, Farmland of Local Importance, Unique Farmland, Farmland of Statewide Importance, and Prime Farmland. According to the current California Department of Conservation Placer County Important Farmland Map (2012), the majority of the City of Roseville is designated as Urban and Built Up Land and most of the open space areas of the City are designated as Grazing Land. There are a few areas designated as Farmland of Local Importance and two small areas designated as Unique Farmland located on the western side of the City along Baseline Road. The current Williamson Act Contract map (2013/2014) produced by the Department of Conservation shows that there are no Williamson Act contracts within the City, and only one (on PFE Road) that is adjacent to the City. None of the land within the City is considered forest land by the Board of Forestry and Fire Protection.

Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?				X
d) Result in the loss of forest land or conversion of forest land to non-forest use?				X
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?				X

Thresholds of Significance and Regulatory Setting:

Unique Farmland, Farmland of Statewide Importance, and Prime Farmland are called out as protected farmland categories within CEQA Guidelines Appendix G. Neither the City nor the State has adopted quantified significance thresholds related to impacts to protected farmland categories or to agricultural and forestry resources. For the purpose of this study, the significance thresholds are as stated in CEQA Guidelines Appendix G, as shown in a–e of the checklist above.

Discussion of Checklist Answers:

a–e) The project site is not used for agricultural purposes, does not include agricultural zoning, is not within or adjacent to one of the areas of the City designated as a protected farmland category on the Placer County Important Farmland map, is not within or adjacent to land within a Williamson Act Contract, and is not considered forest land. Given the foregoing, the proposed project will have no impact on agricultural resources.

III. Air Quality

The City of Roseville, along with the south Placer County area, is located in the Sacramento Valley Air Basin (SVAB). The SVAB is within the Sacramento Federal Ozone Non-Attainment Area. Under the Clean Air Act, Placer County has been designated a "serious non-attainment" area for the federal 8-hour ozone standard, “non-attainment” for the state ozone standard, and a "non-attainment" area for the federal and state PM_{10} standard

(particulate matter less than 10 microns in diameter). Within Placer County, the Placer County Air Pollution Control District (PCAPCD) is responsible for ensuring that emission standards are not violated.

Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?			X	
b) Result in a cumulatively considerable net increase of any criteria for which the project region is non-attainment under an applicable federal or state ambient air quality standard?			X	
c) Expose sensitive receptors to substantial pollutant concentrations?			X	
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			X	

Thresholds of Significance and Regulatory Setting:

In responding to checklist items a, b, and d, project-related air emissions would have a significant effect if they would result in concentrations that either violate an ambient air quality standard or contribute to an existing air quality violation. To assist in making this determination, the PCAPCD adopted thresholds of significance, which were developed by considering both the health-based ambient air quality standards and the attainment strategies outlined in the State Implementation Plan. The PCAPCD-recommended significance threshold for reactive organic gases (ROG) and nitrogen oxides (NO_x) is 82 pounds daily during construction and 55 pounds daily during operation, and for particulate matter (PM) is 82 pounds per day during both construction and operation. For all other constituents, significance is determined based on the concentration-based limits in the Federal and State Ambient Air Quality Standards. Toxic Air Contaminants (TAC) are also of public health concern, but no thresholds or standards are provided because they are considered to have no safe level of exposure. Analysis of TAC is based on the *Air Quality and Land Use Handbook – A Community Health Perspective (*April 2005, California Air Resources Board), which lists TAC sources and recommended buffer distances from sensitive uses. For checklist item c, the PCAPCD's *CEQA Air Quality Handbook* (*Handbook*) recommends that the same thresholds used for the project analysis be used for the cumulative impact analysis.

With regard to checklist item d, there are no quantified significance thresholds for exposure to objectionable odors. Significance is determined after taking into account multiple factors, including screening distances from odor sources (as found in the PCAPCD CEQA Handbook), the direction and frequency of prevailing winds, the time of day when odors are present, and the nature and intensity of the odor source.

Discussion of Checklist Answers:

a-b) Analyses are not included for sulfur dioxide, lead, and other constituents because there are no mass emission thresholds; these are concentration-based limits in the Federal and State Ambient Air Quality Standards which require substantial, point-source emissions (e.g. refineries, concrete plants, etc) before exceedance will occur, and the SVAB is in attainment for these constituents. Likewise, carbon monoxide is not analyzed because the SVAB is in attainment for this constituent, and it requires high localized concentrations (called carbon monoxide "hot spots") before the ambient air quality standard would be exceeded. "Hot spots" are typically associated with heavy traffic congestion occurring at high-volume roadway intersections. The Amoruso Ranch EIR analysis of Citywide traffic indicated that 198 out of 226 signalized intersections would operate at level of service C or better—that is, they will not experience heavy traffic congestion. It further indicated that analyses of existing CO concentrations at the most congested intersections in Roseville show that CO levels are well below federal and state ambient air quality standards. The discussions below focus on emissions of ROG**,** NO_x, or PM**.**

PCAPCD recommends that lead agencies use the California Emissions Estimator Model (CalEEMod) to quantify a project's construction and operational emissions for criterial air pollutants (NO_x, ROG, and PM). The results are then compared to the significance thresholds established by the district, as detailed above. However, according to PCAPCD's published screening table, general commercial projects smaller than 249,099 square feet will not result in NO_x emissions that exceed 55 lbs/day, and therefore modeling is not required. Typically, NO_x emissions are substantially higher than ROG and PM10; therefore, it can be assumed that projects that do not exceed the NO_x threshold will not exceed the ROG and PM10 thresholds, and will not result in a significant impact related to operational emissions. The project proposes the construction of a shopping center consisting of six buildings totaling approximately 82,100 square feet, which is well below PCAPCD's modeled example. Thus, the project is not expected to result in construction or operational emissions that would exceed the district's thresholds for significance.

c) The project includes the construction of a gas station consisting of twelve (12) fuel pumps and an approximate 3,500 square-foot convenience store and car wash. A gasoline facility is a source of gasoline vapors that include TACs, primarily benzene. Prior to construction and operation of the gasoline facility, the applicant is required to obtain an Authority to Construct (ATC) permit from the PCAPCD. A Health Risk Analysis is required as part of the ATC permit in order to determine the potential cancer risk that will be generated as a result of the project. The applicant provided a project-specific Health Risk Analysis (Attachment 3), prepared by Trinity Consultants in March 2020, which concluded the annual amount of gasoline dispensed from the facility will be below the significance threshold for cancer risk of 10 in one million.

The Health Risk Analysis determined that the maximum cancer residential risk associated with the project would be 4.45 cancers/million, which is below the PCAPCD's significance threshold of 10 cancers/million. The Analysis determined that the maximum non-cancer risks at nearby homes would be a hazard index (HI) of 0.02 for maximum chronic non-cancer risk and an HI of 0.23 for maximum acute non-cancer risk, both numbers well below the PCAPCD's significance threshold of 1.0 HI for both chronic and acute non-cancer health risks. Based on these factors, impacts are less than significant.

d) Diesel fumes from construction equipment and delivery trucks are often found to be objectionable; however, construction is temporary and diesel emissions are minimal and regulated. Typical urban projects such as residences and retail businesses generally do not result in substantial objectionable odors when operated in compliance with City Ordinances (e.g. proper trash disposal and storage). The Project is a typical urban development that lacks any characteristics that would cause the generation of substantial unpleasant odors. Thus, construction and operation of the proposed project would not result in the creation of objectionable odors affecting a substantial number of people. A review of the project surroundings indicates that there are no substantial odor-generating uses near the project site; the project location meets the recommended screening distances from odor-generators provided by the PCAPCD. Impacts related to odors are less than significant.

IV. Biological Resources

The project site is currently undeveloped and consists of annual grasses and several native oak trees. City staff determined there are no evidence of wetlands or designated open space areas on the site.

Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		X		
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies or regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?			X	
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				X
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?				X

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			X	
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X

Thresholds of Significance and Regulatory Setting:

There is no ironclad definition of significance as it relates to biological resources. Thus, the significance of impacts to biological resources is defined by the use of expert judgment supported by facts, and relies on the policies, codes, and regulations adopted by the City and by regulatory agencies which relate to biological resources (as cited and described in the Discussion of Checklist Answers section). Thresholds for assessing the significance of environmental impacts are based on the CEQA Guidelines checklist items a–f, above. Consistent with CEQA Guidelines Section 15065, a project may have a significant effect on the environment if:

> The project has the potential to substantially degrade the quality of the environment*;* substantially reduce the habitat of a fish or wildlife species*;* cause a fish or wildlife population to drop below self-sustaining levels*;* threaten to eliminate a plant or animal community; [or] substantially reduce the number or restrict the range of an endangered, rare or threatened species . . .

Various agencies regulate impacts to the habitats and animals addressed by the CEQA Guidelines checklist. These include the United States Fish and Wildlife Service, National Oceanic and Atmospheric Administration–Fisheries, United States Army Corps of Engineers, Central Valley Regional Water Quality Control Board, and California Department of Fish and Wildlife. The primary regulations affecting biological resources are described in the sections below.

Checklist item a addresses impacts to special status species. A "special status" species is one which has been identified as having relative scarcity and/or declining populations. Special status species include those formally listed as threatened or endangered, those proposed for formal listing, candidates for federal listing, and those classified as species of special concern. Also included are those species considered to be "fully protected" by the California Department of Fish and Wildlife (California Fish and Wildlife), those granted "special animal" status for tracking and monitoring purposes, and those plant species considered to be rare, threatened, or endangered in California by the California Native Plant Society (CNPS). The primary regulatory protections for special status species are within the Federal Endangered Species Act, California Endangered Species Act, California Fish and Game Code, and the Federal Migratory Bird Treaty Act (MBTA).

Checklist item b addresses all "sensitive natural communities" that may be affected by local, state, or federal regulations/policies while checklist item c focuses specifically on one type of such a community: federally-protected wetlands. Focusing first on wetlands, there are two questions to be posed in examining wet habitats: the first is whether the wetted area meets the technical definition of a wetland, making it subject to checklist item b, and the second is whether the wetland is subject to federal jurisdiction, making it subject to checklist item c.

The 1987 Army Corps Wetlands Delineation Manual is used to determine whether an area meets the technical criteria for a wetland. A delineation verification by the Army Corps verifies the size and condition of the wetlands and other waters in question, and determines the extent of government jurisdiction as it relates to Section 404 of the Federal Clean Water Act and Section 401 of the State Clean Water Act.

The Clean Water Act protects all "navigable waters", which are defined as traditional navigable waters that are or were used for commerce, or may be used for interstate commerce; tributaries of covered waters; and wetlands adjacent to covered waters, including tributaries. Non-navigable waters are called isolated wetlands, and are not subject to either the Federal or State Clean Water Act. Thus, isolated wetlands are not subject to federal wetland protection regulations. However, in addition to the Clean Water Act, the State also has jurisdiction over impacts to surface waters through the Porter-Cologne Water Quality Control Act (Porter-Cologne), which does not require that waters be "navigable". For this reason, isolated wetlands are regulated by the State of California pursuant to Porter-Cologne. The City of Roseville General Plan also provides protection for wetlands, including isolated wetlands, pursuant to the General Plan Open Space and Conservation Element. Federal, State and City regulations/policies all seek to achieve no net loss of wetland acreage, values, or function.

Aside from wetlands, checklist item b also addresses other "sensitive natural communities," which includes any habitats protected by local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service. The City of Roseville General Plan Open Space and Conservation Element includes policies for the protection of riparian areas (streamside habitat) and floodplain areas; these are Vegetation and Wildlife section Policies 2 and 3. Policy 4 also directs preservation of additional area around stream corridors and floodplain if there is sensitive woodland, grassland, or other habitat which could be made part of a contiguous open space area. Other than wetlands, which were already discussed, US Fish and Wildlife and California Department of Fish and Wildlife habitat protections generally result from species protections, and are thus addressed via checklist item a.

For checklist item d, there are no regulations specific to the protection of migratory corridors. This item is addressed by an analysis of the habitats present in the vicinity and analyzing the probable effects on access to those habitats which will result from a project.

The City of Roseville Tree Preservation ordinance (RMC Ch.19.66) requires protection of native oak trees, and compensation for oak tree removal. The Findings of the Implementing Procedures indicate that compliance with the City of Roseville Tree Preservation ordinance (RMC Ch.19.66) will prevent significant impacts related to loss of native oak trees, referenced by item e, above.

Regarding checklist item f, there are no adopted Habitat Conservation Plans within the City of Roseville.

Discussion of Checklist Answers:

a) The project will require the removal of several oak trees, which could potentially provide habitat for nesting birds. Construction activities could also have the potential to disrupt offsite nesting species. A pre-construction nesting survey, **Mitigation Measure BIO-1**, is required in order to ensure that nesting birds are not harmed during construction. Ground disturbing activities shall not occur during the active nesting season, if it is necessary to conduct such activities during the nesting season, pre-construction surveys and mitigation as described in Mitigation Measure BIO-1, would be required. Compliance with Mitigation Measure BIO-1 will ensure that potential impacts to nesting birds are less than significant.

b-c) As discussed in the Environmental Setting, the project site is located in an urbanized area. The site is adjacent to paved roadways and is adjacent to residential and commercial uses. The property does not contain sensitive natural communities which are protected by federal, state or local policies, nor does it contain any wetlands; thus, the project will have no impact with regard to this criterion.

d) The City includes an interconnected network of open space corridors and preserves located throughout the City, to ensure that the movement of wildlife is not substantially impeded as the City develops. The development of the project site will not negatively impact these existing and planned open space corridors, nor is the project site located in an area that has been designated by the City, United States Fish and Wildlife, or California Department of Fish and Wildlife as vital or important for the movement of wildlife or the use of native wildlife nursery sites.

e) As defined by the City of Roseville Zoning Ordinance (Chapter 19.66, Tree Preservation), native oak trees greater than six (6") diameter at breast height are defined as protected. A Tree Permit is required for the removal of any protected tree, and for any regulated activity within the protected zone of a protected tree where the encroachment exceeds 20 percent. An arborist report including a tree inventory summary was provided by California Tree and Landscape Consulting, Inc., dated February 20, 2020 (Attachment 4). A total of 33 protected oak trees were identified on the property. Of the 33 trees, 28 trees with a total aggregate diameter of 721 inches are proposed for removal to facilitate development of the site, while five (5) trees are proposed to be retained (see Table 2 and Table 3). Eight (8) of the trees proposed for removal were identified as having failed and being in down and dead condition. These trees are identified in Table 2. The arborist's recommendations include monitoring any excavation for the retaining wall footings for the trees to remain on the site. The Tree Permit would contain conditions of approval to follow the recommendations of the Arborist Report, and mitigation measures that include payment of in-lieu mitigation fees to compensate for oak tree removal and on-site replacement plantings consisting of both native and non-native tree species. Any deviation from the approved permit would require a Tree Permit Modification, which would require approval by the City.

The above tree impacts were already anticipated and evaluated within the West Roseville Specific Plan EIR (prior EIR). The prior EIR included an evaluation of tree canopy loss within the entire Specific Plan area, and preserved the majority of the oak groves within open space. Figure 4.7-6 of the prior EIR (see Figure 3, EIR Tree Locations) shows the project site as a Community Commercial parcel, and identified the oak trees on this site as being lost due to development. The EIR estimated a total loss of nearly 6,000 inches of oak trees, and to offset this impact included a tree mitigation plan to plant nearly 7,000 oak trees within the WRSP open space. The proposed project is consistent with the prior EIR analysis, and thus does not result in new or previously undisclosed impacts to native oak tree resources. The EIR required future projects comply with the City's Tree Ordinance; this project includes a Tree Permit, consistent with the City's Tree Ordinance. Consistency with the requirements of the Tree Permit for this project will ensure that impacts are less than significant.

Figure 2: Tree Locations

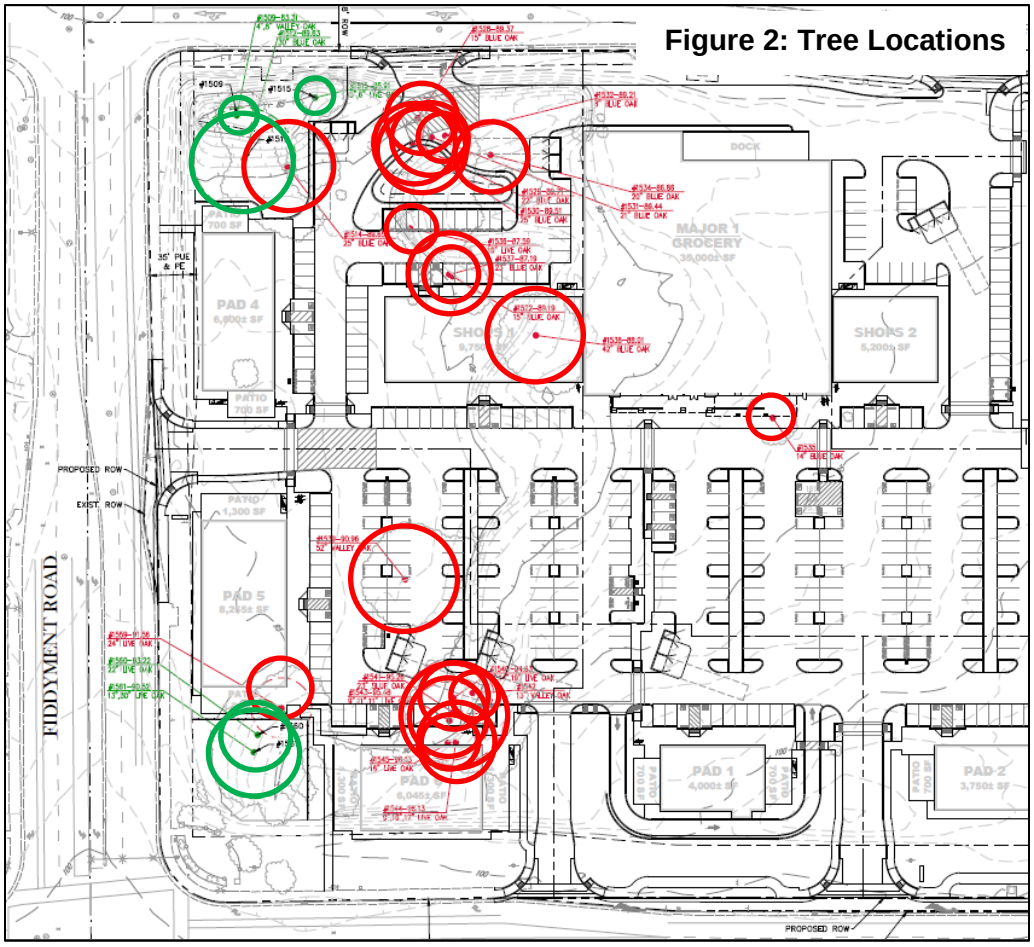


Figure 3: EIR Tree Locations

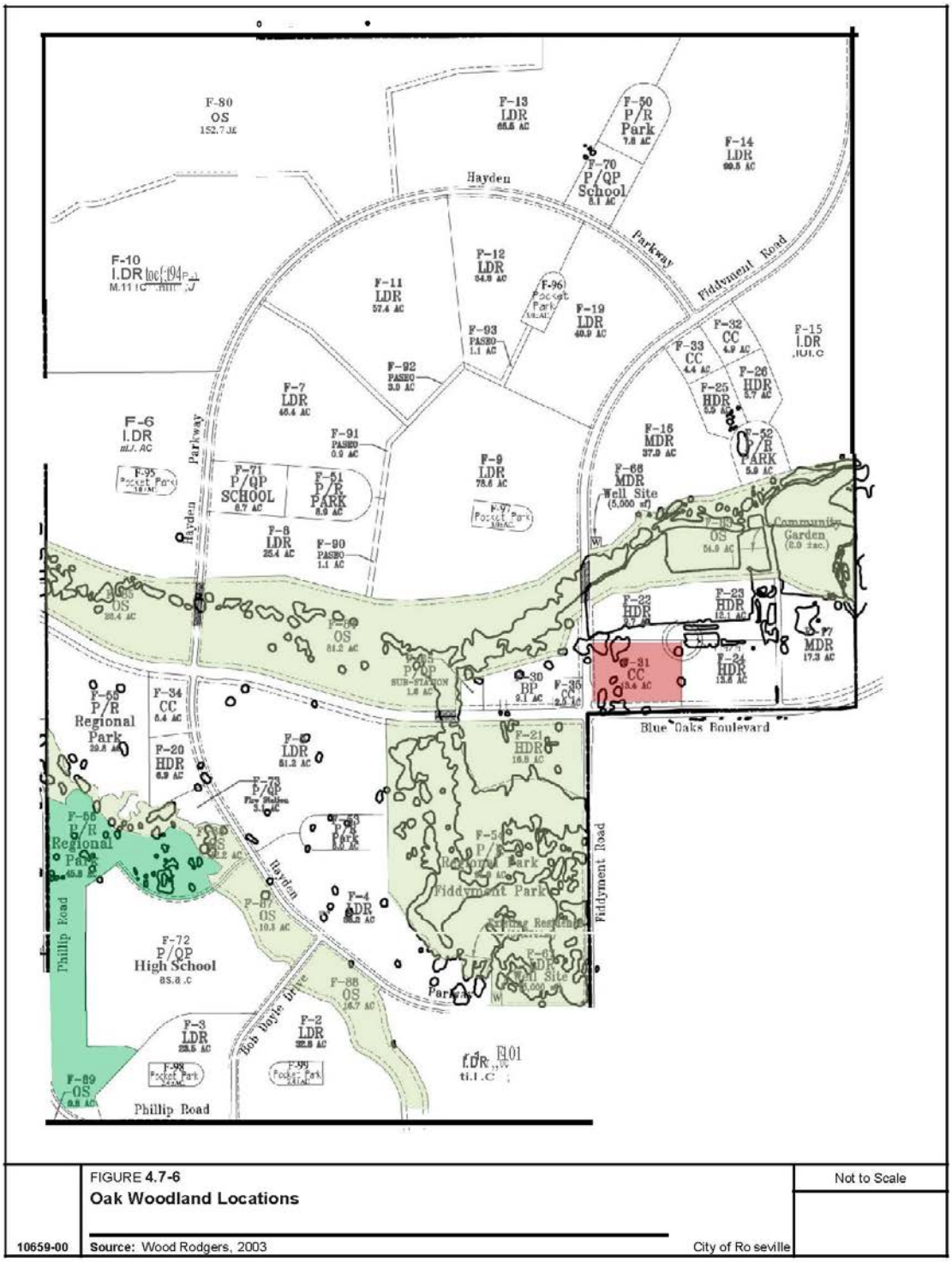


Table 2: Trees Proposed for Removal

Tree Number	Common Name	Structure Health	Dripline Radius (inches)	Total Diameter at Breast Height (DBH) (inches)
1510	Blue Oak	Failed	-	23
1513	Blue Oak	Failed	-	29
1514	Blue Oak	Poor to Fair	33	28
1521	Blue Oak	Failed	-	26
1522	Blue Oak	Fair	22	18
1523	Blue Oak	Failed	-	23
1528	Blue Oak	Poor to Fair	24	17
1529	Blue Oak	Poor to Fair	32	26
1530	Blue Oak	Poor to Fair	33	27
1531	Blue Oak	Poor to Fair	31	24
1532	Blue Oak	Poor	9	8
1533	Blue Oak	Failed	-	20
1534	Blue Oak	Poor	30	21
1535	Blue Oak	Fair	17	14
1536	Interior Live Oak	Fair	22	21
1537	Blue Oak	Fair	31	26
1538	Blue Oak	Fair	37	45
1539	Valley Oak	Poor	39	57
1540	Interior Live Oak	Poor	38	35
1541	Blue Oak	Fair	39	25
1542	Valley Oak	Poor to Fair	16	13
1543	Interior Live Oak	Poor to Fair	32	37
1544	Interior Live Oak	Poor to Fair	32	53
1545	Interior Live Oak	Poor to Fair	29	21
1559	Interior Live Oak	Poor to Fair	26	26
1562	Interior Live Oak	Failed	-	17
1563	Interior Live Oak	Failed	32	21
1564	Blue Oak	Failed	-	20
Total Mitigation Inches				**721**

Table 3: Trees Retained

Tree Number	Common Name	Structure Health	Dripline Radius (inches)	Total Diameter at Breast Height (DBH) (inches)

1509	Valley Oak	Fair	17	16
1512	Blue Oak	Poor to Fair	25	24
1515	Interior Live Oak	Poor to Fair	16	17
1560	Interior Live Oak	Fair	28	25
1561	Interior Live Oak	Poor to Fair	30	40
			Total Inches	**122**

f) There are no Habitat Conservation Plans; Natural Community Conservation Plans; or other approved local, regional, or state habitat conservation plans that apply to the project site.

V. Cultural Resources

As described within the Open Space and Conservation Element of the City of Roseville General Plan, the Roseville region was within the territory of the Nisenan (also Southern Maidu or Valley Maidu). Two large permanent Nisenan habitation sites have been identified and protected within the City's open space (in Maidu Park). Numerous smaller cultural resources, such as midden deposits and bedrock mortars, have also been recorded in the City. The gold rush which began in 1848 marked another settlement period, and evidence of Roseville's ranching and mining past are still found today. Historic features include rock walls, ditches, low terraces, and other remnants of settlement and activity. A majority of documented sites within the City are located in areas designated for open space uses.

Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of an historic resource pursuant to Section 15064.5?			X	
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?			X	
c) Disturb any human remains, including those interred outside of dedicated cemeteries?			X	

Thresholds of Significance and Regulatory Setting:

The significance of impacts to cultural resources is based directly on the CEQA Guidelines checklist items a–e listed above. The Archaeological, Historic, and Cultural Resources section of the City of Roseville General Plan also directs the proper evaluation of and, when feasible, protection of significant resources (Policies 1 and 2). There are also various federal and State regulations regarding the treatment and protection of cultural resources, including the National Historic Preservation Act and the Antiquities Act (which regulate items of significance in history), Section 7050.5 of the California Health and Safety Code, Section 5097.9 of the California Public

Resources Code (which regulates the treatment of human remains) and Section 21073 et seq. of the California Public Resources Code (regarding Tribal Cultural Resources). The CEQA Guidelines also contains specific sections, other than the checklist items, related to the treatment of effects on historic resources.

Pursuant to the CEQA Guidelines, if it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts to be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, mitigation measures are required (Section 21083.2 (a), (b), and (c)). A *historical resource* is a resource listed, or determined to be eligible for listing, in the California Register of Historical Resources (CRHR) (Section 21084.1); a resource included in a local register of historical resources (Section 15064.5(a)(2)); or any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant (Section 15064.5 (a)(3)). Public Resources Code Section 5024.1 requires evaluation of historical resources to determine their eligibility for listing on the CRHR.

Discussion of Checklist Answers:

a–c) No cultural resources are known to exist on the project site per the WRSP EIR; however, standard mitigation measures apply which are designed to reduce impacts to cultural resources, should any be found on-site. The measure requires an immediate cessation of work, and contact with the appropriate agencies to address the resource before work can resume. This mitigation need not be applied herein, as it is already applicable and required of the project pursuant to the WRSP. The project will not result in any new impacts beyond those already discussed and disclosed in the WRSP EIR; thus, project-specific impacts are less than significant.

VI. Energy

Roseville Electric provides electrical power in the City and Pacific Gas and Electric (PG&E) provides natural gas. The City purchases wholesale electrical power from both the Western Area Power Administration (WAPA), which is generated by the federal government's Central Valley Project, which produces 100 percent hydroelectric energy sources from a system of dams, reservoirs, and power plants within central and northern California. In addition, up to 50 percent of the City's power is generated at the City-owned Roseville Energy Park (REP). The REP is a 160 megawatt natural-gas-fired power plant that uses a combined cycle gas turbine technology. The City also owns the 48 megawatt combustion-turbine Roseville Power Plant 2 (REP 2), which is used for peaking energy. The City's electric power mix varies from year-to-year, but according to the most recent Citywide energy analysis (the Amoruso Ranch Environmental Impact Report), the mix in 2013/2014 was 25% eligible renewable (geothermal, small hydroelectric, and wind), 14% hydroelectric, 48% natural gas, and 13% from other sources (power purchased by contract).

Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			X	

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?			X	

Thresholds of Significance and Regulatory Setting:

Established in 2002, California's Renewable Portfolio Standard (RPS) currently requires that 33 percent of electricity retail sales by served by renewable energy resources by 2020, and 50 percent by 2030. The City published a Renewables Portfolio Standard Procurement Plan in June 2018, and continues to comply with the RPS reporting and requirements and standards. There are no numeric significance thresholds to define "wasteful, inefficient, or unnecessary" energy consumption, and therefore significance is based on CEQA Guidelines checklist items a and b, above, and by the use of expert judgment supported by facts, relying on the policies, codes, and regulations adopted by the City and by regulatory agencies which relate to energy. The analysis considers compliance with regulations and standards, project design as it relates to energy use (including transportation energy), whether the project will result in a substantial unplanned demand on the City's energy resources, and whether the project will impede the ability of the City to meet the RPS standards.

Discussion of Checklist Answers:

a-b) The project would consume energy both during project construction and during project operation. During construction, fossil fuels, electricity, and natural gas would be used by construction vehicles and equipment. However, the energy consumed during construction would be temporary, and would not represent a significant demand on available resources. There are no unusual project characteristics that would necessitate the use of construction equipment or methods that would be less energy-efficient or which would be wasteful.

The completed project would consume energy related to building operation, exterior lighting, landscape irrigation and maintenance, and vehicle trips to and from the use. In accordance with California Energy Code Title 24, the project would be required to meet the Building Energy Efficiency Standards. This includes standards for water and space heating and cooling equipment; insulation for doors, pipes, walls, and ceilings; and appliances, to name a few. The project would also be eligible for rebates and other financial incentives from both the electric and gas providers for the purchase of energy-efficient appliances and systems, which would further reduce the operational energy demand of the project. The project was distributed to both PG&E and Roseville Electric for comments, and was found to conform to the standards of both providers; energy supplies are available to serve the project.

The project is consistent with the existing land use designation of Community Commercial, and has therefore been assumed for development with commercial uses in citywide environmental analyses, such as in the Amoruso Ranch Specific Plan, which updated the City's General Plan. The project is therefore consistent with the current citywide assessment of energy demand, and will not result in substantial unplanned demands. In addition, based on the foregoing analysis, the project will not result in inefficient, wasteful, or unnecessary consumption of energy; impacts are less than significant.

VII. Geology and Soils

As described in the Safety Element of the City of Roseville General Plan, there are three inactive faults (Volcano Hill, Linda Creek, and an unnamed fault) in the vicinity, but there are no known active seismic faults within Placer County. The last seismic event recorded in the South Placer area occurred in 1908, and is estimated to have been at least a 4.0 on the Richter Scale. Due to the geographic location and soil characteristics within the City, the General Plan indicates that soil liquefaction, landslides, and subsidence are not a significant risk in the area.

Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:			X	
i) Ruptures of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)			X	
• Strong seismic ground shaking?			X	
• Seismic-related ground failure, including liquefaction?			X	
• Landslides?			X	
b) Result in substantial soil erosion or the loss of topsoil?			X	
c) Be located in a geological unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?				X
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?				X

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				X
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?			X	

Thresholds of Significance and Regulatory Setting:

The significance of impacts related to geology and soils is based directly on the CEQA Guidelines checklist items a–e listed above. Regulations applicable to this topic include the Alquist-Priolo Act, which addresses earthquake safety in building permits, and the Seismic Hazards Mapping Act, which requires the state to gather and publish data on the location and risk of seismic faults.

The Findings of the Implementing Procedures indicate that compliance with the Flood Damage Prevention Ordinance (RMC Ch.9.80) and Design/Construction Standards (Resolution 07-107) will prevent significant impacts related to checklist item b. The Ordinance and standards include permit requirements for construction and development in erosion-prone areas and ensure that grading activities will not result in significant soil erosion or loss of topsoil. The use of septic tanks or alternative waste systems is not permitted in the City of Roseville, and therefore no analysis of criterion e is necessary.

Discussion of Checklist Answers:

a) The project will not expose people or structures to potential substantial adverse effects involving seismic shaking, ground failure or landslides.

i–iii) According to United States Geological Service mapping and literature, active faults are largely considered to be those which have had movement within the last 10,000 years (within the Holocene or Historic time periods)[1] and there are no major active faults in Placer County. The California Geological Survey has prepared a map of the state which shows the earthquake shaking potential of areas throughout California based primarily on an area's distance from known active faults. The map shows that the City lies in a relatively low-intensity ground-shaking zone. Commercial, institutional, and residential buildings as well as all related infrastructure are required, in conformance with Chapter 16, *Structural Design Requirements*, Division IV, *Earthquake Design* of the California Building Code, to lessen the exposure to potentially damaging vibrations through seismic-resistant design. In compliance with the Code, all structures in the Project area would be well-built to withstand ground shaking from possible earthquakes in the region; impacts are less than significant.

iv) Landslides typically occur where soils on steep slopes become saturated or where natural or manmade conditions have taken away supporting structures and vegetation. The existing and proposed slopes of the project site are not steep enough to present a hazard during development or upon completion of the

[1] United States Geological Survey, http://earthquake.usgs.gov/learn/glossary/?term=active%20fault, Accessed January 2016

project. In addition, measures would be incorporated during construction to shore minor slopes and prevent potential earth movement. Therefore, impacts associated with landslides are less than significant.

b) Grading activities will result in the disruption, displacement, compaction and over-covering of soils associated with site preparation (grading and trenching for utilities). Grading activities for the project will be limited to the project site. Grading activities require a grading permit from the Engineering Division. The grading permit is reviewed for compliance with the City's Improvement Standards, including the provision of proper drainage, appropriate dust control, and erosion control measures. Grading and erosion control measures will be incorporated into the required grading plans and improvement plans. Therefore, the impacts associated with disruption, displacement, and compaction of soils associated with the project are less than significant.

c, d) A review of the Natural Resources Conservation Service Soil Survey for Placer County, accessed via the Web Soil Survey (http://websoilsurvey.nrcs.usda.gov/app/), indicates that the soils on the site are Cometa-Fiddyment complex, 1 to 5 percent slopes, Ramona sandy loam, 2 to 9 percent slopes, and Xerofluvents, frequently flooded, none of which are listed as geologically unstable or sensitive. Therefore, the project has no impacts related to this criteria.

f) No paleontological resources are known to exist on the project site per the WRSP EIR; however, standard mitigation measures apply which are designed to reduce impacts to such resources, should any be found on-site. The measure requires an immediate cessation of work, and contact with the appropriate agencies to address the resource before work can resume. With these measures in place, project-specific impacts are less than significant.

VIII. Greenhouse Gases

Greenhouse gases trap heat in the earth's atmosphere. The principal greenhouse gases (GHGs) that enter the atmosphere because of human activities are carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases. As explained by the United States Environmental Protection Agency[2], global average temperature has increased by more than 1.5 degrees Fahrenheit since the late 1800s, and most of the warming of the past half century has been caused by human emissions. The City has taken proactive steps to reduce greenhouse gas emissions, which include the introduction of General Plan policies to reduce emissions, changes to City operations, and climate action initiatives.

Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?			X	
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?			X	

[2] http://www3.epa.gov/climatechange/science/overview.html, Accessed January 2016

Thresholds of Significance and Regulatory Setting:

In Assembly Bill 32 (the California Global Warming Solutions Act), signed by Governor Schwarzenegger of California in September 2006, the legislature found that climate change resulting from global warming was a threat to California, and directed that "the State Air Resources Board design emissions reduction measures to meet the statewide emissions limits for greenhouse gases . . .". The target established in AB 32 was to reduce emissions to 1990 levels by the year 2020. CARB subsequently prepared the *Climate Change Scoping Plan* (Scoping Plan) for California, which was approved in 2008. The Scoping Plan provides the outline for actions to reduce California's GHG emissions. CARB's updated August 2011 Scoping Plan calculated a reduction needed of 21.7% from future "Business As Usual" (BAU) conditions in the year 2020. The current Scoping Plan (adopted May 2014) indicates that statewide emissions of GHG in 1990 amounted to 431 million metric tons, and that the 2020 "Business As Usual" (BAU) scenario is estimated as 509[3] million metric tons, which would require a reduction of 15.3% from 2020 BAU. In addition to this, Senate Bill 32 was signed by the Governor on September 8, 2016, to establish a reduction target of 40 percent below 1990 levels by 2030. The Air Resources Board is currently updating the Scoping Plan to reflect this target.

The Placer County Air Pollution Control District (PCAPCD) recommends that thresholds of significance for GHG be related to AB 32 reduction goals, and has adopted thresholds of significance which take into account the 2030 reduction target. The thresholds include a de minimis and a bright-line maximum threshold. Any project emitting less than 1,100 metric tons of carbon dioxide equivalents per year (MT CO_2e/yr) during construction or operation results in less than significant impacts. The PCAPCD considers any project with emissions greater than the bright-line cap of 10,000 MT CO_2e/yr to have significant impacts. For projects exceeding the de minimum threshold but below the bright-line threshold, comparison to the appropriate efficiency threshold is recommended. The significance thresholds are shown in Table 1 below.

Table 1: GHG Significance Thresholds

Bright-line Threshold 10,000 MT CO_2e/yr			
Residential Efficiency (MT CO_2e/capita[1])		**Non-Residential Efficiency (MT CO_2e/ksf[2])**	
Urban	**Rural**	**Urban**	**Rural**
4.5	5.5	26.5	27.3
De Minimis Threshold 1,100 MT CO_2e/yr			

1. Per Capita = per person
2. Per ksf = per 1,000 square feet of building

Discussion of Checklist Answers:

a–b) Greenhouse gases are primarily emitted as a result of vehicle operation associated with trips to and from a project, and energy consumption from operation of the buildings. Greenhouse gases from vehicles is assessed based on the vehicle miles traveled (VMT) resulting from a project, on a Citywide basis. Residential projects, destination centers (such as a regional mall), and major employers tend to increase VMT in a study area, either by adding new residents traveling in an area, or by encouraging longer trip lengths and drawing in trips from a broader regional area. However, non-residential projects and neighborhood-serving uses (e.g. neighborhood parks) tend to lower VMT in a study area because they do not generate new trips within the study area, they divert existing trips. These trips are diverted because the new use location is closer to home, on their way to another destination (e.g. work), or is otherwise more convenient.

[3] Includes Pavely and Renewables Portfolio Standard reduction

As discussed, the project would not be anticipated to increase VMT, since it is providing services in closer proximity to developed residential areas of the City. In addition, as discussed in the Transportation section of this Initial Study, the project is anticipated to result in a lower trip generation than what was assumed in the City's traffic model for this area. Therefore, the focus of this analysis is on the emissions which would result from the operation of the proposed buildings. CalEEMod Version 2016.3.2 was used to calculate the operational emissions of the project (see Attachment 5), which includes energy run to the buildings, area emissions such as landscape equipment to maintain the site, and water and wastewater energy demands. According to the CalEEMod results, the project would result in annual operational emissions of 726.45 MT CO_2e, which is below the de minimis threshold of 1,100 MT CO_2e. Therefore, the proposed project would not result in significant operational emissions of GHG.

Construction-related GHG emissions occur at one point in time and are therefore not typically expected to significantly contribute to climate change. Climate change is a cumulative effect that occurs over time, as emissions increase on a year-to-year basis due to increases in developed area and other factors; construction emissions are a one-time emission source, which end once the project is built. The CalEEMod results indicate the project would result in annual construction emissions of 338.07 CO_2e in the most active construction year, which is below the de minimis threshold of 1,100 MT CO_2e/yr. Thus, the project-generated GHG emissions would not conflict with, and are consistent with, the State goals listed in AB32 and other policies and regulations adopted by the California Air Resources Board. This impact is considered less than significant.

IX. Hazards and Hazardous Materials

There are no hazardous cleanup sites of record within 1,000 feet of the site according to both the State Water Resources Control Envirostor database (http://geotracker.waterboards.ca.gov/) and the Department of Toxic Substances Control Envirostor database (http://www.envirostor.dtsc.ca.gov/public/). The project is not located on a site where existing hazardous materials have been identified, and the project does not have the potential to expose individuals to hazardous materials.

Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
b) Create a significant hazard to the public or the environment though reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			X	

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?				X
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?				X

Thresholds of Significance and Regulatory Setting:

The significance of impacts related to hazardous materials is based directly on the CEQA Guidelines checklist items a–h listed above. A material is defined as hazardous if it appears on a list of hazardous materials prepared by a federal, state or local regulatory agency, or if it has characteristics defined as hazardous by such an agency. The determination of significance based on the above criteria depends on the probable frequency and severity of consequences to people who might be exposed to the health hazard, and the degree to which Project design or existing regulations would reduce the frequency of or severity of exposure. As an example, products commonly used for household cleaning are classified as hazardous when transported in large quantities, but one would not conclude that the presence of small quantities of household cleaners at a home would pose a risk to a school located within ¼-mile.

Many federal and State agencies regulate hazards and hazardous substances, including the United States Environmental Protection Agency (US EPA), California Department of Toxic Substances Control (DTSC), Central Valley Regional Water Quality Control Board (Regional Water Board), and the California Occupational Safety and Health Administration (CalOSHA). The state has been granted primacy (primary responsibility for oversight) by the US EPA to administer and enforce hazardous waste management programs. State regulations also have detailed planning and management requirements to ensure that hazardous materials are handled, stored, and disposed of properly to reduce human health risks. California regulations pertaining to hazardous waste management are published in the California Code of Regulations (see 8 CCR, 22 CCR, and 23 CCR).

The project is not within an airport land use plan or within two miles of a public or public use airport. Therefore, no further discussion is provided for items e.

Discussion of Checklist Answers:

a-b) Standard construction activities would require the use of hazardous materials such as fuels, oils, lubricants, glues, paints and paint thinners, soaps, bleach, and solvents. These are common household and commercial materials routinely used by both businesses and average members of the public. The materials only pose a hazard if they are improperly used, stored, or transported either through upset conditions (e.g. a vehicle accident) or mishandling. In addition to construction use, the operational project would result in the use of common hazardous materials as well, including bleach, solvents, and herbicides. Regulations pertaining to the transport of materials are codified in 49 Code of Federal Regulations 171–180, and transport regulations are enforced and monitored by the California Department of Transportation and by the California Highway Patrol. Specifications for storage on a construction site are contained in various regulations and codes, including the California Code of Regulations, the Uniform Fire Code, and the California Health and Safety Code. These same codes require that all hazardous materials be used and stored in the manner specified on the material packaging. In addition, compliance with state and federal standards governing gas stations, including the PCAPCD's permitting requirements for such uses, would ensure that the project does not result in significant impacts related to hazards and hazardous materials. Existing regulations and programs are sufficient to ensure that potential impacts as a result of the use or storage of hazardous materials are reduced to less than significant levels.

c) The project is not located within a ¼-mile of an existing or proposed school, and thus there is no impact with respect to this criterion.

d) The project is not located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5[4]; therefore, no impact will occur.

f) This project is located within an area currently receiving City emergency services and development of the site has been anticipated and incorporated into emergency response plans. As such, the project will cause a less than significant impact to the City's Emergency Response or Management Plans. Furthermore, the project will be required to comply with all local, State and federal requirements for the handling of hazardous materials, which will ensure less-than-significant impacts. These will require the following programs:

- A Risk Management and Prevention Program (RMPP) is required of uses that handle toxic and/or hazardous materials in quantities regulated by the California Health and Safety Code and/or the City.

- Businesses that handle toxic or hazardous materials are required to complete a Hazardous Materials Management Program (HMMP) pursuant to local, State, or federal requirements.

g) The California Department of Forestry and Fire Protection (CAL FIRE) is the state agency responsible for wildland fire protection and management. As part of that task, CAL FIRE maintains maps designating

[4] http://www.calepa.ca.gov/SiteCleanup/CorteseList/SectionA.htm

Wildland Fire Hazard Severity zones. The City is not located within a Very High Fire Hazard Severity Zone, and is not in a CAL FIRE responsibility area; fire suppression is entirely within local responsibility. The project site is in an urban area, and therefore would not expose people to any risk from wildland fire. There would be no impact with regard to this criterion.

X. Hydrology and Water Quality

As described in the Open Space and Conservation Element of the City of Roseville General Plan, the City is located within the Pleasant Grove Creek Basin and the Dry Creek Basin. Pleasant Grove Creek and its tributaries drain most of the western and central areas of the City and Dry Creek and its tributaries drain the remainder of the City. Most major stream areas in the City are located within designated open space.

Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			X	
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:			X	
i. result in substantial erosion or siltation on or off-site;			X	
ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;			X	

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater systems or provide substantial additional sources of polluted runoff; or			X	
iv. impede or redirect flood flows?				X
d) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?			X	
e) In flood hazard, tsunami, or seiches zones, risk release of pollutants due to project innundation?				X

Thresholds of Significance and Regulatory Setting:

The significance of impacts related to hydrology and water quality is based directly on the CEQA Guidelines checklist items a–e listed above. For checklist item a, c (i), d, and e, the Findings of the Implementing Procedures indicate that compliance with the City of Roseville Design/Construction Standards (Resolution 07-107), Urban Stormwater Quality Management and Discharge Control Ordinance (RMC Ch. 14.20), and Stormwater Quality Design Manual (Resolution 16-152) will prevent significant impacts related to water quality or erosion. The standards require preparation of an erosion and sediment control plan for construction activities and includes designs to control pollutants within post-construction urban water runoff. Likewise, it is indicated that the Drainage Fees for the Dry Creek and Pleasant Grove Watersheds (RMC Ch.4.48) and City of Roseville Design/Construction Standards (Resolution 07-107) will prevent significant impacts related to checklist items c (ii) and c (iii). The ordinance and standards require the collection of drainage fees to fund improvements that mitigate potential flooding impacts, and require the design of a water drainage system that will adequately convey anticipated stormwater flows without increasing the rate or amount of surface runoff. These same ordinances and standards prevent impacts related to groundwater (items a and d), because developers are required to treat and detain all stormwater onsite using stormwater swales and other methods which slow flows and preserve infiltration. Finally, it is indicated that compliance with the Flood Damage Prevention Ordinance (RMC Ch. 9.80) will prevent significant impacts related to items c (iv) and e. The Ordinance includes standard requirements for all new construction, including regulation of development with the potential to impede or redirect flood flows, and prohibits development within flood hazard areas. Impacts from tsunamis and seiches were screened out of the analysis (item e) because the project is not located near a water body or other feature that would pose a risk of such an event.

Discussion of Checklist Answers:

a,c (i),d, e) The project will involve the disturbance of on-site soils and the construction of impervious surfaces, such as asphalt paving. Disturbing the soil can allow sediment to be mobilized by rain or wind, and cause displacement into waterways. To address this and other issues, the developer is required to receive approval of

a grading permit and/or improvement plants prior to the start of construction. The permit or plans are required to incorporate mitigation measures for dust and erosion control. In addition, the City has a National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater Permit issued by the Central Valley Regional Water Quality Control Board which requires the City to reduce pollutants in stormwater to the maximum extent practicable. The City does this, in part, by means of the City's 2016 Design/Construction Standards, which require preparation and implementation of a Stormwater Pollution Prevention Plan. All permanent stormwater quality control measures must be designed to comply with the City's Manual for Stormwater Quality Control Standards for New Development, the City's 2016 Design/Construction Standards, Urban Stormwater Quality Management and Discharge Control Ordinance, and Stormwater Quality Design Manual. For these reasons, impacts related to water quality are less than significant.

b, d) The project does not involve the installation of groundwater wells. The City maintains wells to supplement surface water supplies during multiple dry years, but the effect of groundwater extraction on the aquifer was addressed in the Water Supply Assessment of the Amoruso Ranch Specific Plan EIR, which included a Citywide water analysis. The proposed project is consistent with the General Plan land use designation, and is thus consistent with the citywide Water Supply Assessment. Project impacts related to groundwater extraction are less than significant. Furthermore, all permanent stormwater quality control measures must be designed to comply with the Stormwater Quality Design Manual, which requires the use of bioswales and other onsite detention and infiltration methods. These standards ensure that stormwater will continue to infiltrate into the groundwater aquifer.

c (ii and iii)) The project has been reviewed by City Engineering staff for conformance with City ordinances and standards. The project includes adequate and appropriate facilities to ensure no net increase in the amount or rate of stormwater runoff from the site, and which will adequately convey stormwater flows.

c (iv) and e) The project has been reviewed by City Engineering staff for conformance with City ordinances and standards. The project is not located within either the Federal Emergency Management Agency floodplain or the City's Regulatory Floodplain (defined as the floodplain which will result from full buildout of the City). Therefore, the project will not impede or redirect flood flows, nor will it be inundated. The proposed project is located within an area of flat topography and is not near a waterbody or other feature which could cause a seiche or tsunami. There would be no impact with regard to these criterion.

XI. Land Use and Planning

The project site has a General Plan land use designation and zoning designation of Community Commercial (CC). Surrounding properties have commercial and residential land use and zoning designations, as described in the Background section of this Initial Study.

Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Physically divide an established community?				X
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?				X

Thresholds of Significance and Regulatory Setting:

The significance of impacts related to land use is based directly on the CEQA Guidelines checklist items a–c listed above. Consistency with applicable City General Plan policies, Improvement Standards, and design standards is already required and part of the City's processing of permits and plans, so these requirements do not appear as mitigation measures. Land use regulations applicable to the site include the City's General Plan 2035, the Zoning Ordinance, and the NERSP. The NERSP contains general design guidelines and policies for development within the NERSP as a whole.

Discussion of Checklist Answers:

a) The project area has been planned for development, including adequate roads, pedestrian paths, and bicycle paths to provide connections within the community. The project involves frontage improvements including new driveways, sidewalks, and pedestrian connections. As such, the project will not physically divide an established community.

b) With the application for a Tree Permit, the project is consistent with the Zoning Ordinance requirements for the removal and mitigation of oak trees. The project would be required to comply with the City's Improvement Standards in order to receive a grading permit. The proposed project is consistent with the General Plan and the WRSP, and does not conflict with the City's policies and regulations adopted for the purpose of avoiding or mitigating an environmental impact.

XII. Mineral Resources

The Surface Mining and Reclamation Act (SMARA) of 1975 requires the State Geologist to classify land into Mineral Resource Zones (MRZ's) based on the known or inferred mineral resource potential of that land. The California Division of Mines and Geology (CDMG) was historically responsible for the classification and designation of areas containing—or potentially containing—significant mineral resources, though that responsibility now lies with the California Geological Survey (CGS). CDMG published Open File Report 95-10, which provides the mineral classification map for Placer County. A detailed evaluation of mineral resources has not been conducted within the City limits, but MRZ's have been identified. There are four broad MRZ categories (MRZ-1 through MRZ-4), and only MRZ-2 represents an area of known significant mineral resources. The City of Roseville General Plan EIR included Exhibit 4.1-3, depicting the location of MRZ's in the City limits. There is only one small MRZ-2 designation area, located at the far eastern edge of the City.

Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X

Thresholds of Significance and Regulatory Setting:

The significance of impacts related to mineral resources is based directly on the CEQA Guidelines checklist items a and b listed above.

Discussion of Checklist Answers:

a–b) The project site is not in the area of the City known to include any mineral resources that would be of local, regional, or statewide importance; therefore, the project has no impacts on mineral resources.

XIII. Noise

The project site is currently undeveloped and is surrounded by residential and commercial uses, which typically do not generate substantial noise volumes. Both of these roadways are identified as transportation noise sources in the City's General Plan Noise Element. According to the General Plan, the project site is within the 60 dB L_{dn} noise contour for existing roadways and within the 65 dB L_{dn} noise contour for future roadways (City of Roseville 2015, Figure IX-1 and Figure IX-2).

Would the project result in:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		X		
b) Generation of excessive ground borne vibration of ground borne noise levels?			X	

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				X

Thresholds of Significance and Regulatory Setting:

Standards for transportation noise and non-transportation noise affecting existing or proposed land uses are established within the City of Roseville General Plan Noise Element Table IX-1 and IX-3, and these standards are used as the thresholds to determine the significance of impacts related to items a and c. The significance of other noise impacts is based directly on the CEQA Guidelines checklist items b and c listed above. The Findings of the Implementing Procedures indicate that compliance with the City Noise Regulation (RMC Ch. 9.24) will prevent significant non-transportation noise as it relates to items a and b. The Ordinance establishes noise exposure standards that protect noise-sensitive receptors from a variety of noise sources, including non-transportation/fixed noise, amplified sound, industrial noise, and events on public property. The project is not within an airport land use plan, within two miles of a public or public use airport and there are also no private airstrips in the vicinity of the project area. Therefore, item c has been ruled out from further analysis.

Discussion of Checklist Answers:

a) The City of Roseville General Plan Noise Element includes Policy 7, which requires proposed fixed noise sources to be mitigated so as not to exceed the noise level performance standards contained within Noise Element Table IX-3. These standards are included in Table 4 below. Fixed noise sources are defined as noises that come from a specified area, while moving noise sources are from transportation facilities (roadway noise, train noise, etc.); the proposed project will generate fixed noise.

Table 4: Noise Element Table IX-3

PERFORMANCE STANDARDS FOR NON-TRANSPORTATION NOISE SOURCES OR PROJECTS AFFECTED BY NON-TRANSPORTATION NOISE SOURCES (As Measured at the Property Line of Noise-Sensitive Uses)

Noise Level Descriptor	Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)
Hourly L_{eq}, dB	50	45
Maximum level, dB	70	65

[1] For municipal power plants consisting primarily of broadband, steady state noise sources, the hourly (Leq) noise standard may be increased up to 10 dB(A), but not exceed 55 dB(A) Hourly Leq dB.

Each of the noise levels specified above should be lowered by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. Such noises are generally considered by residents to be particularly annoying and are a primary source of noise complaints. These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

No standards have been included for interior noise levels. Standard construction practices should, with exterior noise levels identified, result in acceptable interior noise levels.

The proposed project is a shopping center including a grocery store and a mix of retail and commercial uses. The project includes two loading dock areas adjacent to the grocery store and Junior Major buildings on the northern portion of the site, south of Harvey Way. The project also includes a gas station with an approximate 3,500 square-foot convenience store building and drive-through car wash on Pad 3, which is located on the southeastern portion of the overall site (see Figure 3). An Environmental Noise Assessment was prepared for the project by Bollard Acoustical Consultants, Inc. (BAC) and is included as Attachment 6. The assessment evaluates noise from the proposed loading dock areas and car wash portion of the gas station. It concluded that the noise generated by on-site truck circulation, loading docks, and car wash dryer operations could potentially exceed the applicable noise level limits at the nearest residential uses. As such, noise mitigation measures are required in order to comply with the General Plan noise standards, and to ensure impacts are less than significant. Each of these noise sources and related mitigation measures are addressed separately, below.

On-Site Truck Circulation Noise

Noise exposure from on-site truck circulation is expected to exceed the applicable General Plan noise standard for nighttime noise (45 dB L_{eq} and 65 dB L_{max}) at the adjacent residential use to the north, across Harvey Way. Therefore, in order to avoid exceeding General Plan noise standards, **Mitigation Measure NOI-1** is included which requires a solid noise barrier measuring a minimum of 7 feet in height between the proposed truck lane and residential development to the north. Alternatively, commercial truck deliveries shall be restricted to daytime hours (7 a.m. to 10 p.m.) if a noise barrier is not constructed as prescribed.

Loading Dock Noise

Noise exposure from loading dock activities is expected to exceed the General Plan noise standard for daytime and nighttime noise at the adjacent future High Density Residential (HDR) use to the north, across Harvey Way. The assessment concluded a solid noise barrier measuring a minimum of 6 feet in height is required in order to comply with the daytime noise standards, while a solid noise barrier measuring a minimum of 9 feet in height is required in order to comply with the nighttime noise standards. If the noise barrier is less than 9 feet in height,

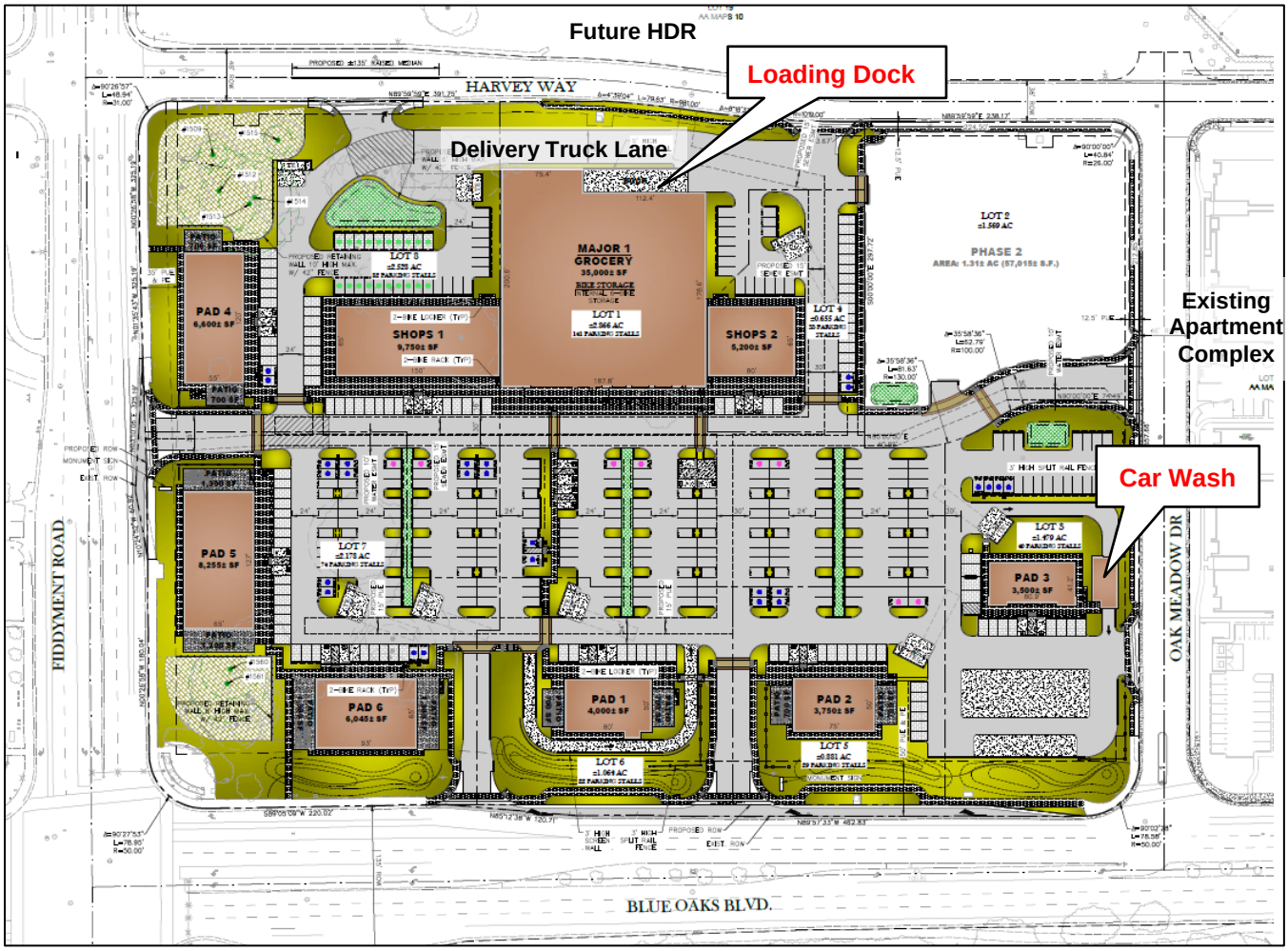
delivery activities shall be restricted to daytime hours (7 a.m. to 10 p.m.) in order to comply with the nighttime noise standards. This is reflected in Mitigation Measure NOI-1.

Car Wash Dryer Noise

The project includes a gas station facility with a car wash located at the southeastern corner of the overall site. The location of the car wash and nearest residential uses are shown on Figure 3. According to the study prepared by BAC, noise levels generated by car wash facilities are primarily due to the drying portion of the operation. As such, the effectiveness of installing car wash entrance and exit doors was considered and it was concluded that the doors would provide 14 dB of noise reduction when kept in the closed position during wash cycles. This meets the City's daytime noise level standard; however, the hourly average car wash noise levels could still exceed the City's 45 dB L_{eq} nighttime noise level standard by 3 dB at the nearest residential property line to the east. Therefore, Mitigation Measure NOI-1 also requires the installation of car wash entrance and exit doors that are kept in the closed position during wash cycles and limits the car wash operations to daytime hours (7 a.m. to 10 p.m.).

With mitigation, impacts will be less than significant.

Figure 3: Project Site Plan



b) Surrounding uses may experience short-term increases in groundborne vibration, groundborne noise, and airborne noise levels during construction. However, these increases would only occur for a short period of

time. When conducted during daytime hours, construction activities are exempt from Noise Ordinance standards, but the standards do apply to construction occurring during nighttime hours. While the noise generated may be a minor nuisance, the City Noise Regulation standards are designed to ensure that impacts are not unduly intrusive. Based on this, the impact is less than significant.

XIV. Population and Housing

The project site is located within the City's West Roseville Specific Plan (WRSP) area, is zoned for commercial uses and has a land use designation of Community Commercial. The City of Roseville General Plan Table II-4 identifies the total number of residential units and population anticipated as a result of buildout of the City, and the Specific Plan likewise includes unit allocations and population projections for the Plan Area. Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?			X	
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				X

Thresholds of Significance and Regulatory Setting:

The significance of impacts related to population and housing is based directly on the CEQA Guidelines checklist items a–c listed above.

Discussion of Checklist Answers:

a) The CEQA Guidelines identify several ways in which a project could have growth-inducing impacts (Public Resources Code Section 15126.2), either directly or indirectly. Growth-inducement may be the result of fostering economic growth, fostering population growth, providing new housing, or removing barriers to growth. Growth inducement may be detrimental, beneficial, or of no impact or significance under CEQA. An impact is only deemed to occur when it directly or indirectly affects the ability of agencies to provide needed public services, or if it can be shown that the growth will significantly affect the environment in some other way. The project is consistent with the land use designation of the site. The City already has several developed commercial centers, so the presence or absence of commercial centers is not currently a constraint on City growth. Therefore, construction of this commercial center will not remove a barrier to growth or induce substantial growth. Therefore, the impact of the project is less than significant.

b) The project site is vacant. No housing exists on the project site, and there would be no impact with respect to this criterion.

XV. Public Services

Fire protection, police protection, park services, and library services are provided by the City. The project is located within the Roseville Elementary School District and the Roseville Joint Union High School District.

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the following public services:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Fire protection?			X	
b) Police protection?			X	
c) Schools?			X	
d) Parks?			X	
e) Other public facilities?			X	

Thresholds of Significance and Regulatory Setting:

The significance of impacts related to public services is based directly on the CEQA Guidelines checklist items a–e listed above. The EIR for the Amoruso Ranch Specific Plan, which updated Citywide analyses, addressed the level of public services which would need to be provided in order to serve planned growth in the community. The project is consistent with the existing land use designations. In addition, the project has been routed to the various public service agencies, both internal and external, to ensure that the project meets the agencies' design standards (where applicable) and to provide an opportunity to recommend appropriate conditions of approval.

a) Existing City codes and regulations require adequate water pressure in the water lines, and construction must comply with the Uniform Fire and Building Codes used by the City of Roseville. Additionally, the applicant is required to pay a fire service construction tax, which is used for purchasing capital facilities for the Fire Department. Existing codes, regulations, funding agreements, and facilities plans are sufficient to ensure less than significant impacts.

b) Sales taxes and property taxes resulting from development will add revenue to the General Fund, which provides funding for police services. Existing codes, regulations, funding agreements, and facilities plans are sufficient to ensure less than significant impacts.

c) Project applicants are required to pay school impact fees at a rate determined by the local school districts. School fees will be collected prior to the issuance of building permits, consistent with City requirements. Existing codes, regulations, funding agreements, and facilities plans are sufficient to ensure less than significant impacts.

d) Future park and recreation sites and facilities have already been identified as part of the Specific Plan process. Existing codes, regulations, funding agreements, and facilities plans are sufficient to ensure less than significant impacts.

e) Sales taxes and property taxes resulting from development will add revenue to the General Fund, which provides funding for the library system and other such facilities and services. In addition, the City charges fees to end-users for other services, such as garbage and greenwaste collection, in order to fund those

services. Existing codes, regulations, funding agreements, and facilities plans are sufficient to ensure less than significant impacts.

XVI. Recreation

There are no parks or recreation facilities immediately adjacent to the project site. The nearest recreation area is School House Park, located approximately 0.15-mile south of the site, along Fiddyment Road.

Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that physical deterioration of the facility would occur or be accelerated?			X	
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X

Thresholds of Significance and Regulatory Setting:

The significance of impacts related to recreation services is based directly on the CEQA Guidelines checklist items a–b listed above.

Discussion of Checklist Answers:

a) The WRSP EIR addressed the level of park services—including new construction, maintenance, and operations—which would need to be provided in order to serve planned growth in the community. Given that the project is consistent with the General Plan and Specific Plan, the project would not cause any unforeseen or new impacts related to the use of existing or proposed parks and recreational facilities. Existing codes, regulations, funding agreements, and facilities plans are sufficient to ensure less than significant impacts.

b) Park sites and other recreational facilities were identified within the WRSP, and the plan-level impacts of developing those facilities were addressed within the Final EIR for the Specific Plan. The project will not cause any unforeseen or new impacts related to the construction or expansion of recreational facilities.

XVII. Transportation

The project site is located at the northwest corner of Blue Oaks Boulevard and Fiddyment Road, both of which are major arterials with transit facilities in the City of Roseville. Blue Oaks Boulevard includes on-street, striped bicycle lanes and partially constructed sidewalks. Fiddyment Road includes on-street, striped bicycle lanes, attached sidewalks, and a bus turn-out for a future transit stop.

Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?			X	
b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?			X	
c) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?			X	
d) Result in inadequate emergency access?			X	

Thresholds of Significance and Regulatory Setting:

CEQA Guidelines Section 15064.3 indicates that a project's effect on automobile delay cannot be considered a significant impact, and directs transportation system analysis to focus on vehicle miles traveled (VMT), per checklist item b. However, the CEQA Guidelines also include consistency with a program, plan, or policy addressing transportation systems as an area of potential environmental effects (checklist item a). The City has adopted the following plans, ordinances, or policies applicable to this checklist item: Pedestrian Master Plan, Bicycle Master Plan, Short-Range Transit Plan, and General Plan Circulation Element. The project is evaluated for consistency with these plans and the policies contained within them, which includes an analysis of delay as a potential policy impact. The Circulation Element of the General Plan establishes Level of Service C or better as an acceptable operating condition at all signalized intersections during a.m. and p.m. peak hours. Exceptions to this policy may be made by the City Council, but a minimum of 70% of all signalized intersections must maintain LOS C. The Findings of the Implementing Procedures indicate that compliance with the Traffic Mitigation Fee (RMC Ch. 4.44) will fund roadway projects and improvements necessary to maintain the City's Level of Service standards for projects consistent with the General Plan and related Specific Plan. An existing plus project conditions (short-term) traffic impact study may be required for projects with unique trip generation or distribution characteristics, in areas of local traffic constraints, or to study the proposed project access. A cumulative plus project conditions (long-term) study is required if a project is inconsistent with the General Plan or Specific Plan and would generate more than 50 pm peak-hour trips. The guidelines for traffic study preparation are found in the City of Roseville Design and Construction Standards–Section 4.

For checklist item b, the CEQA Guidelines Section 15064.3 establishes a detailed process for evaluating the significance of transportation impacts. In accordance with this section, the analysis must focus on the generation

of VMT. Projects within one-half mile of either an existing major transit stop[5] or a stop along an existing high quality transit corridor[6] should be presumed to have less than significant impacts, as should any project which will decrease VMT when compared with the existing conditions. VMT may be analyzed qualitatively if existing models or methods are not available to estimate VMT for a particular project; this will generally be appropriate for discussions of construction traffic VMT.

Impacts with regard to items c and d are assessed based on the expert judgment of the City Engineer and City Fire Department, as based upon facts and consistency with the City's Design and Construction Standards.

Discussion of Checklist Answers:

a) The City of Roseville has adopted a Pedestrian Master Plan, Bicycle Master Plan, and Short-Range Transit Plan. The project was reviewed for consistency with these documents. Pedestrian facilities have already been constructed adjacent to Blue Oaks Boulevard, as well as a portion of Fiddyment Road. Bicycle facilities have also been constructed adjacent to Blue Oaks Boulevard and Fiddyment Road, and the project will not decrease the performance or safety of those facilities. The project design includes installation of sidewalks around the perimeter of the site, which would complete the pedestrian circulation system in the project vicinity. Thus, the project results in a beneficial impact related to pedestrian access and circulation. Additionally, the WRSP designates the project site as a park and ride lot. This requires the project to provide 20 parking spaces designated for commuters to leave their vehicles to meet carpools, vanpools or access transit. The project is consistent with the policies of the Pedestrian Master Plan, Bicycle Master Plan, and Short-Range Transit Plan.

A trip generation estimate was prepared by the City's Engineering Division in order to compare the project's anticipated p.m. peak hour trips to the City's modeled trips. Table 5, below, represents the anticipated trip generation for buildout of Transportation Analysis Zone 1107 with and without implementation of the project.

Table 5: Project Trip Generation Estimate
Traffic Analysis Zone 1107

Use	Units / Square Feet (sf)	Model Trip Rate	PM Peak Trips
2035 Build Out			
Retail	150,000 sf	2.46	369
Single-Family Residential (SFR)	131	0.69	90
Multi-Family Residential (MFR)	866	0.52	450
Existing			
Retail	0 sf	2.46	0
SFR	227	0.69	157
MFR	0	0.52	0
Proposed			
Retail	82,100 sf	2.46	202
2035 Build Out			*910*
Existing Plus Project			*359*
Total			**-551**

[5] A site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods. (Public Resources Code Section 21064.3)
[6] A corridor with fixed route bus service at service intervals of 15 minutes or less during peak commute hours.

With the addition of the project's p.m. peak hour trips to the existing condition, the resulting trip generation of 359 peak trips is 551 trips less than what was anticipated for the TAZ. Therefore, a long-term traffic study was not required given the project does not exceed the number of trips anticipated in the General Plan.

Kimley-Horn prepared a short-term traffic study for the proposed project (Attachment 7) to evaluate the project's access points and localized circulation, including throat depths, tapers, storage, and driveway treatments that are necessary to ensure safe and efficient operations and to maintain the City's existing level of service. The study concluded that the signalized intersections at Blue Oaks Boulevard at Fiddyment Road and Blue Oaks Boulevard at Orchard View both operate at LOS C or better during the Existing (2018) plus Project conditions. However, the following improvements have been identified to be constructed by the project:

1. The western project driveway along Harvey Way be restricted to right-turn in/out movements with installation of a narrow-raised median along Harvey Way and the addition of appropriate signing and striping at the driveway approach. This will ensure sufficient storage capacity to accommodate the 95th percentile queue for the westbound left-turn at Harvey Way and Fiddyment Road.

2. For the site driveway along Fiddyment Road, install "KEEP CLEAR" signing and pavement marking within the driveway intersection with the upstream drive aisle to minimize the potential for driveway blockage.

3. Lengthen the deceleration lane along westbound Blue Oaks Boulevard approaching Intersection #2 by 360 feet to adequately accommodate slowing vehicles entering the site.

These improvements have been incorporated into the project plans. Given the fact that the project is consistent with the City's Traffic Model and the results of the study will be implemented by the project, impacts to traffic and level of service have been determined to be less than significant.

b) Traffic analyses focus on the number of trips traveling in specified areas during peak periods, in order to quantify impacts as specific intersections. However, there is no direct relationship between the number of trips and the amount of VMT generated by a use. Projects which substantially increase trips to a specific area may in fact decrease VMT in the City. As an example, if a new grocery store is added to an area, customers who go to that store were already going to a grocery store elsewhere, and are most likely to choose the new store because it is closer to home or on their way to another location (e.g. work). So while the store would generate substantial new trips, it would lower Citywide VMT. Unless a project includes unique characteristics, non-residential projects do not increase VMT; they divert existing trips into a similar or more efficient pathway.

The proposed project is non-residential development of a vacant property, surrounded by existing development. The project does not include any unique characteristics which would draw in regional traffic, or which would prompt longer trips. The project would locate services and employment in proximity to existing developed areas, and would therefore have a neutral or positive impact on vehicle miles traveled. Impacts are less than significant.

c-d) The project has been reviewed by the City Engineering and City Fire Department staff, and has been found to be consistent with the City's Design Standards. Furthermore, standard conditions of approval added to all City project require compliance with Fire Codes and other design standards. Compliance with existing regulations ensure that impacts are less than significant.

XVIII. Tribal Cultural Resources

As described within the Open Space and Conservation Element of the City of Roseville General Plan, the Roseville region was within the territory of the Nisenan (also Southern Maidu or Valley Maidu). Two large permanent Nisenan habitation sites have been identified and protected within the City's open space (in Maidu Park). Numerous smaller cultural resources, such as midden deposits and bedrock mortars, have also been

recorded in the City. A majority of documented sites within the City are located in areas designated for open space uses.

Would the project cause a substantial adverse change in the significance of a Tribal Cultural Resource as defined in Public Resources Code Section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?			X	
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1 the lead agency shall consider the significance of the resource to a California Native American tribe.		X		

Thresholds of Significance and Regulatory Setting:

In addition to archeological resources, tribal cultural resources are also given particular treatment. Tribal cultural resources are defined in Public Resources Code Section 21074, as either 1) a site, feature, place, geographically-defined cultural landscape, sacred place, or object with cultural value to a California Native American Tribe, that is listed or eligible for listing on the California Register or Historical Resources, or on a local register of historical resources or as 2) a resource determined by the lead agency, supported by substantial evidence, to be significant according to the historical register criteria in Public Resources Code section 5024.1(c), and considering the significance of the resource to a California Native American Tribe.

Discussion of Checklist Answers:

a) The WRSP EIR included a historic and cultural resources study, which concluded there were no listed or eligible sites documented in the project area. However, the WRSP EIR includes standard mitigation measures which are designed to reduce impacts to any previously undiscovered resources should any be found on site. Language included in the measure requires an immediate cessation of work, and the requirement to contact the appropriate agencies to address the resource before work can resume. The project will not result in any new

impacts beyond those already discussed and disclosed in the WRSP EIR; therefore, project-specific impacts are less than significant.

b) Notice of the proposed project was mailed to tribes which had requested such notice pursuant to Assembly Bill 52 (AB 52) on January 2, 2020. A request for consultation was received from the United Auburn Indian Community (UAIC) on January 7, 2020. City staff met with tribal representatives at the project site on February 7, 2020 and no resources were found to exist on the site. However, the UAIC recommended that a standard mitigation measure (**TCR-1**) be made a requirement of the project to reduce impacts to resources, should any be found on-site. The measure requires an immediate cessation of work, and contact with the appropriate agencies to address the resource before work can resume. This measure is already required by the prior EIR, but the standard language has been updated since the original EIR was published, and therefore the most current version of this measure is included herein as mitigation measure TCR-1.

In addition to the standard measure, the UAIC stated that oak trees in excess of 100 years in age should be considered tribal cultural resources, and that several of the largest trees on this site were likely to meet this criteria. Acting as lead agency, the City has evaluated the information provided by the UAIC to determine if it meets the definitions in Section 21074(a) of the Public Resources Code. This section states that tribal cultural resources are resources (including landscapes and features) which are:

- included or determined to be eligible for inclusion in the California Register of Historical Resources or a local register of historical resources *or*

- it meets the following National Register of Historic Places criteria and is determined to be significant, as supported by substantial evidence: it is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage; is associated with the lives of persons important in our past; it embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or has yielded, or may be likely to yield, information important in prehistory or history.

The site is not listed on either the California or National Register of Historic Places. To be eligible for either register, a site or resource must be shown to meet one of the criteria for listing *and* must be found to be significant. Native oak trees are associated with tribal cultural history, and have served and continue to serve important purposes in tribal communities, including as a food supply and to provide materials for basketry, regalia and ceremonies, household utensils, structures, tools, and weapons. While oak trees in general are associated with events and persons important to cultural heritage, a site review found no resources on the site (such as hand stones) which would indicate that these trees in particular were associated with tribal activities.

In addition, the second part of the determination of eligibility requires a finding that the resource is significant. Significance requires the resource be uncommon, unique or have other particularly important characteristics. Several of the oak trees on this site are large, but not uncommonly so; there are many oak trees of similar size in the nearby open space preserve. The oak trees on the site do not have any uncommon, unique, or particularly important characteristics which would make them a significant resource. Therefore, the City acting as lead agency finds that the oak trees on the site do not meet the legal definitions of a tribal cultural resource.

The UAIC concluded consultation on April 14, 2020 with incorporation of the TCR-1 mitigation measure. With mitigation, impacts will be less than significant.

TCR-1: **Inadvertent Discoveries** – If any TCRs are discovered during ground disturbing construction activities, all work shall cease within 100 feet of the find. The appropriate tribal representatives from culturally affiliated tribes shall be immediately notified. Work at the discovery location cannot resume until it is determined, in consultation with culturally affiliated tribes, that the find is not a TCR, or that the find is a TCR and all necessary

investigation and evaluation of the discovery under the requirements of the CEQA, including AB 52, has been satisfied. Preservation in place is the preferred alternative under CEQA and UAIC protocols, and every effort must be made to preserve the resources in place, including through project redesign. The contractor shall implement any measures deemed by the CEQA lead agency to be necessary and feasible to preserve in place, avoid, or minimize impacts to the resource, including, but not limited to, facilitating the appropriate tribal treatment of the find, as necessary.

XIX. Utilities and Service Systems

Water and sewer services will be provided by the City of Roseville. The developer will be responsible for extending new lines onto the site in order to serve the project. Storm water will be collected on-site and transferred via pipe into an off-site storm drain system. Solid waste will be collected by the City of Roseville's Refuse Department. The City of Roseville will provide electric service to the site, while natural gas will be provided by PG&E. Comcast will provide cable. The project has been reviewed by the City's Engineering Division, Environmental Utilities, Roseville Electric and PG&E. Adequate services are available for the project.

Would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?			X	
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?			X	
c) Result in a determination by the wastewater treatment provider which serves the project that it has adequate capacity to serve the project's projected demand in addition of the provider's existing commitments?			X	

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?			X	
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?			X	

Thresholds of Significance and Regulatory Setting:

The significance of impacts related to utilities and service systems is based directly on the CEQA Guidelines checklist items a–g listed above.

Discussion of Checklist Answers:

a) The major utility infrastructure to serve this area is already installed, which includes a looped sewer line and looped water line system in the streets surrounding the site, and stormwater lines. Minor additional infrastructure will be constructed within the project site to tie the project into the major systems, but these facilities will be constructed in locations where site development is already occurring as part of the overall project; there are no additional substantial impacts specific or particular to the minor infrastructure improvements.

b) The City of Roseville 2015 Urban Water Management Plan (UWMP), adopted May 2016, estimates water demand and supply for the City through the year 2040, based on existing land use designations and population projections. In addition, the Amoruso Ranch Water Supply Assessment (AR WSA, Appendix E of the Amoruso Ranch FEIR), dated May 2016, estimates water demand and supply for ultimate General Plan buildout. The UWMP indicates that existing water supply sources are sufficient to meet all near term needs, estimating an annual water demand of 45,475 acre-feet per year (AFY) by the year 2020 and existing surface and recycled water supplies in the amount of 70,421 AFY. The AR WSA estimates a Citywide buildout demand of 64,370 AFY when including recycled water, and of 59,657 AFY of potable water. The AR WSA indicates that surface water supply is sufficient to meet demand during normal rainfall years, but is insufficient during single- and multiple-dry years. However, the City's UWMP establishes mandatory water conservation measures and the use of groundwater to offset reductions in surface water supplies. Both the UWMP and AR WSA indicate that these measures, in combination with additional purchased water sources, will ensure that supply meets projected demand. The project, which is consistent with existing land use designations, would not require new or expanded water supply entitlements.

c) The proposed project would be served by the Pleasant Grove Wastewater Treatment Plant (PGWWTP). The Central Valley Regional Water Quality Control Board (RWQCB) regulates water quality and quantity of effluent discharged from the City's wastewater treatment facilities. The Pleasant Grove WWTP has the capacity to treat 12 million gallons per day (mgd) and is currently treating 7.0 mgd. The volume of wastewater generated by the proposed project could be accommodated by the facility, because Citywide planning of sewer infrastructure is based on land use, and the project is consistent with the existing land use designations. The proposed project will not contribute to an exceedance of applicable wastewater treatment requirements. The impact would be less than significant.

d,e) The Western Placer Waste Management Authority is the regional agency handling recycling and waste disposal for Roseville and surrounding areas. The regional waste facilities include a Material Recovery Facility (MRF) and the Western Regional Sanitary Landfill (WRSL). Currently, the WRSL is permitted to accept up to 1,900 tons of municipal solid waste per day. According to the solid waste analysis of the Amoruso Ranch Specific Plan FEIR, under current projected development conditions the WRSL has a projected lifespan extending through 2058. The project is consistent with the existing land use designation, and therefore there is sufficient existing capacity to serve the proposed project. Though the project will contribute incrementally to an eventual need to find other means of waste disposal, this impact of City buildout has already been disclosed and mitigation applied as part of each Specific Plan the City has approved, including the most recent Amoruso Ranch Specific Plan. All residences and business in the City pay fees for solid waste collection, a portion of which is collected to fund eventual solid waste disposal expansion. The project will not result in any new impacts associated with major infrastructure. Environmental Utilities staff has reviewed the project for consistency with policies, codes, and regulations related to waste disposal and waste reduction regulations and policies and has found that the project design is in compliance.

XX. Wildfire

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?				X
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?				X
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?				X
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of				X

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
runoff, post-fire slope instability, or drainage changes?				

Thresholds of Significance and Regulatory Setting:

The significance of impacts related to utilities and service systems is based directly on the CEQA Guidelines checklist items a–d listed above. The California Department of Forestry and Fire Protection (CAL FIRE) is the state agency responsible for wildland fire protection and management. As part of that task, CAL FIRE maintains maps designating Wildland Fire Hazard Severity zones. The City is not located within a Very High Fire Hazard Severity Zone, and is not in a CAL FIRE responsibility area; fire suppression is entirely within local responsibility.

Discussion of Checklist Answers:

a–d) Checklist questions a–d above do not apply, because the project site is not within a Very High Fire Hazard Severity Zone and is not in a CAL FIRE responsibility area.

XXI. Mandatory Findings of Significance

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
e) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of an endangered, threatened or rare species, or eliminate important examples of the major periods of California history or prehistory?			X	
f) Does the project have impacts which are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and			X	

Environmental Issue	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
the effects of probable future projects.)				
g) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?			X	

Significance Criteria and Regulatory Setting:

The significance of impacts related to mandatory findings of significance is based directly on the CEQA Guidelines checklist items a–c listed above.

Discussion of Checklist Answers:

a–c) Long term environmental goals are not impacted by the proposed project. The cumulative impacts do not deviate beyond what was contemplated in the WRSP EIR, and mitigation measures have already been incorporated. With implementation of the City's Mitigating Ordinances, Guidelines, and Standards and best management practices, mitigation measures described in this chapter, and permit conditions, the proposed project will not have a significant impact on the habitat of any plant or animal species. Based on the foregoing, the proposed project does not have the potential to degrade the quality of the environment, substantially reduce the habitat of any wildlife species, or create adverse effects on human beings.

ENVIRONMENTAL DETERMINATION:

In reviewing the site specific information provided for this project and acting as Lead Agency, the City of Roseville, Development Services Department, Planning Division has analyzed the potential environmental impacts created by this project and determined that with mitigation the impacts are less than significant. As demonstrated in the initial study checklist, there are no "project specific significant effects which are peculiar to the project or site" that cannot be reduced to less than significant effects through mitigation (CEQA Section 15183) and therefore an EIR ***is not*** *required. Therefore,* ***on the basis of the foregoing initial study:***

[**X**] I find that the proposed project COULD, but with mitigation agreed to by the applicant, clearly will not have a significant effect on the environment and a *MITIGATED NEGATIVE DECLARATION* has been prepared.

Initial Study Prepared by:

Kinarik Shallow

Kinarik Shallow, Associate Planner
City of Roseville, Development Services – Planning Division

Attachments:

1. West Roseville Specific Plan EIR (this document can be found online at: https://www.roseville.ca.us/cms/One.aspx?portalId=7964922&pageId=8775152
2. Mitigation Monitoring & Reporting Program
3. Health Risk Assessment
4. Arborist Report and Preliminary Tree Impact Plan
5. CalEEMod Results
6. Environmental Noise Assessment
7. Kimley-Horn Traffic Evaluation

CITY OF ROSEVILLE CALIFORNIA

DEVELOPMENT SERVICES DEPARTMENT – PLANNING DIVISION
311 Vernon Street, Roseville, CA 95678 (916) 774-5276

MITIGATION MONITORING AND REPORTING PROGRAM

Project Title/File Number:	WRSP PCL F-31 – The Plaza at Blue Oaks; File #PL17-0368
Project Location:	1950 Blue Oaks Boulevard, Roseville, Placer County, CA; APN 017-117-093-000
Project Description:	The proposed project is a retail center consisting of a ±35,000 square-foot anchor grocery store, a 12-pump gas station with a ±3,500 square-foot convenience store and car wash, and seven additional buildings ranging in size from approximately 3,750 square feet to 9,750 square feet. The project includes a Design Review Permit to review the site design and proposed buildings, a Tree Permit to remove several native oak trees on the westerly portion of the site, and a Tentative Subdivision Map to subdivide the parcel into eight (8) lots.
Environmental Document	Mitigated Negative Declaration
Project Applicant:	Joe Zawidski, Signature Management Company
Property Owner:	Joe Zawidski, West Roseville Development Company, Inc.
Lead Agency Contact Person:	Kinarik Shallow, Associate Planner, 916-746-1309

Section 21081.6 of the California Public Resources Code requires public agencies to "adopt a reporting and monitoring program for the changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment." This Mitigation Monitoring and Reporting Program has been adopted for the purpose of avoiding environmental impacts

MONITORING PROCESS: Existing monitoring mechanisms are in place that assist the City of Roseville in meeting the intent of CEQA. These existing monitoring mechanisms eliminate the need to develop new monitoring processes for each mitigation measure. These mechanisms include grading plan review and approval, improvement/building plan review and approval and on-site inspections by City Departments. Given that these monitoring processes are requirements of the project, they are not included in the mitigation monitoring program.

It shall be the responsibility of the project applicant/owner to provide written notification to the City using the Mitigation Verification Cover Sheet and Forms, in a timely manner, of the completion of each Mitigation Measure as identified on the following pages. The City will verify that the project is in compliance with the adopted Mitigation Monitoring and Reporting Program. Any non-compliance will be reported by the City to the applicant/owner, and it shall be the project applicant's/owner's responsibility to rectify the situation by bringing the project into compliance. The purpose of this program is to ensure diligent and good faith compliance with the Mitigation Measures which have been adopted as part of the project.

TABLE OF MITIGATION MEASURES

Mitigation Measure	Implementation	Timing	Reviewing Party	Documents to be Submitted to City	Staff Use Only
BIO-1: Avoid nesting sites To ensure that fully protected bird and raptor species are not injured or disturbed by construction in the vicinity of nesting habitat, the project applicant shall implement the following measures: (a) When feasible, all tree removal shall occur between August 30 and February 15 to avoid the breeding season of any raptor species that could be using the area, and to discourage hawks from nesting in the vicinity of an upcoming construction area. This period may be modified with the authorization of the DFG; or (b) Prior to the beginning of mass grading, including grading for major infrastructure improvements, during the period between February 15 and August 30, all trees and potential burrowing owl habitat within 350 feet of any grading or earthmoving activity shall be surveyed for active raptor nests or burrows by a qualified biologist no more than 30 days prior to disturbance. If active raptor nests or burrows are found, and the site is within 350 feet of potential construction activity, a fence shall be erected around the tree or burrow(s) at a distance of up to 350 feet, depending on the species, from the edge of the canopy to prevent construction disturbance and intrusions on the nest area. The appropriate buffer shall be determined by the City in consultation with CDFG. (c) No construction vehicles shall be permitted within restricted areas (i.e., raptor protection zones), unless directly related to the management or protection of the legally protected species. (d) In the event that a nest is abandoned, despite efforts to minimize disturbance, and if the nestlings are still alive, the developer shall contact CDFG and, subject to CDFG approval, fund the recovery and hacking (controlled release of captive reared young) of the nestling(s). (e) If a legally protected species nest is located in a tree designated for removal, the removal shall be deferred until after August 30th, or until the adults and young of the year are no longer dependent on the nest site as determined by a qualified biologist. (f) The project applicant, in consultation with the CDFG, shall conduct a pre-construction survey within the phases of the project site that are scheduled for construction activities. The survey shall be conducted by a qualified biologist to determine if burrowing owls are occupying the project site. The survey shall be conducted no more than three weeks prior to grading of the project site. If the above survey does not identify burrowing owls on the project site, then no further mitigation would be required. However, should burrowing owls be found on the project site, the following measures shall be required: (g) The applicant shall avoid all potential burrowing owl burrows that may be disturbed by project construction during the breeding season between February 15 and August 30 (the period when nest burrows are typically occupied by adults with eggs or young). Avoidance shall include the establishment of a 350-foot diameter non-disturbance buffer zone around any occupied burrows. The buffer zone shall be delineated by highly visible temporary construction fencing. Disturbance of any occupied burrows shall only occur outside of the breeding season (August 30 through February 15). Based on approval by the CDFG, preconstruction and nonbreeding season exclusion measures may be implemented to preclude burrowing owl occupation of the project site prior to project-related disturbance (such as grading). Burrowing owls may be passively excluded from burrows in the construction area by placing one-way doors in the burrows according to current CDFG protocol. The one-way doors must be in place for a minimum of three days. All burrows that may be occupied by burrowing owls, regardless of whether they exhibit signs of occupation, must be cleared. Burrows that have been cleared through the use of the one-way doors shall then be closed or backfilled to prevent owls from entering the burrow. The one-way doors shall not be used more than two weeks before construction to ensure that owls do not recolonize the area of construction.	Results of preconstruction surveys shall be submitted prior to the issuance of a grading permit or Improvement Plans. Applicable construction restrictions shall be reflected within plans. The applicants shall prepare annual reports on the status and success of mitigation and shall submit these reports to USFWS and CDFG. The applicants shall coordinate with USFWS and CDFG to modify as necessary any mitigation plans in an effort to attain mitigation success.	*Pre-Construction and Construction*: Surveys required prior to construction. If surveys are positive for birds, then remainder of mitigation steps are required prior to construction. Add as note on Improvement Plans.	Engineering	Nesting bird surveys	
NOI-1: Commercial Noise Control	Project plans will be reviewed for compliance. The applicants shall submit site-specific acoustical	*Pre-Construction:* Prior to issuance of Improvement Plans and/or Building Permits	Engineering will review Improvement Plans for	An Acoustical Study	

For all commercial uses within 150 feet of residential uses, implement the following or equally effective measures: (a) For commercial loading docks and on-site truck circulation areas that are planned to be within 150 feet of sensitive receptors (including backyards), the following measures shall be implemented: (1) Loading docks and on-site truck circulation routes shall be designed to ensure that noise levels do not exceed 70 dB Lmax or 50 dB hourly Leq at the nearest residence. An acoustic analysis shall demonstrate that the loading area design, including any noise attenuation features (e.g., covering, sound walls, orientation) would be adequate to achieve this standard; and, (2) Deliveries shall generally be limited to the hours between 7:00 A.M. and 10:00 P.M. (b) For all commercial buildings, roof-top HVAC shall be oriented away from residential areas and systems shall not produce noise levels that exceed 50 dB at a distance of 25 feet. In addition, roof-top parapets shall block line-of-sight from noise-sensitive uses to HVAC equipment. (c) Setbacks or enhanced barriers (e.g., 8 feet tall) as needed to achieve City standards. (d) Car wash entrance and exit doors shall be kept in the closed potion during wash cycles. Car wash operations shall be limited to the hours of 7:00 A.M. and 10:00 P.M. An acoustical analysis shall be conducted to demonstrate that City noise standards would be achieved by these measures. Additional measures shall be implemented, if needed, to meet the standards.	analyses to the Chief Building Inspector for review.	Add as note on Improvement Plans and Building Plans	compliance with wall and noise requirements. Building will review Building Plans for compliance with HVAC requirements.		
TCR-1: Inadvertent Discoveries If any TCRs are discovered during ground disturbing construction activities, all work shall cease within 100 feet of the find. The appropriate tribal representatives from culturally affiliated tribes shall be immediately notified. Work at the discovery location cannot resume until it is determined, in consultation with culturally affiliated tribes, that the find is not a TCR, or that the find is a TCR and all necessary investigation and evaluation of the discovery under the requirements of the CEQA, including AB 52, has been satisfied. Preservation in place is the preferred alternative under CEQA and UAIC protocols, and every effort must be made to preserve the resources in place, including through project redesign. The contractor shall implement any measures deemed by the CEQA lead agency to be necessary and feasible to preserve in place, avoid, or minimize impacts to the resource, including, but not limited to, facilitating the appropriate tribal treatment of the find, as necessary.	This condition shall be reflected in all construction and building plans, and construction site workers shall be advised by the site manager of this measure.	*Construction*: Measure applies if resources are discovered during construction. Add as note on Improvement Plans and Building Plans.	Engineering and Building	None	

CITY OF ROSEVILLE CALIFORNIA

DEVELOPMENT SERVICES DEPARTMENT
311 Vernon Street, Roseville, CA 95678 (916) 774-5276

MITIGATION VERIFICATION SUBMITTAL COVER SHEET

Project Title/Planning File # _____

Project Address _____

Property Owner _____

Planning Division Contact _____

SUMMARY OF VERIFICATION MATERIALS INCLUDED IN THIS SUBMITTAL

Mitigation Measure	Supporting Attachments Included	Date Complete

I HAVE ATTACHED THE FOLLOWING REQUIRED ITEMS:

☐ Table of Applicable Mitigation Measures

☐ Mitigation Verification Form(s)

☐ Specific supporting documentation required by measure(s), if applicable (e.g. biologist's report)

I hereby certify under penalty of perjury under the laws of the State of California that I am the property owner or an agent of the property owner and am authorized to submit this Mitigation Verification Form. I also certify that the above-listed mitigation measures have been completed in the manner required, and that all of the information in this submittal is true and correct, to the best of my knowledge:

_____ _____ _____

Signature and Date | Print Name | Contact Number

MITIGATION VERIFICATION FORM

Mitigation Measure

Description of Monitoring and Verification Work Performed. The following information is a required part of the description: dates, personnel names or titles, and the stage/phase of construction work. Additional notes sheets may be attached, if necessary, or the below may simply reference a separate attachment that provides the required information.

INSTRUCTIONS

COVER SHEET:

A Cover Sheet for the project/development is prepared by City staff, with the top portion filled out. Each time Mitigation Verification Forms(s) are being submitted, a Cover Sheet completed by the Developer, Contractor, or Designee is required. An example of a completed summary table is provided below. The signature on the Cover Sheet must be *original wet ink*.

EXAMPLE MITIGATION VERIFICATION SUBMITTAL COVER SHEET

Project Title/Planning File #	New Coffee Shop, PL15-0000
Project Address	10 Justashort Street
Property Owner	Jane Owner
Planning Division Contact	Joe Planner, Associate Planner, (916) 774-####

SUMMARY OF VERIFICATION MATERIALS INCLUDED IN THIS SUBMITTAL

Mitigation Measure	Supporting Attachments Included	Date Complete
MM-3	Copy of survey report signed by biologist	5/10/2016
MM-4	All information included in Mitigation Verification Form	5/12/2016
MM-5	E-mail from Air District approving Dust Control Plan	5/05/2016

MITIGATION VERIFICATION FORM:

A Mitigation Verification Form is provided by City staff, along with the Cover Sheet and Table of Applicable Mitigation Measures. A form is filled in and submitted for each mitigation measure by the Developer, Contractor, or Designee. The form needs only the mitigation number to be filled in, along with the Description of Monitoring and Verification Work Performed. Multiple forms may be submitted simultaneously, under one cover sheet. It is also permissible to submit a form for each part of a measure, on separate dates. For instance, in the example measure MM-4 in the table above, the actual mitigation requires informing construction workers *and* retaining a qualified archeologist if resources are uncovered. Thus, a developer may submit a form in May certifying that construction workers have been informed, and also submit a second copy of the form in July because resources were discovered and additional actions had to be undertaken.

Each mitigation measure specifies the type of supporting documentation required; this must be submitted in order for the City to accept the mitigation as complete. An example of a completed Mitigation Verification Form is provided below.

EXAMPLE
MITIGATION VERIFICATION FORM

Mitigation Measure MM3

Description of Monitoring and Verification Work Performed. The following information is a required part of the description: dates, personnel names or titles, and the stage/phase of construction work. Additional notes sheets may be attached, if necessary, or the below may simply reference a separate attachment that provides the required information.

The mitigation measure text is included on the Improvement Plans General Notes page (Improvement Plan EN15-0001). On May 4, 2016, prior to any ground-disturbing activities (the pre-construction phase), a site meeting was held. At this meeting, workers on the site were informed of the potential to unearth remains, and were instructed to cease work and notify their supervisor immediately if any resources were observed.

I.S. ATTACHMENT 3

HEALTH RISK ASSESSMENT

Signature Homes, Inc. – Plaza at Blue Oaks
Roseville, CA

Placer County Air Pollution Control District
Health Risk Assessment Submittal

Prepared By:

TRINITY CONSULTANTS
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(916) 444-6666

March 2020

Project 180506.0096

Trinity Consultants

Environmental solutions delivered uncommonly well

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LIST OF ABBREVIATIONS / ACRONYMS

AB2588	Air Toxics "Hot Spots" Information and Assessment Act
AERMOD	American Meteorological Society Regulatory Model
BPIPPRIME	Building Profile Input Program PRIME
CARB	California Air Resources Board
CAS	Chemical Abstract System
GIS	Geographic Information System
HARP	Hot Spots Analysis and Reporting Program
HI	Hazard Index
NC Acute	Non-carcinogenic Acute
NC Chronic	Non-carcinogenic Chronic
HRA	Health Risk Assessment
NED	National Elevation Datasets
MEIR	Maximally Exposed Individual Resident
MEIW	Maximally Exposed Individual Worker
OEHHA	Office of Environmental Health Hazard Assessment
PM	Particulate Matter
PMI	Point of Maximum Impact
REL	Reference Exposure Level
TAC	Toxic Air Contaminants
USEPA	United States Environmental Protection Agency USGS United States Geological Survey
UTM	Universal Transverse Mercator
ZOI	Zone of Impact

1. EXECUTIVE SUMMARY

Signature Homes, Inc. is developing a gas pad (The Facility) in the southeast corner of the Plaza at Blue Oaks development in Roseville, California. The Facility is under the jurisdiction of the Placer County Air Pollution Control District (PCAPCD). After reviewing the relevant Committee of the California Air Pollution Control Officers Association (CAPCOA) guidance for conducting health risk assessments (HRAs) at gasoline stations, it was determined that The Facility would be unable to screen out of doing an HRA, as the estimated impacts were above a 10 in 1 million cancer risk. Therefore, Signature Homes, Inc. is submitting this refined HRA for the Facility to demonstrate that health risk impacts are below 10 in 1 million cancer risk and a hazard index of 1. This report constitutes the results of the HRA performed in accordance with the Placer County Air Pollution Control District's guidelines for preparing a health risk assessment and the Office of Environmental Health Hazard Assessment (OEHHA) developed *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments* (OEHHA HRA Guidance Manual).[1] The analysis uses the Hotspots Analysis and Reporting Program (HARP) Version 2.0 with inputs from US-EPA's AERMOD modeling program to perform the exposure/risk assessment.

The objectives of this HRA are to: (1) estimate off-site air concentrations of the substances identified in AB2588 and emitted from the facility, (2) evaluate potential exposures to the surrounding community, (3) characterize the potential health risks to individuals and the exposed population associated with those levels of exposure, and (4) determine if additional actions are required. This report presents the results of the HRA analysis. In addition to this HRA report, supplemental modeling and HRA files have been provided via an electronic data transfer system.

The results obtained from HARP provide the necessary information to generate the zones of impact (ZOIs) and identify potentially exposed populations. In addition, potential health effects were evaluated for the maximum exposed individual resident (MEIR) and the maximum exposed individual worker (MEIW) for both non-carcinogenic and carcinogenic health impacts. The results of the HRA are summarized in Table 1-1 below.

[1] Office of Environmental Health Hazard Assessment (OEHHA), *Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments*, February 2015, California Environmental Protection Agency.

Table 1-1. HRA Results Summary

Receptor Type	Cancer Risk		Chronic		Acute	
	Receptor ID	Risk (in a million)	Receptor ID	Hazard Index	Receptor ID	Hazard Index
Point of Maximum Impact	319	48.39	319	0.23	291	0.73
Maximum Exposed Individual Resident	422	4.45	422	0.02	312	0.23
Maximum Exposed Individual Worker	320	2.42	320	0.13	347	0.48

1.1. APPLICABLE REGULATIONS

In accordance with our correspondence with Emmanuel Orozco of Placer County, dated March 24, 2016, public notice and risk reduction are triggered for a cancer risk greater than or equal to 10 in 1 million and non-cancer hazard index greater than or equal to 1. The results in Table 1-1 show that the Facility does not trigger the public notice or risk reduction thresholds for cancer risk or any of the non-cancer hazard indices.

For this HRA, Trinity used HARP – Air Dispersion and Risk Tool (Version 2.0 dated 19121).

Table 2-1. Facility Information

Facility Name	The Plaza at Blue Oaks Plaza
Facility Address	1950 Blue Oaks Blvd Fiddyment F-31 Roseville, CA
UTM Coordinates	642,811.78 m E, 4,294,994.31 m N
Datum	UTM, NAD83, Zone Grid 10S

2.1. FACILITY OPERATIONS

The Facility is a gas station that is being installed as part of the Plaza at Blue Oaks development project, which consists of 92,450 square feet of commercial and retail development in Roseville, California. The Facility specifically contains fuel pumps and underground fuel tanks with a Phase I & II vapor recovery system. The annual throughput of the Facility will have a maximum throughput of 5.5 million gallons per year.

2.2. EMISSIONS

The emissions for this HRA are based on the 2017 Risk Assessment Procedures provided by South Coast Air Quality Management District[2] and the maximum annual gasoline thoughput. A summary of facility-wide emissions is provided in Table 2-2.

Table 2-2. Facility Emissions Summary

Pollutant ID	Pollutant Name	lbs/yr	lbs/hr
71432	Benzene	21.74	0.00248
100414	Ethylbenzene	19.96	00.00228
91203	Naphthalene	2.31	0.00026

[2] South Coast Air Quality Management District, *Risk Assessment Procedures for rules 1401, 1401.1 and 212 version 8.1*, September 1, 2017

3.1. RELEASE INFORMATION

Emission source locations and elevations are provided in Table 3-1. Tables 3-2 and 3-3 identify the release information for the point sources and volume sources at the facility, respectively.

Table 3-1. Emission Source Modeling Locations

Model ID	Description	X (m)	Y (m)	Elevation	Emission Rate (g/s)
VENT	Loading	642,809.3	4,294,992.7	32.98	1
VENT2	Breathing	642,809.3	4,294,992.7	32.98	1
SPILL	Loading Spill Emissions	642,809.3	4,294,992.7	32.98	1
REFUEL	Refueling Emissions	642,809.3	4,294,992.7	32.98	1

Table 3-2. Emission Source Modeling Parameters – Point Sources

Model ID	Description	Stack Height (m)	Temp (F)	Stack Velocity (m/s)	Stack Diameter (ft)
VENT	Loading	3.66	60	0	2
VENT2	Breathing	3.66	60	0	2

Table 3-3. Emission Source Modeling Parameters – Volume Sources

Model ID	Description	Release Height (m)	Init. Lat. Dimension (m)	Init. Vert. Dimension (ft)
REFUEL	Loading Spill Emissions	1	3.02	1.86
SPILL	Refueling Emissions	0	3.02	1.86

4. EMISSION QUANTIFICATION

The emission factors and weight percent values from South Coast Air Quality Management District Risk Assessment Procedures were used to determine emission rates and potential health impacts. Using a maximum yearly throughput of 5.5 million gallons per year and the emission factors listed in Table 4-1, the estimated yearly emissions from the project are summarized in Tables 4-2 below.

Table 4-1. SCAQMD Risk Assessment Procedure Emission Factors

Pollutant	Source	Pollutant Emission Factor (lb Pollutant/1,000 gal)
Benzene	VENT	6.83E-04
	VENT2	1.09E-04
	SPILL	1.70E-03
	REFUEL	1.46E-03
Ethylbenzene	VENT	1.61E-04
	VENT2	2.57E-05
	SPILL	3.10E-03
	REFUEL	3.42E-04
Naphthalene	VENT	6.00E-07
	VENT2	9.60E-08
	SPILL	4.18E-04
	REFUEL	1.28E-06

Table 4-2. Yearly and Hourly Project Emissions

Pollutant	Source	Throughput (gal)	Emission Rate (lb/yr)	Emission Rate (lb/hr)
Benzene	VENT	5,500,000	3.76	8.58E-04
	VENT2	5,500,000	0.60	1.37E-04
	SPILL	5,500,000	9.35	2.13E-03
	REFUEL	5,500,000	8.03	1.83E-03
Ethylbenzene	VENT	5,500,000	0.89	2.02E-04
	VENT2	5,500,000	0.14	3.23E-05
	SPILL	5,500,000	17.1	3.89E-03
	REFUEL	5,500,000	1.88	4.29E-04
Naphthalene	VENT	5,500,000	0.003	7.53E-07
	VENT2	5,500,000	0.001	1.21E-07
	SPILL	5,500,000	2.30	5.25E-04
	REFUEL	5,500,000	0.007	1.61E-06

5.1.1. Spatial Averaging

Spatial averaging was not used to determine risk values for receptors. Instead, the most conservative, representative value for each receptor was chosen. This methodology results in a higher risk values than spatial averaging and is therefore a more conservative approach.

5.1.2. Meteorological and Elevation Data

Five years of pre-processed meteorological data supplied by the California Air Resources Board (CARB) for 2009 through 2013 were used for this model.[3] The surface station data are from Sacramento International Airport (WBAN 23232) and the upper air data are from Oakland International Airport (WBAN 23230). Terrain data were obtained from the Multi-Resolution Land Characteristics Consortium (MRLC) in the form of National Elevation Dataset (NED) files at 1/3 arc second resolution.[4]

5.1.3. Model Options

Air dispersion modeling is performed with US-EPA AERMOD through the EPA approved BREEZE user interface. All modeling exercises were conducted using the previous version of EPA AERMOD (v18081). Air dispersion modeling was prepared prior to the release of v19191. No differences are expected between AERMOD versions. Modeling was performed utilizing all regulatory defaults as defined by EPA. Selected outputs were for the 1st high 1-hr and 1st high period values.

The following modeling input files are included electronically in Appendix D.

- Surface Met Data File (*.sfc)
- Profile Met Data File (*.pfl)
- National Elevation Database File (*ned)
- AERMAP Source File (*aermap.src)
- AERMAP Receptor File (*aermap.rec)
- BPIP Input File (*bpip.inp)
- AERMOD Input File (*aermod.inp)

The following modeling output files are included electronically in Appendix D.

- AERMAP Output File (*aermap.out)
- BPIP Summary File (*bpip.sum)
- BPIP Output File (*bpip.out)
- AERMOD Output File (*aermod.out)
- AERMOD Error File (*aermod.err)
- Plotfiles (*.plt and *txt)

Building downwash was not included as CAPCOA guidelines for industry-wide risk assessments of gasoline stations states “Results of the modeling indicated that the placement of the buildings and their subsequent potential to create downwash have very little effect on the resultant risks from the vent pipes.”

[3] https://www.arb.ca.gov/toxics/harp/metfiles2.htm
[4] https://www.mrlc.gov/viewerjs/

5.1.4. Receptor Placement

The following receptor placements were used for this HRA.

- Nearby Residences and Workers (Discrete Grid) - The modeling discrete receptor grid uses a variable density receptor grid with 10 m spacing out to 150 m from the center of the facility, and 25m spacing out to 500m from the center of the facility. Given the nature of the facility emissions and the nearby workplaces and residences, a high density receptor approach was used to ensure the worst case Residential and Worker impacts were captured in the modeling exercise. Residential and workplace receptors were identified using a joining of modeled HRA impacts with satellite imagery. The MEI receptors were conservatively matched to grid receptors with the maximum impacts on parcels identified as residences and workplaces.
- Sensitive Receptors - No sensitive receptors were identified within the Zone of Influence (ZOI) of the facility.
- Census Block Receptors - AB2588 also requires an estimates of the number of impacted individuals in residences and off-site workplaces within the ZOI. Census data is used to determine affected populations within geographic areas defined by census tracts. A census tract centroid (geographical center) is identified as a receptor location, which represents exposure to the population within that census tract. For this HRA, affected populations were estimated based on census data obtained from the built-in HARP 2.0 2010 Census Database. Figure B-2 shows the impacted census tracts for this HRA within the ZOI. Census tract information was obtained directly from HARP 2.0 by inputting the facility center point and requesting receptors out to a radius of 300 meters. All census block receptors with a population of 0 were excluded from the Cancer Burden analysis. Only one census block receptor was identified within the ZOI and is listed in Table 5-1 below.

Table 5-1. Census Block Receptor

Track No.	Block No.	X (m)	Y (m)	Elev. (m)	Population
21039	1002	642,710	4,294,813	31.25	48

- Onsite Receptors – No onsite receptors were identified.

5.1.5. Receptors Evaluated for Multipathway Analysis

A summary of receptor pathways chosen for the analysis is shown in Table 5-2 below.

Table 5-2. Receptor Pathways Evaluated

Pathway	Residential Receptors	Worker Receptors
Inhalation	Y	Y
Soil	Y	Y
Dermal	Y	Y
Mother's Milk	Y	
Homegrown Crop		
Chicken		
Egg		

5.1.6. Multipathway and Exposure Parameters

Only default HARP2 values were used for the pathways identified in Section 5.1.6 of this report.

5.1.7. Health Values and HARP Version Used in Risk Analysis

For this HRA, Trinity used the last version of HARP – Air Dispersion and Risk Tool (Version 2.0 dated 19121). This version of HARP utilized a health.mdb file updated on May 1, 2019.

Summary results are presented in Tables A-1 through A-4. The content contained within each table is listed below:

- Table A-1. Summary of Maximum Cancer Health Risk Impacts
- Table A-2. Summary of Maximum Chronic Non-cancer Health Risk Impacts
- Table A-3. Summary of Maximum Acute Non-cancer Health Risk Impacts
- Table A-4. Census Block Receptors and Impacts

6.1.1. Risk Driver Tables

Tables A-5 through A-7 show the driving devices and pollutants for each MEIR, MEIW, and PMI for cancer, non-cancer chronic, and non-cancer acute impacts.

7. MAPS AND AERIAL PHOTOS REQUIRED BY DISTRICT

Figures B-1 through B-6 included in Appendix B include the required imagery and isopleths and are summarized below:

- Figure B-1. Facility Location
- Figure B-2. Census Receptor
- Figure B-3. 1 in 1 million resident cancer risk isopleth
- Figure B-4. 1 in 1 million worker cancer risk isopleth
- Figure B-5. Acute non-cancer HI of 0.1 risk isopleth
- Figure B-6. Chronic non-cancer HI of 0.1 risk isopleth

8. REQUIRED FILES

The following files are provided electronically.

- Written HRA report (*.pdf)
- HARP 2 Facility and Emissions Database (*.mdb)
- Project Summary Report (ProjectSummaryReport.txt)
- Ground Level Concentration Files (*.txt)
- Health Database (*.mdb)
- Air Dispersion Files
  - Surface Met Data File (*.sfc)
  - Profile Met Data File (*.pfl)
  - National Elevation Database File (*ned)
  - AERMAP Source File (*aermap.src)
  - AERMAP Receptor File (*aermap.rec)
  - BPIP Input File (*bpip.inp)
  - AERMOD Input File (*aermod.inp)
  - AERMAP Output File (*aermap.out)
  - BPIP Summary File (*bpip.sum)
  - BPIP Output File (*bpip.out)
  - AERMOD Output File (*aermod.out)
  - AERMOD Error File (*aermod.err)
  - Plotfiles (*.plt and *txt)
- Risk Analysis Files
  - Input file with risk scenario and site specific information (*HRAInput.hra)
  - Supplemental input file with health values (*PolDB.csv)
  - Supplemental input file with GLCs (*GLCList.csv)
  - Output log file (*output.txt)
  - Output file with cancer risk details (*CancerRisk.csv)
  - Output file with chronic non-cancer risk details (*NCCHronicRisk.csv)
  - Output file with acute non-cancer risk details (*NCAcuteRisk.csv)
  - Pathway Receptor Information (*PathwayRec.csv)

Appendix A: **TABLES**

Table A-1. Summary of Maximum Cancer Health Risk Impacts

Receptor type	Cancer Risk (in a million)	Significance Threshold	Receptor Number	UTME (m)	UTMN (m)
PMI	29.35	N/A	320	642,799.3	4,295,012.7
MEIR	2.84	≥10	423	642,839.3	4,294,922.7
MEIW	1.50	≥10	321	642,799.3	4,295,022.7

Table A-2. Summary of Maximum Chronic Non-cancer Health Risk Impacts

Receptor type	Chronic Non-Cancer HI	Significance Threshold	Receptor Number	UTME (m)	UTMN (m)
PMI	1.28E-01	N/A	320	642,799.3	4,295,012.7
MEIR	1.25E-02	≥1	423	642,839.3	4,294,922.7
MEIW	7.20E-02	≥1	321	642,799.3	4,295,022.7

Table A-3. Summary of Maximum Acute Non-cancer Health Risk Impacts

Receptor type	Acute Non-Cancer HI	Significance Threshold	Receptor Number	UTME (m)	UTMN (m)
PMI	7.34E-01	N/A	292	642,789.3	4,294,992.7
MEIR	2.35E-01	≥1	313	642,799.3	4,294,912.7
MEIW	4.95E-01	≥1	348	642,809.3	4,295,022.7

Table A-4. Census Block Receptors and Impacts

Track:	Block:	X (m)	Y (m)	Population:	AERMOD Description	Excess Cancer Risk	Burden
21039	1002	642,710.00	4,294,813.00	48	Track: 21039, Block: 1002, Population: 48	5.19E-07	2.49E-05
						Total:	2.49E-05

Table A-5. PMI Risk Drivers

Receptor Type	Receptor Number	UTME (m)	UTMN (m)	Driving Pollutant	Driving Source
PMI - Cancer	320	642,799.3	4,295,012.7	Benzene	SPILL
PMI - NC Chronic	320	642,799.3	4,295,012.7	Benzene	SPILL
PMI - NC Acute	292	642,789.3	4,294,992.7	Benzene	SPILL

Table A-6. MEIR Risk Drivers

Receptor Type	Receptor Number	UTME (m)	UTMN (m)	Driving Pollutant	Driving Source
MEIR - Cancer	423	642,839.3	4,294,922.7	Benzene	SPILL
MEIR - NC Chronic	423	642,839.3	4,294,922.7	Benzene	SPILL
MEIR - NC Acute	312	642,809.3	4,295,022.7	Benzene	SPILL

Table A-7. MEIW Risk Drivers

Receptor Type	Receptor Number	UTME (m)	UTMN (m)	Driving Pollutant	Driving Source
MEIW - Cancer	321	642,799.3	4,295,022.7	Benzene	SPILL
MEIW - NC Chronic	321	642,799.3	4,295,022.7	Benzene	SPILL
MEIW - NC Acute	348	642,809.3	4,295,022.7	Benzene	SPILL

Table A-8. Pollutant Health Values[1]

Pollutant ID	Pollutant Abbreviation	Inhalation Cancer Potency Factor (mg/kg*d)	Inhalation Chronic REL ($\mu g/m^3$)	Inhalation Chronic 8-hour REL ($\mu g/m^3$)	Inhalation Acute REL ($\mu g/m^3$)	Inhalation Unit Risk ($\mu g/m^3$)
71432	Benzene	0.1	3	3	27	2.90E-05
100414	Ethyl Benzene	0.0087	2,000			2.50E-06
91203	Naphthalene	0.12	9			3.40E-05

1. Oral Cancer Slope Factors and Oral Chronic RELs are not listed because none of the pollutants have health values for those pathways

Figure B-1. Facility Location

Trinity Consultants

Project Number:
180506.0096

0 690 1,380 2,070 Meters

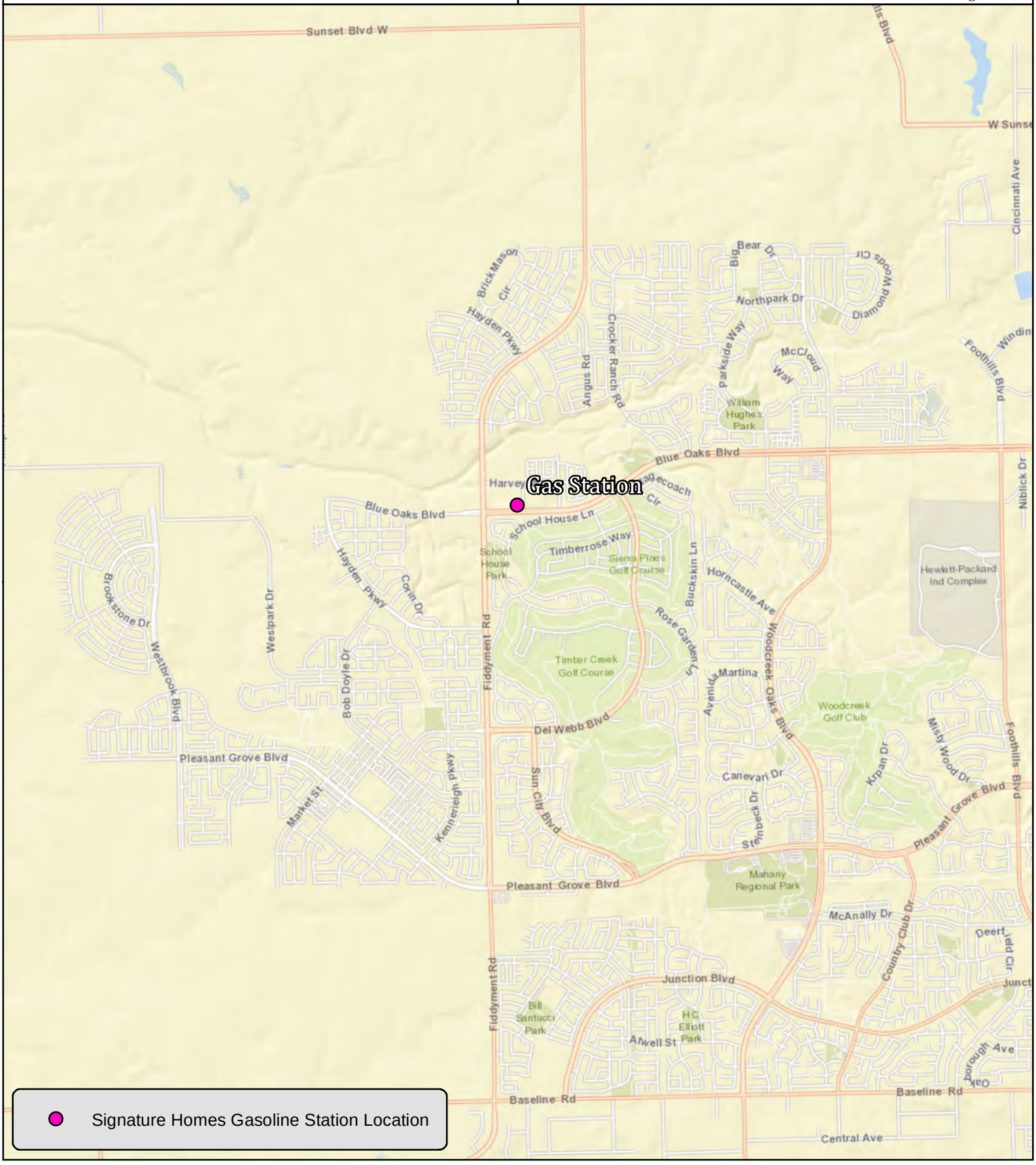


Figure B-2. Census Receptor

Trinity Consultants

Project Number:
180506.0096

0 60 120 180 Meters

N W E S

Figure B-3. Resident Cancer Risk

Trinity Consultants

Project Number:
180506.0096

0 50 100 150 Meters

N W E S

Figure B-4. Worker Cancer Risk

Trinity Consultants

Project Number:
180506.0096

0 50 100 150
Meters

N
W E
S

Worker Cancer Risk

1 in 10^6

1 - 3

Signature Homes Gasoline Station Location

Figure B-5. Acute Hazard Index

Trinity Consultants

Project Number:
180506.0096

0 40 80 120
Meters

N
W E
S

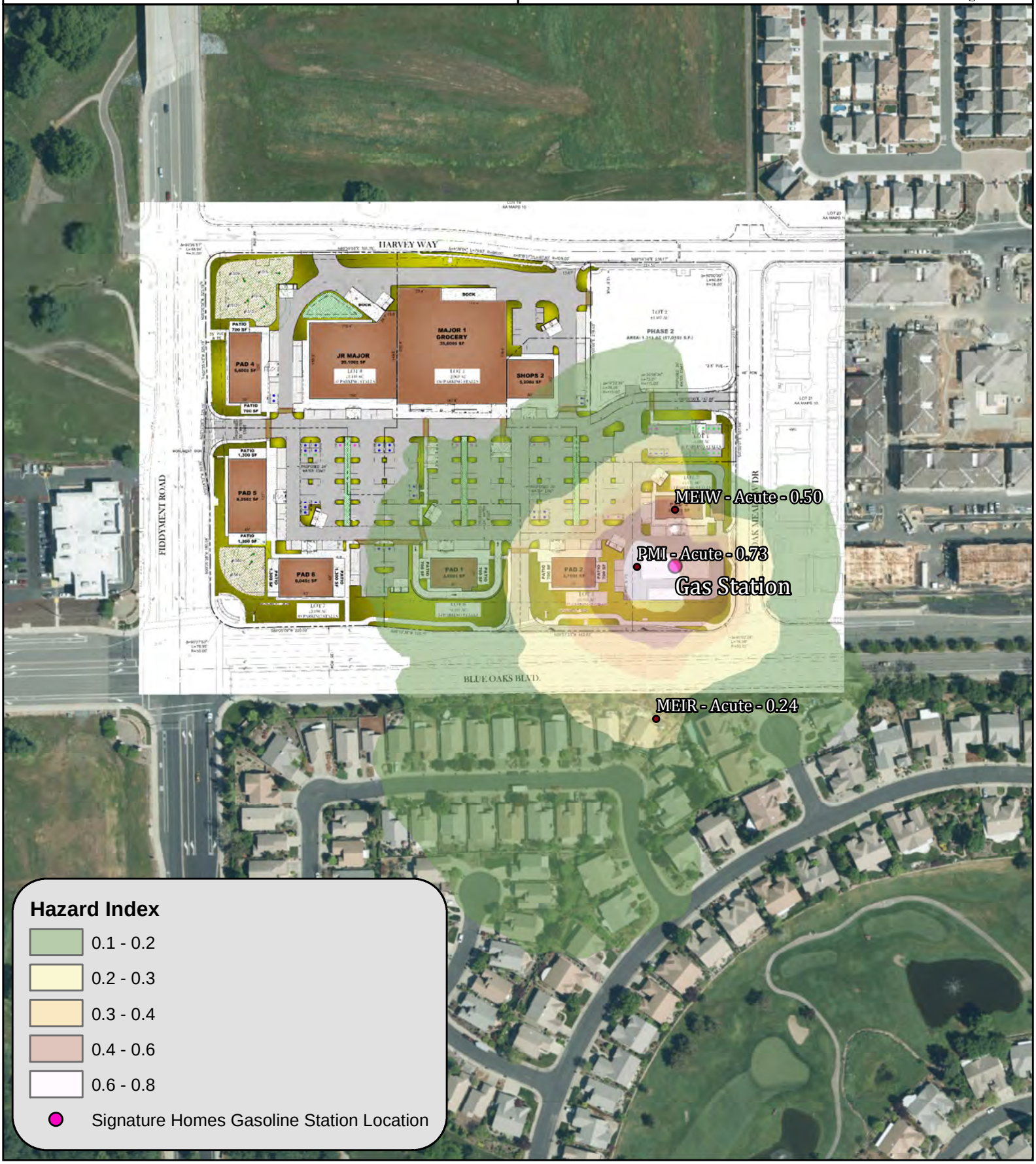


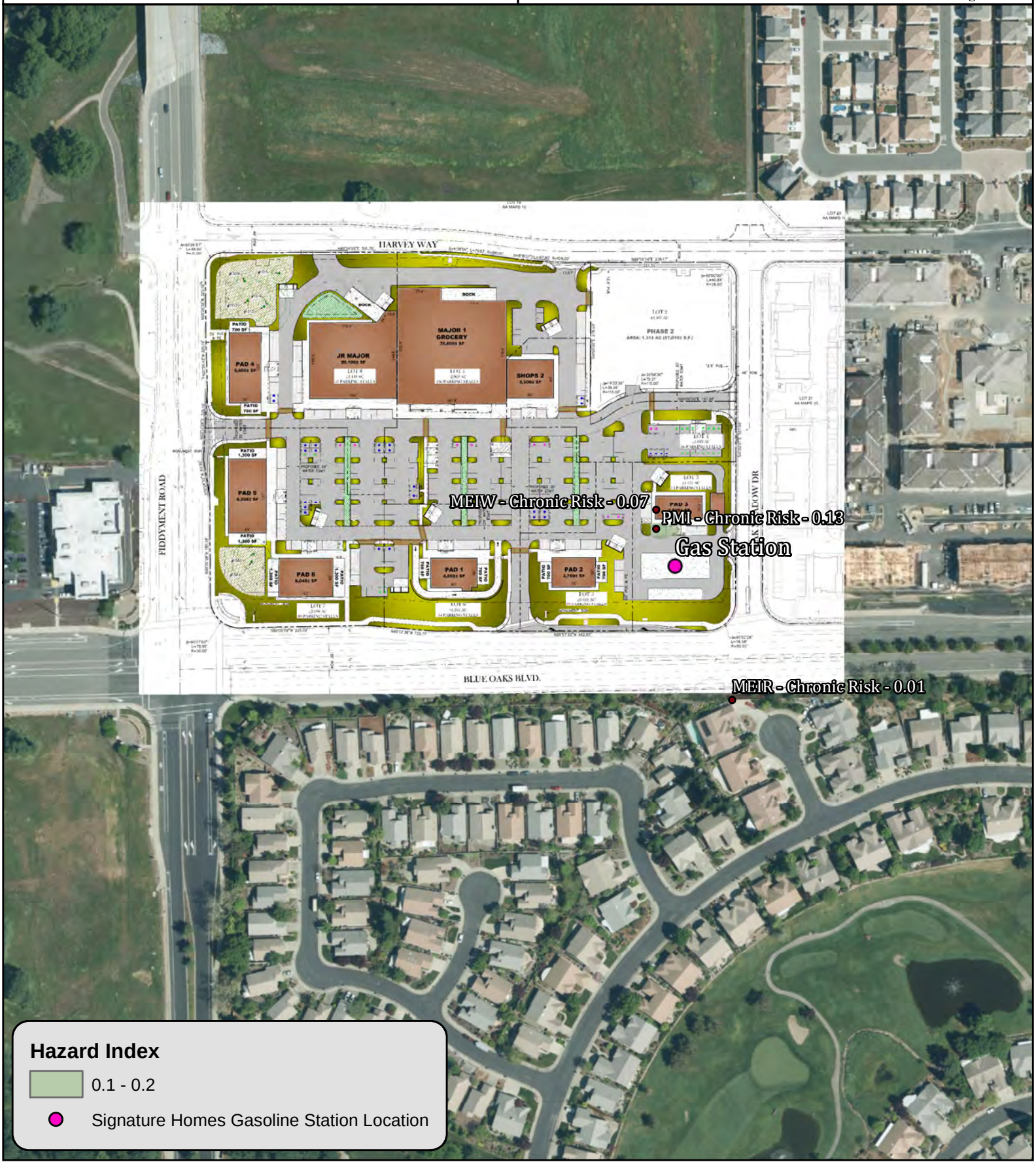
Figure B-6. Chronic Hazard Index

Trinity Consultants

Project Number:
180506.0096

0 40 80 120 Meters

N W E S



California Tree and Landscape Consulting, Inc.

February 20, 2020

Joseph Zawidski
Signature Homes, Inc.
4670 Willow Road, Suite 200
Pleasanton, California 94588

Via Email: jzawidski@hotmail.com

PROPERTY TRANSITION ARBORIST REPORT

RE: Arborist Report and Tree Inventory for Fiddyment Farms, Unit 17 Project Site
City of Roseville, California

Executive Summary:

Signature Homes, Inc. contacted California Tree and Landscape Consulting, Inc. to document the trees on the property for a better understanding of the existing resource and any potential improvement obstacles that may arise. Signature Homes, Inc. requested an arborist report and tree inventory updates and impact assessment for the property located at Fiddyment Farms, Unit 17, suitable for submittal to the City of Roseville. This is an Updated Arborist Report and Tree Inventory for the filing of plans to develop the property.

Ed Stirtz, ISA Certified Arborist WE0510A, visited the property on February 17, 2020, to provide updated species identification, measurements of DBH and canopy, field condition notes, recommended actions, ratings, and approximate locations for the trees. A total of 26 trees were evaluated on this property, of which 26 are protected trees according to the City of Roseville's Municipal Code. Chapter 19.66, Tree Preservation, defines a "Protected Tree" as any native oak tree equal to or greater than 6 inches diameter at breast height (DBH) measured as a total of a single trunk or multiple trunks. The purpose of this field reconnaissance effort was to identify, inventory, and comment upon the current structure and vigor of the "protected trees" located within and/or overhanging the project site.

The vegetation on site includes those native oak trees as identified in the inventory and three to five other substandard size oak trees 1" to 2" diameter range.

TABLE 1

Tree Species	Trees on this Site	Protected Trees on the Site	Proposed for Removal for Development	Total Proposed for Retention
Blue Oak	13	13	11	2
Interior Live Oak	10	10	7	3
Valley Oak	3	3	2	1
TOTALS	**26**	**26**	**20**	**6**

ASSIGNMENT

Perform an examination of the site to document the presence and condition of trees protected by the City of Roseville. The "study area" for this effort includes the area as depicted on "The Plaza at Blue Oaks" preliminary tree impact plan prepared by TSD Engineering, Inc., dated February 5, 2020. (All trees protected by the City are included in the inventory.) Prepare a report of findings.

METHODS

Appendix 2 and Tables 1, 2 and 3 in this report are the detailed inventory and recommendations for the trees. The following terms and Table A – Ratings Descriptions will further explain our findings.

Species of trees is listed by our local common name and botanical name by genus and species.

DBH (diameter breast high) is normally measured at 4'6" (54" above the average ground, height but if that varies then the location where it is measured is noted here. A steel diameter tape was used to measure the trees.

Canopy radius is measured in feet. It is the farthest extent of the crown composed of leaves and small twigs measured by a Stanley digital distance meter. This measurement often defines the Critical Root Zone (CRZ) or Protection Zone (PZ), which is a circular area around a tree with a radius equal to this measurement.

Actions listed are recommendations to improve health or structure of the tree. Trees in public spaces require maintenance. If a tree is to remain and be preserved, then the tree may need some form of work to reduce the likelihood of failure and increase the longevity of the tree. Preservation requirements and actions based on a proposed development plan are not included here.

Arborist Rating is subjective to condition and is based on both the health and structure of the tree. All of the trees were rated for condition, per the recognized national standard as set up by the Council of Tree and Landscape Appraisers and the International Society of Arboriculture (ISA) on a numeric scale of 5 (being the highest) to 0 (the worst condition, dead). The rating was done in the field at the time of the measuring and inspection.

Table A – Ratings Descriptions

No problem(s)	5	excellent
No apparent problem(s)	4	good
Minor problem(s)	3	fair
Major problem(s)	2	poor
Extreme problem(s)	1	hazardous, non-correctable
Dead	0	dead

Rating #0: This indicates a tree that has no significant sign of life.

Rating #1: The problems are extreme. This rating is assigned to a tree that has structural and/or health problems that no amount of work or effort can change. The issues may or may not be considered a dangerous situation.

Rating #2: The tree has major problems. If the option is taken to preserve the tree, its condition could be improved with correct arboricultural work including, but not limited to: pruning, cabling, bracing, bolting, guying, spraying, mistletoe removal, vertical mulching, fertilization, etc. If the recommended actions are completed correctly, hazard can be reduced and the rating can be elevated to a 3. If no action is taken the tree is considered a liability and should be removed.

Rating #3: The tree is in fair condition. There are some minor structural or health problems that pose no immediate danger. When the recommended actions in an arborist report are completed correctly the defect(s) can be minimized or eliminated.

Rating #4: The tree is in good condition and there are no apparent problems that a Certified Arborist can see from a visual ground inspection. If potential structural or health problems are tended to at this stage future hazard can be reduced and more serious health problems can be averted.

Rating #5: No problems found from a visual ground inspection. Structurally, these trees have properly spaced branches and near perfect characteristics for the species. Highly rated trees are not common in natural or developed landscapes. No tree is ever perfect especially with the unpredictability of nature, but with this highest rating, the condition should be considered excellent.

Notes indicate the health, structure and environment of the tree and explain why the tree should be removed or preserved. Additional notes may indicate if problems are minor, extreme or correctible.

Remove is the recommendation that the tree be removed. The recommendation will normally be based either on poor structure or poor health and is indicated as follows:

Yes H – Tree is unhealthy
Yes S – Tree is structurally unsound

OBSERVATIONS AND CONCLUSIONS

The site is a partially developed commercial site in northwest Roseville. The east side of the site has been rough graded and has annual grasses and a single oak (#1535). The western portion of the site has two patches of oak trees, which are both well below the surrounding grade and on two sides of both patches are City arterial streets.

Development impacts to the two trees proposed to be retained in the south patch will sustain moderate impacts and are anticipated to adjust to the proposed site changes. The trees to be retained in the north patch will be subjected to some amount of summer irrigation runoff. It is difficult to say with any certainty if this will prove detrimental to the trees. It may, and it may be that the trees adjust and adapt to the presence of additional summer moisture.

Below is a summary of tree condition by Arborist Rating and Species.

TABLE 2

# Trees	Common Name	DBH	Canopy Radius	Arborist Rating	Defects Found	Retain/ Remove?
1	Blue Oak	28	33	1 Extreme Structure or Health Problems	Old callusing trunk, west side, 9' above grade with interior decay; slightly out of balance east; above average amount of deadwood.	1 Remove
1	Interior Live Oak	35	38	1 Extreme Structure or Health Problems	Old callusing basal trunk wound, north side; moderate to significant decay; out of balance north; slightly above average amount of deadwood.	1 Remove
1	Valley Oak	57	39	1 Extreme Structure or Health Problems	Numerous large scaffold failures, with resulting decay; scaffold limb failure, north side, resulting in a large callusing wound reaching from 2'-20' above grade, with moderate interior decay; above average amount of deadwood.	1 Remove

# Trees	Common Name	DBH	Canopy Radius	Arborist Rating	Defects Found	Retain/ Remove?
1	Blue Oak	24	25	2 Major Structure or Health Problems	Measured 2' above grade. Old callusing trunk wound, south side, at point of limb failure, with interior decay; above average amount of deadwood.	1 Retain
11	Blue Oak	8-45	9-39	3 Fair - Minor Problems	See Tree Inventory.	11 Retain
9	Interior Live Oak	17-53	16-32	3 Fair - Minor Problems	See Tree Inventory.	9 Retain
2	Valley Oak	13-16	16-17	3 Fair - Minor Problems	Out of balance northwest.	1 Retain
26 TOTAL						**3 Remove 23 Retain**

RECOMMENDED REMOVALS

At this time, 3 trees (totaling 120 aggregate diameter inches) have been recommended for removal from the proposed project area due to the nature and extent of defects, compromised health, and/or structural instability noted at the time of field inventory efforts. If these trees were retained within the proposed project area, it is our opinion that they may be hazardous depending upon their proximity to planned development activities. For reference, the trees which have been recommended for removal due to the severity of noted defects, compromised health, and/or structural instability are highlighted in green within the accompanying Tree Inventory Summary and are briefly summarized as follows:

TABLE 3

Tag #	Protected By Code	Common Name	Species	Multi-Stems (inches)	DBH (inches)	Measured At	Measured Canopy Radius (feet)	Arborist Rating
1514	Yes	Blue Oak	*(Quercus douglasii)*		28	54	33	1 Extreme Structure or Health Problems
1539	Yes	Valley Oak	*(Quercus lobata)*		57	54	39	1 Extreme Structure or Health Problems
1540	Yes	Interior Live Oak	*(Quercus wislizeni)*	14,21	35	54	38	1 Extreme Structure or Health Problems

Trees numbered 1510, 1513, 1521, 1523, 1533, 1562, 1563 and 1564 were all identified as having failed and being in down and dead condition. Some of these trees were identified as down in previous updates and all have been removed from the improvement plans.

CONSTRUCTION REMOVALS

At this time, 20 trees (totaling 535 aggregate diameter inches) have been recommended for construction removal from the proposed project area. Those trees are briefly summarized as follows:

Tree #	Common Name	Species	Multi-Stems (inches)	Total DBH (inches)	DLR (feet)	Structure	Vigor
1522	Blue Oak	*(Quercus douglasii)*		18	22	Fair	Fair
1528	Blue Oak	*(Quercus douglasii)*		17	24	Poor to fair	Poor to fair
1529	Blue Oak	*(Quercus douglasii)*		26	32	Poor to fair	Fair
1530	Blue Oak	*(Quercus douglasii)*		27	33	Poor to fair	Fair
1531	Blue Oak	*(Quercus douglasii)*		24	31	Poor to fair	Fair
1532	Blue Oak	*(Quercus douglasii)*		8	9	Poor	Fair
1534	Blue Oak	*(Quercus douglasii)*		21	30	Poor	Fair
1535	Blue Oak	*(Quercus douglasii)*		14	17	Fair	Fair
1536	Interior Live Oak	*(Quercus wislizeni)*		21	22	Fair	Fair
1537	Blue Oak	*(Quercus douglasii)*		26	31	Fair	Fair
1538	Blue Oak	*(Quercus douglasii)*		45	37	Fair	Fair
1539	Valley Oak	*(Quercus lobata)*		57	39	Poor	Fair
1540	Interior Live Oak	*(Quercus wislizeni)*	14,21	35	38	Poor	Fair
1541	Blue Oak	*(Quercus douglasii)*		25	39	Fair	Fair
1542	Valley Oak	*(Quercus lobata)*		13	16	Poor to fair	Fair
1543	Interior Live Oak	*(Quercus wislizeni)*	12,12,13	37	32	Poor to fair	Fair
1544	Interior Live Oak	*(Quercus wislizeni)*	12,20,21	53	32	Poor to fair	Fair
1545	Interior Live Oak	*(Quercus wislizeni)*		21	29	Poor to fair	Fair
1559	Interior Live Oak	*(Quercus wislizeni)*		26	26	Poor to fair	Fair
1563	Interior Live Oak	*(Quercus wislizeni)*		21	32	Poor	Fair

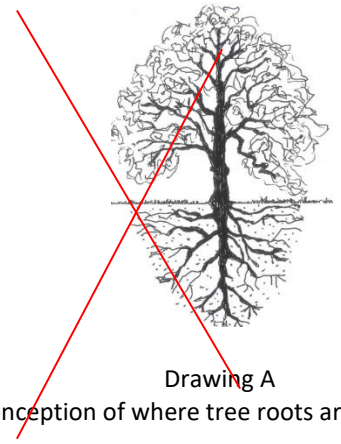
DISCUSSION

Trees need to be protected from normal construction practices if they are to remain healthy and viable on the site. Our recommendations are based on experience, and County ordinance requirements, so as to enhance tree longevity. This requires their root zones remain intact and viable, despite heavy equipment being on site, and the need to install foundations, driveways, underground utilities, and landscape irrigation systems. Simply walking and driving on soil has serious consequences for tree health.

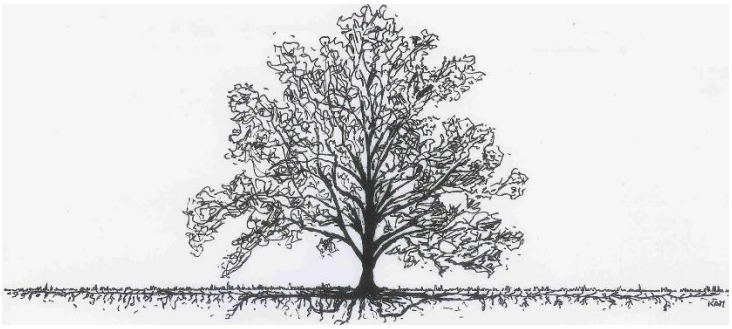
Following is a summary of Impacts to trees during construction and Tree Protection measures that should be incorporated into the site plans in order to protect the trees. Once the plans are approved, they become the document that all contractors will follow. ***The plans become the contract between the owner and the contractor, so that only items spelled out in the plans can be expected to be followed. Hence, all protection measures, such as fence locations, mulch requirements and root pruning specifications must be shown on the plans.***

Root Structure

The majority of a tree's roots are contained in a radius from the main trunk outward approximately two to three times the canopy of the tree. These roots are located in the top 6" to 3' of soil. It is a common misconception that a tree underground resembles the canopy (see Drawing A below). The correct root structure of a tree is in Drawing B. All plants' roots need both water and air for survival. Surface roots are a common phenomenon with trees grown in compacted soil. Poor canopy development or canopy decline in mature trees is often the result of inadequate root space and/or soil compaction.



Drawing A
Common misconception of where tree roots are assumed to be located



Drawing B
The reality of where roots are generally located

Structural Issues

Limited space for canopy development produces poor structure in trees. The largest tree in a given area, which is 'shading' the other trees is considered Dominant. The 'shaded' trees are considered Suppressed. The following picture illustrates this point. Suppressed trees are more likely to become a potential hazard due to their poor structure.

Dominant Tree

Growth is upright

Canopy is balanced by limbs and foliage equally

Suppressed Tree

Canopy weight all to one side

Limbs and foliage grow away from dominant tree

Co-dominant leaders are another common structural problem in trees.

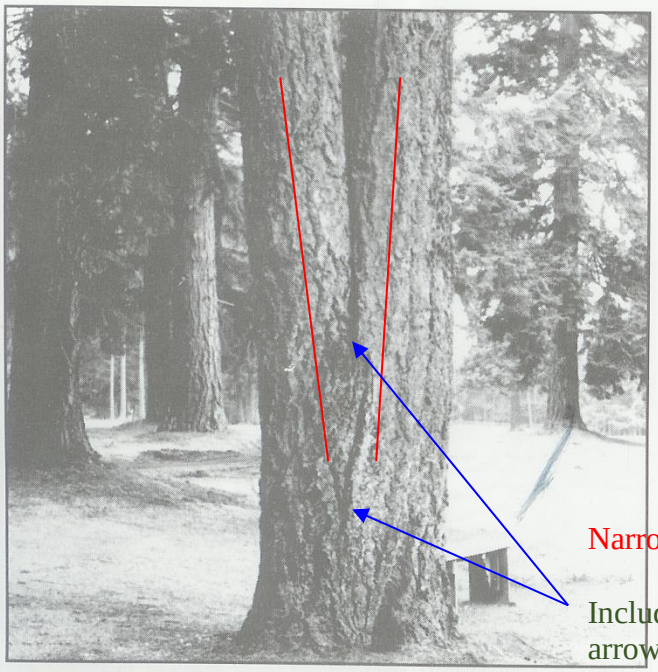


Figure 6. Codominant stems are inherently weak because the stems are of similar diameter.

The tree in this picture has a co-dominant leader at about 3' and included bark up to 7 or 8'. Included bark occurs when two or more limbs have a narrow angle of attachment resulting in bark between the stems – instead of cell to cell structure. This is considered a critical defect in trees and is the cause of many failures.

Narrow Angle

Included Bark between the arrows

Photo from Evaluation of Hazard Trees in Urban Areas by Nelda P. Matheny and James R. Clark, 1994 International Society of Arboriculture

Pruning Mature Trees for Risk Reduction

There are few good reasons to prune mature trees. Removal of deadwood, directional pruning, removal of decayed or damaged wood, and end-weight reduction as a method of mitigation for structural faults are the only reasons a mature tree should be pruned. Live wood over 3" should not be pruned unless absolutely necessary. Pruning cuts should be clean and correctly placed. Pruning should be done in accordance with the American National Standards Institute (ANSI) A300 standards. It is far better to use more small cuts than a few large cuts as small pruning wounds reduce risk while large wounds increase risk.

Pruning causes an open wound in the tree. Trees do not "heal" they compartmentalize. Any wound made today will always remain, but a healthy tree, in the absence of decay in the wound, will 'cover it' with callus tissue. Large, old pruning wounds with advanced decay are a likely failure point. Mature trees with large wounds are a high failure risk.

Overweight limbs are a common structural fault in suppressed trees. There are two remedial actions for overweight limbs (1) prune the limb to reduce the extension of the canopy, or (2) cable the limb to reduce movement. Cables do not hold weight they only stabilize the limb and require annual inspection.

Photo of another tree – not at this site.

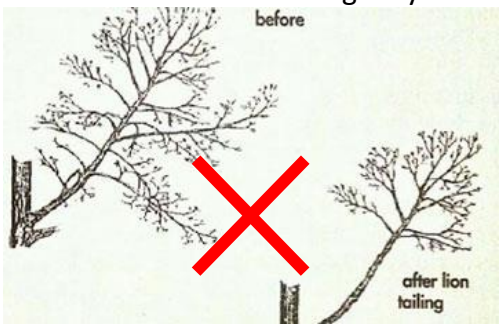
Normal limb structure

Over weight, reaching limb with main stem diameter small compared with amount of foliage present

Photo of another tree – not at this site

Lion's – Tailing is the pruning practice of removal of "an excessive number of inner and/or lower lateral branches from parent branches. Lion's tailing is not an acceptable pruning practice" ANSI A300 (part 1) 4.23. It increases the risk of failure.

Pruning – Cutting back trees changes their natural structure, while leaving trees in their natural form enhances longevity.



Arborist Classifications

There are different types of Arborists:

Tree Removal and/or Pruning Companies. These companies may be licensed by the State of California to do business, but they do not necessarily know anything about trees;

Arborists. Arborist is a broad term. It is intended to mean someone with specialized knowledge of trees but is often used to imply knowledge that is not there.

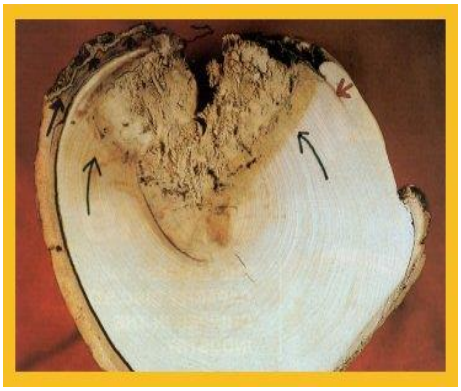
ISA Certified Arborist: An International Society of Arboriculture Certified Arborist is someone who has been trained and tested to have specialized knowledge of trees. You can look up certified arborists at the International Society of Arboriculture website: isa-arbor.org.

Consulting Arborist: An American Society of Consulting Arborists Registered Consulting Arborist is someone who has been trained and tested to have specialized knowledge of trees and trained and tested to provide high quality reports and documentation. You can look up registered consulting arborists at the American Society of Consulting Arborists website: https://www.asca-consultants.org/

Decay in Trees

Decay (in General): Fungi cause all decay of living trees. Decay is considered a disease because cell walls are altered, wood strength is affected, and living sapwood cells may be killed. Fungi decay wood by secreting enzymes. Different types of fungi cause different types of decay through the secretion of different chemical enzymes. Some decays, such as white rot, cause less wood strength loss than others because they first attack the lignin (causes cell walls to thicken and reduces susceptibility to decay and pest damage) secondarily the cellulose (another structural component in a cell walls). Others, such as soft rot, attack the cellulose chain and cause substantial losses in wood strength even in the initial stages of decay. Brown rot causes wood to become brittle and fractures easily with tension. Identification of internal decay in a tree is difficult because visible evidence may not be present.

According to Evaluation of Hazard Trees in Urban Areas (Matheny, 1994) decay is a critical factor in the stability of the tree. As decay progresses in the trunk, the stem becomes a hollow tube or cylinder rather than a solid rod. This change is not readily apparent to the casual observer. Trees require only a small amount of bark and wood to transport water, minerals and sugars. Interior heartwood can be eliminated (or degraded) to a great degree without compromising the transport process. Therefore, trees can contain significant amounts of decay without showing decline symptoms in the crown.



Compartmentalization of decay in trees is a biological process in which the cellular tissue around wounds is changed to inhibit fungal growth and provide a barrier against the spread of decay agents into the barrier zones is the formation of while a tree may be able to limit pruning cuts, in the event that there located vertically along the main additional cells. The weakest of the vertical wall. Accordingly, decay progression inward at large are more than one pruning cut trunk of the tree, the likelihood of decay progression and the associated structural loss of integrity of the internal wood is high.

Oak Tree Impacts

Our native oak trees are easily damaged or killed by having the soil within the Critical Root Zone (CRZ) disturbed or compacted. All of the work initially performed around protected trees that will be saved should be done by people rather than by wheeled or track type tractors. Oaks are fragile giants that can take little change in soil grade, compaction, or warm season watering. Don't be fooled into believing that warm season watering has no adverse effects on native oaks. Decline and eventual death can take as long as 5-20 years with poor care and inappropriate watering. Oaks can live hundreds of years if treated properly during construction, as well as later with proper pruning, and the appropriate landscape/irrigation design.

RECOMMENTATIONS: SUMMARY OF TREE PROTECTION MEASURES

Hire a Project Arborist to help ensure protection measures are incorporated into the site plans and followed. The Project Arborist should, in cooperation with the Engineers and/or Architects:

- Identify the Root Protection Zones on the final construction drawings, prior to bidding the project.
- Show the placement of tree protection fences, as well as areas to be irrigated, fertilized and mulched on the final construction drawings.
- Clearly show trees for removal on the plans and mark them clearly on site. A Contractor who is a Certified Arborist should perform tree and stump removal. All stumps within the root zone of trees to be preserved shall be ground out using a stump router or left in place. **No trunk within the root zone of other trees shall be removed using a backhoe or other piece of grading equipment**.
- Prior to any grading, or other work on the site that will come within 50' of any tree to be preserved:
    1. Irrigate (if needed) and place a 3" layer of chip mulch over the protected root zone of all trees that will be impacted.
    2. Erect Tree Protection Fences. Place boards against trees located within 3' of construction zones, even if fenced off.
    3. Remove lower foliage that may interfere with equipment PRIOR to having grading or other equipment on site. The Project Arborist should approve the extent of foliage elevation, and oversee the pruning, performed by a contractor who is an ISA Certified Arborist.
- For cuts, expose roots by hand digging, potholing or using an air spade and then cut roots cleanly prior to further grading outside the tree protection zones.
- For fills, if a cut is required first, follow as for cuts.
- Where possible, specify geotextile fabric in lieu of compacting and root cutting, prior to placing fills on the soil surface. Any proposed retaining wall or fill soil shall be discussed with the engineer and arborist in order to reduce impacts to trees to be preserved.
- Clearly designate an area on the site outside the drip line of all trees where construction materials may be stored, and parking can take place. No materials or parking shall take place within the root zones of protected trees.
- Design utility and irrigation trenches to minimize disturbance to tree roots. Where possible, dig trenches with a hydraulic or air spade, placing pipes underneath the roots, or bore the deeper trenches underneath the roots.
- Include on the plans an Arborist inspection schedule to monitor the site during (and after) construction to ensure protection measures are followed and make recommendations for care of the trees on site, as needed.

General Tree protection measures are included as Appendix 3. These measures need to be included on the Site, Grading, Utility and Landscape Plans. A final report of recommendations specific to the plan can be completed as part of, and in conjunction with, the actual plans. This will require the arborist working directly with the engineer and architect for the project. If the above recommendations are followed, the amount of time required by the arborist for the final report should be minim this will require the arborist working directly

with the engineer and architect for the project. If the above recommendations are followed, the amount of time required by the arborist for the final report should be minimal.

Report Prepared by:

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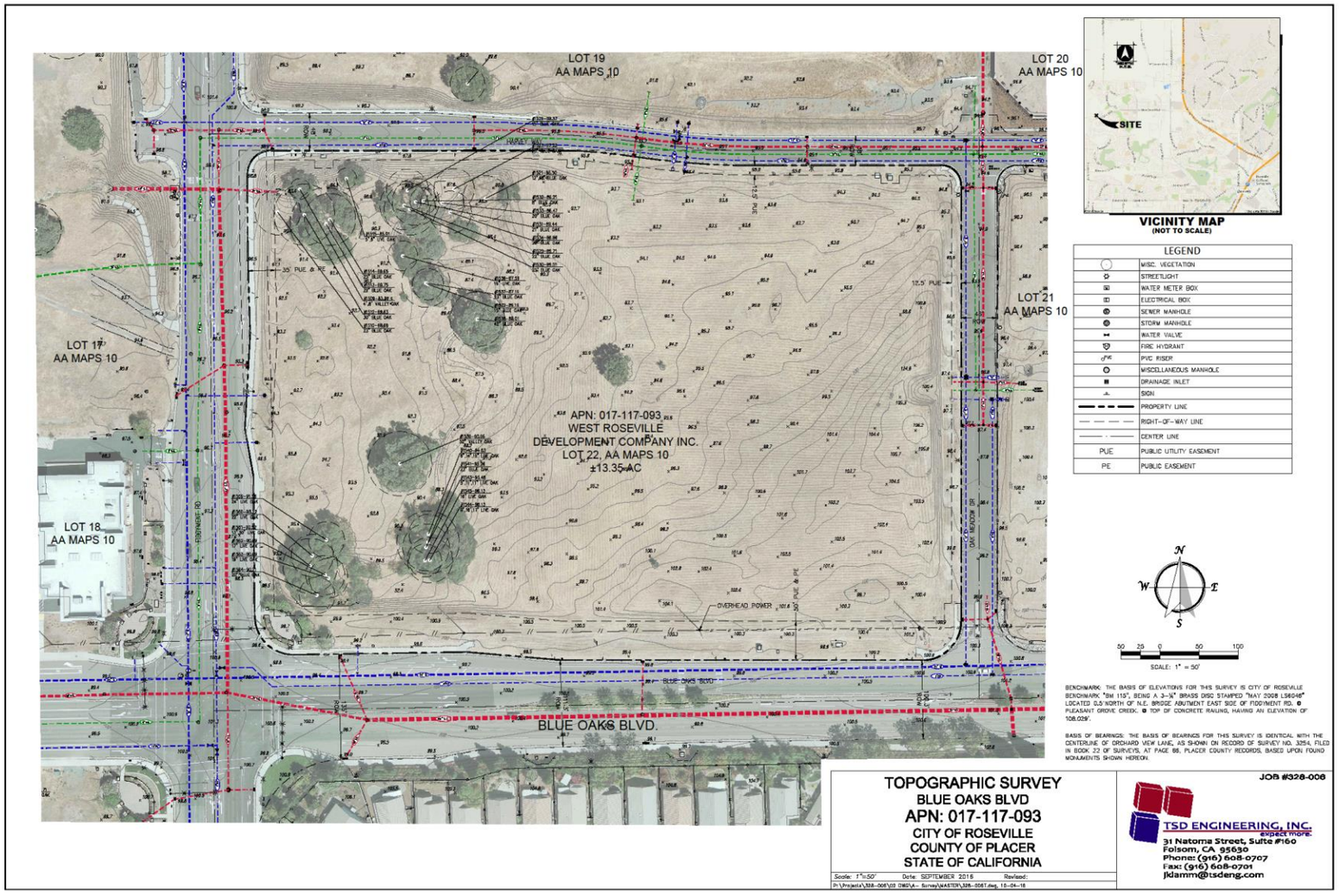
Certified Arborist WE-0510A
ISA Tree Risk Assessment Qualified
Member, American Society of Consulting Arborists

Enc.: Appendix 1 – Map of The Property Showing Tree Locations
Appendix 2 – Tree Information Collected
Appendix 3 – General Practices for Tree Protection

APPENDIX 1 – MAP OF THE PROPERTY SHOWING TREE LOCATIONS



APPENDIX 2 – TREE INFORMATION COLLECTED

Tree #	COMMON NAME	SPECIES	MULTI-STEMS (inches)	TOTAL DBH (inches)	DLR (feet)	CONDITIONAL ASSESSMENT						ARBORIST RATING	NOTABLE CHARACTERISTICS	PERCEIVED IMPACTS	RECOMMENDATIONS	Construc-tion Removal Mitigation Inches
						RT CR	TRUNK	LIMBS	FOLIAGE	STRUCTURE	VIGOR					
1509	Valley Oak	*(Quercus lobata)*		16	17	Fair	Fair	Fair	Dormant	Fair	Fair	3 Fair - Minor Problems		No encroachment depicted.	None at this time.	
1512	Blue Oak	*(Quercus douglasii)*		24	25	Fair	Poor to fair	Fair	Dormant	Poor to fair	Fair	2 Major Structure or Health Problems	**AKA Tree 931** Measured 2' above grade. Old callusing trunk wound, south side, at point of limb failure, with interior decay; above average amount of deadwood.	Minor to negligible encroachment for retaining wall construction south side.	***Perform decay detection and provide further recommendations. If retained, any excavation for retaining wall footings shall be monitored by the project arborist. May require root pruning. Will require canopy pruning.***	
1514	Blue Oak	*(Quercus douglasii)*		28	33	Fair	Poor to fair	Fair	Dormant	Poor to fair	Fair	1 Extreme Structure or Health Problems	**AKA Tree 929** Old callusing trunk, west side, 9' above grade with interior decay; slightly out of balance to the east; above average amount of deadwood.	Arborist's tree removal.	***Recommend removal due to nature and extent of noted defects***	
1515	Interior Live Oak	*(Quercus wislizeni)*		17	16	Fair	Poor to fair	Fair	Fair	Poor to fair	Fair	3 Fair - Minor Problems	Measured 1.5' above grade; trunk forks 2' above grade into codominant stems which then graft 6'-9' above grade; slightly above average amount of deadwood.	Minor to negligible encroachment for retaining wall construction south side.	***Excavation for retaining wall footings shall be monitored by the project arborist. Root pruning may be necessary.***	

Tree #	COMMON NAME	SPECIES	MULTI-STEMS (inches)	TOTAL DBH (inches)	DLR (feet)	CONDITIONAL ASSESSMENT						ARBORIST RATING	NOTABLE CHARACTERISTICS	PERCEIVED IMPACTS	RECOMMENDATIONS	Construc-tion Removal Mitigation Inches
						RT CR	TRUNK	LIMBS	FOLIAGE	STRUCTURE	VIGOR					
1522	Blue Oak	*(Quercus douglasii)*		18	22	Fair	Fair	Fair	Dormant	Fair	Fair	3 Fair - Minor Problems	**AKA Tree 917** Above average amount of deadwood.	Tree removal.	None at this time.	18
1528	Blue Oak	*(Quercus douglasii)*		17	24	Fair	Poor to fair	Poor to fair	Dormant	Poor to fair	Poor to fair	3 Fair - Minor Problems	**AKA Tree 927**Out of balance to the south; above average amount of deadwood; poor bud formation.	Tree removal.	None at this time.	17
1529	Blue Oak	*(Quercus douglasii)*		26	32	Fair	Poor to fair	Poor to fair	Dormant	Poor to fair	Fair	3 Fair - Minor Problems	**AKA Tree 926** Out of balance to the west; above average amount of deadwood; sprout growth on the larger wood.	Tree removal.	None at this time.	26
1530	Blue Oak	*(Quercus douglasii)*		27	33	Fair	Poor to fair	Fair	Dormant	Poor to fair	Fair	3 Fair - Minor Problems	**AKA Tree 925** Slightly out of balance to the south; above average amount of deadwood.	Tree removal.	None at this time.	27
1531	Blue Oak	*(Quercus douglasii)*		24	31	Fair	Poor to fair	Poor to fair	Dormant	Poor to fair	Fair	3 Fair - Minor Problems	**AKA Tree 924** Out of balance to the east; above average amount of deadwood.	Tree removal.	None at this time.	24
1532	Blue Oak	*(Quercus douglasii)*		8	9	Poor	Poor to fair	Poor to fair	Dormant	Poor	Fair	3 Fair - Minor Problems	Past partial root system failure, partially on grade.	Tree removal.	None at this time.	8
1534	Blue Oak	*(Quercus douglasii)*		21	30	Poor	Poor	Poor	Dormant	Poor	Fair	3 Fair - Minor Problems	**AKA Tree 922** Tree suffered a partial root system failure in the past and is lying on grade to the south; above average amount of deadwood.	Tree removal.	None at this time.	21

Tree #	COMMON NAME	SPECIES	MULTI-STEMS (inches)	TOTAL DBH (inches)	DLR (feet)	CONDITIONAL ASSESSMENT						ARBORIST RATING	NOTABLE CHARACTERISTICS	PERCEIVED IMPACTS	RECOMMENDATIONS	Construc-tion Removal Mitigation Inches
						RT CR	TRUNK	LIMBS	FOLIAGE	STRUCTURE	VIGOR					
1535	Blue Oak	*(Quercus douglasii)*		14	17	Fair	Fair	Fair	Dormant	Fair	Fair	3 Fair - Minor Problems	**AKA Tree 919** Out of balance to the east; slightly above average amount of deadwood.	Tree removal.	None at this time.	14
1536	Interior Live Oak	*(Quercus wislizeni)*		21	22	Fair	Fair	Poor to fair	Fair	Fair	Fair	3 Fair - Minor Problems	**AKA Tree 918**Old callusing lower trunk wounds, north side, with minor decay; slightly above average amount of deadwood.	Tree removal.	None at this time.	21
1537	Blue Oak	*(Quercus douglasii)*		26	31	Fair	Poor	Poor to fair	Dormant	Fair	Fair	3 Fair - Minor Problems	**AKA Tree 916** Out of balance to the west; inherently weak primary crotch; slightly above average amount of deadwood.	Tree removal.	None at this time.	26
1538	Blue Oak	*(Quercus douglasii)*		45	37	Fair	Fair	Fair	Dormant	Fair	Fair	3 Fair - Minor Problems	**AKA Tree 915** Root crown and some buttresses exposed from bank erosion on the northwest side; above average amount of deadwood.	Tree removal.	None at this time.	45

Tree #	COMMON NAME	SPECIES	MULTI-STEMS (inches)	TOTAL DBH (inches)	DLR (feet)	CONDITIONAL ASSESSMENT						ARBORIST RATING	NOTABLE CHARACTERISTICS	PERCEIVED IMPACTS	RECOMMENDATIONS	Construc-tion Removal Mitigation Inches
						RT CR	TRUNK	LIMBS	FOLIAGE	STRUCTURE	VIGOR					
1539	Valley Oak	*(Quercus lobata)*		57	39	Fair	Poor	Poor to fair	Dormant	Poor	Fair	1 Extreme Structure or Health Problems	**AKA Tree 913** Numerous large scaffold failures, with resulting decay; scaffold limb failure, north side, resulting in a large callusing wound reaching from 2'-20' above grade, with moderate interior decay; above average amount of deadwood.	Arborist's tree removal.	***Recommend removal due to nature and extent of noted defects***	57
1540	Interior Live Oak	*(Quercus wislizeni)*	14,21	35	38	Poor	Poor	Poor to fair	Fair	Poor	Fair	1 Extreme Structure or Health Problems	**AKA Tree 911**Old callusing basal trunk wound, north side; moderate to significant decay; out of balance to the north; slightly above average amount of deadwood.	Arborist's tree removal.	***Recommend removal due to nature and extent of noted defects***	35
1541	Blue Oak	*(Quercus douglasii)*		25	39	Poor to fair	Poor to fair	Fair	Fair	Fair	Fair	3 Fair - Minor Problems	**AKA Tree 910** Buttress roots exposed due to bank erosion; out of balance east; slightly above average amount of deadwood.	Tree removal.	***Clean out crown and perform weight/size reduction pruning.***	25
1542	Valley Oak	*(Quercus lobata)*		13	16	Fair	Poor to fair	Fair	Dormant	Poor to fair	Fair	3 Fair - Minor Problems	Out of balance northwest.	Tree removal.	None at this time.	13

Tree #	COMMON NAME	SPECIES	MULTI-STEMS (inches)	TOTAL DBH (inches)	DLR (feet)	CONDITIONAL ASSESSMENT						ARBORIST RATING	NOTABLE CHARACTERISTICS	PERCEIVED IMPACTS	RECOMMENDATIONS	Construc-tion Removal Mitigation Inches
						RT CR	TRUNK	LIMBS	FOLIAGE	STRUCTURE	VIGOR					
1543	Interior Live Oak	*(Quercus wislizeni)*	12,12,13	37	32	Poor to fair	Poor to fair	Fair	Fair	Poor to fair	Fair	3 Fair - Minor Problems	**AKA Tree 909** Out of balance south; old callusing wounds in various locations on the scaffold branches, with minor decay evident.	Tree removal.	***Clean out crown and perform weight/size reduction pruning.***	37
1544	Interior Live Oak	*(Quercus wislizeni)*	12,20,21	53	32	Poor to fair	Poor to fair	Fair	Fair	Poor to fair	Fair	3 Fair - Minor Problems	**AKA Tree 908** Old callusing basal trunk wound, west side, with minor decay; out of balance east; slightly above average amount of deadwood.	Tree removal.	None at this time.	53
1545	Interior Live Oak	*(Quercus wislizeni)*		21	29	Poor to fair	Fair	Poor to fair	Fair	Poor to fair	Fair	3 Fair - Minor Problems	**AKA Tree 907**Old callusing basal trunk wound, north side, with minor decay; out of balance south; slightly above average amount of deadwood.	Tree removal.	None at this time.	21
1559	Interior Live Oak	*(Quercus wislizeni)*		26	26	Fair	Poor to fair	Fair	Fair	Poor to fair	Fair	3 Fair - Minor Problems	**AKA Tree 902** Old callusing wounds, various locations, with no obvious decay; above average amount of deadwood.	Tree removal.	None at this time.	26

Tree #	COMMON NAME	SPECIES	MULTI-STEMS (inches)	TOTAL DBH (inches)	DLR (feet)	CONDITIONAL ASSESSMENT						ARBORIST RATING	NOTABLE CHARACTERISTICS	PERCEIVED IMPACTS	RECOMMENDATIONS	Construc-tion Removal Mitigation Inches
						RT CR	TRUNK	LIMBS	FOLIAGE	STRUCTURE	VIGOR					
1560	Interior Live Oak	*(Quercus wislizeni)*		25	28	Fair	Fair	Fair	Fair	Fair	Fair	3 Fair - Minor Problems	**AKA Tree 901**	Moderate to significant encroachment from retaining wall construction 14' north of trunk.	***Excavation for retaining wall footings shall be monitored by the project arborist. Root pruning may be necessary.***	
1561	Interior Live Oak	*(Quercus wislizeni)*		40	30	Fair	Poor to fair	Fair	Fair	Poor to fair	Fair	3 Fair - Minor Problems	**AKA Tree 903** Measured 2' above grade; callusing on the south side; suspect interior decay; out of balance south; slightly above average amount of deadwood.	Minor to moderate encroachment from retaining wall construction 126'4' north of trunk.	***Excavation for retaining wall footings shall be monitored by the project arborist. Root pruning may be necessary.***	
1563	Interior Live Oak	*(Quercus wislizeni)*		21	32	Poor	Poor	Fair	Fair	Poor	Fair	3 Fair - Minor Problems	**AKA Tree 905**Partial failure of the root system has left the tree growing prone on grade toward the south; terminal 15' is dead.	Tree removal.	None at this time.	21

TOTAL INVENTORIED TREES = 26 trees (685 aggregate diameter inches)
TOTAL RECOMMENDED REMOVALS = 3 trees (120 aggregate diameter inches)
PRECAUTIONARY TREES HIGHLIGHTED FOR REFERENCE
TOTAL CONSTRUCTION REMOVALS = 20 Trees (535 aggregate diameter inches)

APPENDIX 3 – GENERAL PRACTICES FOR TREE PROTECTION

Definitions

Root zone: The roots of trees grow fairly close to the surface of the soil, and spread out in a radial direction from the trunk of tree. A general rule of thumb is that they spread 2 to 3 times the radius of the canopy, or 1 to 1 ½ times the height of the tree. It is generally accepted that disturbance to root zones should be kept as far as possible from the trunk of a tree.

Inner Bark: The bark on large valley oaks and coast live oaks is quite thick, usually 1" to 2". If the bark is knocked off a tree, the inner bark, or cambial region, is exposed or removed. The cambial zone is the area of tissue responsible for adding new layers to the tree each year, so by removing it, the tree can only grow new tissue from the edges of the wound. In addition, the wood of the tree is exposed to decay fungi, so the trunk present at the time of the injury becomes susceptible to decay. Tree protection measures require that no activities occur which can knock the bark off the trees.

Methods Used in Tree Protection:

No matter how detailed Tree Protection Measures are in the initial Arborist Report, they will not accomplish their stated purpose unless they are applied to individual trees and a Project Arborist is hired to oversee the construction. The Project Arborist should have the ability to enforce the Protection Measures. The Project Arborist should be hired as soon as possible to assist in design and to become familiar with the project. He must be able to read and understand the project drawings and interpret the specifications. He should also have the ability to cooperate with the contractor, incorporating the contractor's ideas on how to accomplish the protection measures, wherever possible. It is advisable for the Project Arborist to be present at the Pre-Bid tour of the site, to answer questions the contractors may have about Tree Protection Measures. This also lets the contractors know how important tree preservation is to the developer.

Root Protection Zone (RPZ): Since in most construction projects it is not possible to protect the entire root zone of a tree, a Root Protection Zone is established for each tree to be preserved. The minimum Root Protection Zone is the area underneath the tree's canopy (out to the dripline, or edge of the canopy), plus 10'. The Project Arborist must approve work within the RPZ.

Irrigate, Fertilize, Mulch: Prior to grading on the site near any tree, the area within the Tree Protection fence should be fertilized with 4 pounds of nitrogen per 1000 square feet, and the fertilizer irrigated in. The irrigation should percolate at least 24 inches into the soil. This should be done no less than 2 weeks prior to grading or other root disturbing activities. After irrigating, cover the RPZ with at least 12" of leaf and twig mulch. Such mulch can be obtained from chipping or grinding the limbs of any trees removed on the site. Acceptable mulches can be obtained from nurseries or other commercial sources. Fibrous or shredded redwood or cedar bark mulch shall not be used anywhere on site.

Fence: Fence around the Root Protection Zone and restrict activity therein to prevent soil compaction by vehicles, foot traffic or material storage. The fenced area shall be off limits to all construction equipment, unless there is express written notification provided by the Project Arborist, and impacts are discussed and mitigated prior to work commencing.

> No storage or cleaning of equipment or materials, or parking of any equipment can take place within the fenced off area, known as the RPZ.

The fence should be highly visible, and stout enough to keep vehicles and other equipment out. I recommend the fence be made of orange plastic protective fencing, kept in place by t-posts set no farther apart than 6'.

In areas of intense impact, a 6' chain link fence is preferred.

In areas with many trees, the RPZ can be fenced as one unit, rather than separately for each tree.

Where tree trunks are within 3' of the construction area, place 2" by 4" boards vertically against the tree trunks, even if fenced off. Hold the boards in place with wire. Do not nail them directly to the tree. The purpose of the boards is to protect the trunk, should any equipment stray into the RPZ.

Elevate Foliage: Where indicated, remove lower foliage from a tree to prevent limb breakage by equipment. Low foliage can usually be removed without harming the tree, unless more than 25% of the foliage is removed. Branches need to be removed at the anatomically correct location in order to prevent decay organisms from entering the trunk. For this reason, a contractor who is an ISA Certified Arborist should perform all pruning on protected trees.[1]

Expose and Cut Roots: Breaking roots with a backhoe, or crushing them with a grader, causes significant injury, which may subject the roots to decay. Ripping roots may cause them to splinter toward the base of the tree, creating much more injury than a clean cut would make. At any location where the root zone of a tree will be impacted by a trench or a cut (including a cut required for a fill and compaction), the roots shall be exposed with either a backhoe digging radially to the trunk, by hand digging, or by a hydraulic air spade, and then cut cleanly with a sharp instrument, such as chainsaw with a carbide chain. Once the roots are severed, the area behind the cut should be moistened and mulched. A root protection fence should also be erected to protect the remaining roots, if it is not already in place. Further grading or backhoe work required outside the established RPZ can then continue without further protection measures.

Protect Roots in Deeper Trenches: The location of utilities on the site can be very detrimental to trees. Design the project to use as few trenches as possible, and to keep them away from the major trees to be protected. Wherever possible, in areas where trenches will be very deep, consider boring under the roots of the trees, rather than digging the trench through the roots. This technique can be quite useful for utility trenches and pipelines.

Protect Roots in Small Trenches: After all construction is complete on a site, it is not unusual for the landscape contractor to come in and sever a large number of "preserved" roots during the installation of irrigation systems. The Project Arborist must therefore approve the landscape and irrigation plans. The irrigation system needs to be designed so the main lines are located outside the root zone of major trees, and the secondary lines are either laid on the surface (drip systems), or carefully dug with a hydraulic or air spade, and the flexible pipe fed underneath the major roots.

Design the irrigation system so it can slowly apply water (no more than ¼" to ½" of water per hour) over a longer period of time. This allows deep soaking of root zones. The system also needs to accommodate infrequent irrigation settings of once or twice a month, rather than several times a week.

Monitoring Tree Health During and After Construction: The Project Arborist should visit the site at least twice a month during construction to be certain the tree protection measures are being followed, to monitor the health of impacted trees, and make recommendations as to irrigation or other needs. After construction is

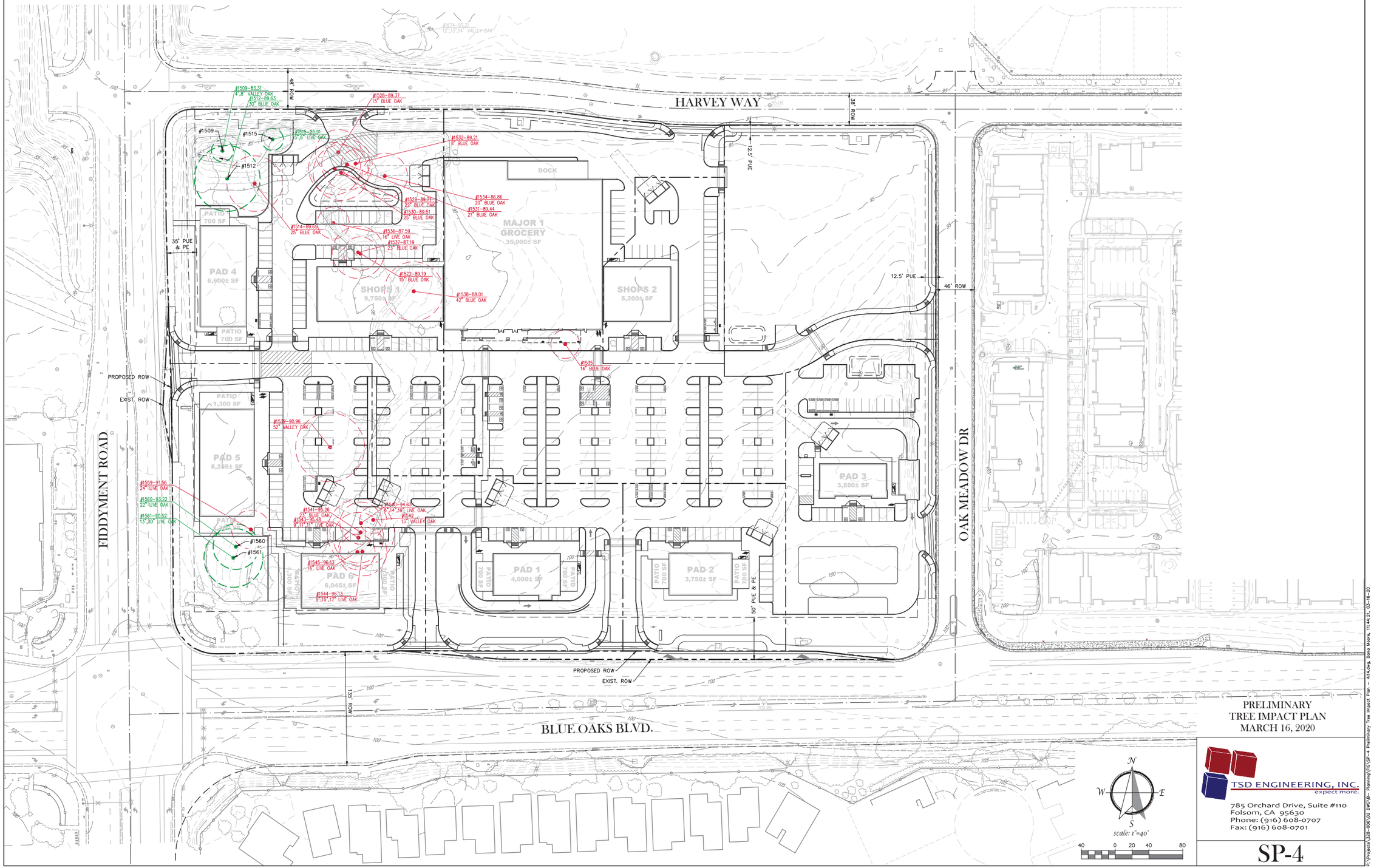
[1] International Society of Arboriculture (ISA), maintains a program of Certifying individuals. Each Certified Arborist has a number and must maintain continuing education credits to remain Certified.

complete, the arborist should monitor the site monthly for one year and make recommendations for care where needed. If longer term monitoring is required, the arborist should report this to the developer and the planning agency overseeing the project.

PRELIMINARY TREE IMPACT PLAN - ALT 4

THE PLAZA AT BLUE OAKS

1950 BLUE OAKS BLVD
FIDDYMENT F-31
ROSEVILLE, CA



PRELIMINARY
TREE IMPACT PLAN
MARCH 16, 2020

TSD ENGINEERING, INC.
expect more.
785 Orchard Drive, Suite #110
Folsom, CA 95630
Phone: (916) 608-0707
Fax: (916) 608-0701

SP-4

Plaza at Blue Oaks

Placer-Sacramento County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Supermarket	35.00	1000sqft	0.80	35,000.00	0
Regional Shopping Center	43.60	1000sqft	1.00	43,600.00	0
Convenience Market With Gas Pumps	12.00	Pump	0.04	1,694.10	0
Parking Lot	109.00	1000sqft	2.50	109,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	74
Climate Zone	2			**Operational Year**	2021
Utility Company	Roseville Electric				
CO2 Intensity (lb/MWhr)	531.85	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Start of construction and operational year are estimates. CO2 intensity factor adjusted to reflect R.E.'s anticipated progress towards statewide RPS goals.

Land Use -

Architectural Coating - Low VOC paint.

Vehicle Trips - Non-residential project not anticipated to increase vmt so no mobile analysis is required.

Area Coating - Low VOC.

Energy Use -

Sequestration - based on landscape plan.

Mobile Land Use Mitigation -

Mobile Commute Mitigation - designated park-n-ride site (20 spaces).

Area Mitigation -

Energy Mitigation -

Water Mitigation -

Plaza at Blue Oaks - Placer-Sacramento County, Annual

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	EF_Nonresidential_Exterior	100.00	50.00
tblArchitecturalCoating	EF_Nonresidential_Interior	100.00	50.00
tblArchitecturalCoating	EF_Parking	100.00	50.00
tblAreaCoating	Area_EF_Nonresidential_Exterior	100	50
tblAreaCoating	Area_EF_Nonresidential_Interior	100	50
tblAreaCoating	Area_EF_Parking	100	50
tblAreaMitigation	UseLowVOCPaintParkingCheck	False	True
tblProjectCharacteristics	CO2IntensityFactor	793.8	531.85
tblSequestration	NumberOfNewTrees	0.00	373.00
tblVehicleTrips	ST_TR	204.47	0.00
tblVehicleTrips	ST_TR	49.97	0.00
tblVehicleTrips	ST_TR	177.59	0.00
tblVehicleTrips	SU_TR	166.88	0.00
tblVehicleTrips	SU_TR	25.24	0.00
tblVehicleTrips	SU_TR	166.44	0.00
tblVehicleTrips	WD_TR	542.60	0.00
tblVehicleTrips	WD_TR	42.70	0.00
tblVehicleTrips	WD_TR	102.24	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1221	1.1780	0.8762	1.7600e-003	0.0943	0.0585	0.1527	0.0445	0.0546	0.0991	0.0000	154.9667	154.9667	0.0327	0.0000	155.7850
2021	0.4045	1.9469	1.7883	3.8100e-003	0.0689	0.0909	0.1598	0.0188	0.0855	0.1042	0.0000	336.6221	336.6221	0.0581	0.0000	338.0752
Maximum	**0.4045**	**1.9469**	**1.7883**	**3.8100e-003**	**0.0943**	**0.0909**	**0.1598**	**0.0445**	**0.0855**	**0.1042**	**0.0000**	**336.6221**	**336.6221**	**0.0581**	**0.0000**	**338.0752**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1221	1.1780	0.8762	1.7600e-003	0.0943	0.0585	0.1527	0.0445	0.0546	0.0991	0.0000	154.9665	154.9665	0.0327	0.0000	155.7848
2021	0.4045	1.9469	1.7883	3.8100e-003	0.0689	0.0909	0.1598	0.0188	0.0855	0.1042	0.0000	336.6219	336.6219	0.0581	0.0000	338.0749
Maximum	**0.4045**	**1.9469**	**1.7883**	**3.8100e-003**	**0.0943**	**0.0909**	**0.1598**	**0.0445**	**0.0855**	**0.1042**	**0.0000**	**336.6219**	**336.6219**	**0.0581**	**0.0000**	**338.0749**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	9-1-2020	11-30-2020	1.0056	1.0056
2	12-1-2020	2-28-2021	0.7721	0.7721
3	3-1-2021	5-31-2021	0.7616	0.7616
4	6-1-2021	8-31-2021	0.7610	0.7610
5	9-1-2021	9-30-2021	0.1484	0.1484
		Highest	1.0056	1.0056

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.3402	2.0000e-005	1.8400e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.5700e-003	3.5700e-003	1.0000e-005	0.0000	3.8000e-003
Energy	0.0102	0.0929	0.0780	5.6000e-004		7.0600e-003	7.0600e-003		7.0600e-003	7.0600e-003	0.0000	578.9382	578.9382	0.0280	7.2400e-003	581.7968
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	49.3633	0.0000	49.3633	2.9173	0.0000	122.2956
Water						0.0000	0.0000		0.0000	0.0000	2.4332	11.8603	14.2935	0.2506	6.0300e-003	22.3557
Total	**0.3504**	**0.0929**	**0.0799**	**5.6000e-004**	**0.0000**	**7.0700e-003**	**7.0700e-003**	**0.0000**	**7.0700e-003**	**7.0700e-003**	**51.7965**	**590.8021**	**642.5986**	**3.1959**	**0.0133**	**726.4519**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.3167	2.0000e-005	1.8400e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.5700e-003	3.5700e-003	1.0000e-005	0.0000	3.8000e-003
Energy	0.0102	0.0929	0.0780	5.6000e-004		7.0600e-003	7.0600e-003		7.0600e-003	7.0600e-003	0.0000	578.9382	578.9382	0.0280	7.2400e-003	581.7968
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	49.3633	0.0000	49.3633	2.9173	0.0000	122.2956
Water						0.0000	0.0000		0.0000	0.0000	2.4332	11.8603	14.2935	0.2506	6.0300e-003	22.3557
Total	**0.3270**	**0.0929**	**0.0799**	**5.6000e-004**	**0.0000**	**7.0700e-003**	**7.0700e-003**	**0.0000**	**7.0700e-003**	**7.0700e-003**	**51.7965**	**590.8021**	**642.5986**	**3.1959**	**0.0133**	**726.4519**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**6.69**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.3 Vegetation

Vegetation

	CO2e
Category	MT
New Trees	264.0840
Total	**264.0840**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	9/1/2020	9/28/2020	5	20	
2	Site Preparation	Site Preparation	9/29/2020	10/5/2020	5	5	
3	Grading	Grading	10/6/2020	10/15/2020	5	8	
4	Building Construction	Building Construction	10/16/2020	9/2/2021	5	230	
5	Paving	Paving	9/3/2021	9/28/2021	5	18	
6	Architectural Coating	Architectural Coating	9/29/2021	10/22/2021	5	18	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 4

Acres of Paving: 2.5

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 120,441; Non-Residential Outdoor: 40,147; Striped Parking Area: 6,540 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	2	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	158	0.38
Building Construction	Cranes	1	7.00	231	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Grading	Excavators	1	8.00	158	0.38
Paving	Pavers	1	8.00	130	0.42
Paving	Rollers	2	6.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	1	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Generator Sets	1	8.00	84	0.74
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Paving	Paving Equipment	2	6.00	132	0.36
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Building Construction	Welders	1	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	71.00	31.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	8	20.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	14.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0331	0.3320	0.2175	3.9000e-004		0.0166	0.0166		0.0154	0.0154	0.0000	33.9986	33.9986	9.6000e-003	0.0000	34.2386
Total	**0.0331**	**0.3320**	**0.2175**	**3.9000e-004**		**0.0166**	**0.0166**		**0.0154**	**0.0154**	**0.0000**	**33.9986**	**33.9986**	**9.6000e-003**	**0.0000**	**34.2386**

3.2 Demolition - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.2000e-004	3.6000e-004	3.8900e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0167	1.0167	3.0000e-005	0.0000	1.0173
Total	**5.2000e-004**	**3.6000e-004**	**3.8900e-003**	**1.0000e-005**	**1.1800e-003**	**1.0000e-005**	**1.1900e-003**	**3.1000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**1.0167**	**1.0167**	**3.0000e-005**	**0.0000**	**1.0173**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0331	0.3320	0.2175	3.9000e-004		0.0166	0.0166		0.0154	0.0154	0.0000	33.9986	33.9986	9.6000e-003	0.0000	34.2385
Total	**0.0331**	**0.3320**	**0.2175**	**3.9000e-004**		**0.0166**	**0.0166**		**0.0154**	**0.0154**	**0.0000**	**33.9986**	**33.9986**	**9.6000e-003**	**0.0000**	**34.2385**

3.2 Demolition - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.2000e-004	3.6000e-004	3.8900e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.1000e-004	1.0000e-005	3.2000e-004	0.0000	1.0167	1.0167	3.0000e-005	0.0000	1.0173
Total	**5.2000e-004**	**3.6000e-004**	**3.8900e-003**	**1.0000e-005**	**1.1800e-003**	**1.0000e-005**	**1.1900e-003**	**3.1000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**1.0167**	**1.0167**	**3.0000e-005**	**0.0000**	**1.0173**

3.3 Site Preparation - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0452	0.0000	0.0452	0.0248	0.0000	0.0248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0102	0.1060	0.0538	1.0000e-004		5.4900e-003	5.4900e-003		5.0500e-003	5.0500e-003	0.0000	8.3577	8.3577	2.7000e-003	0.0000	8.4253
Total	**0.0102**	**0.1060**	**0.0538**	**1.0000e-004**	**0.0452**	**5.4900e-003**	**0.0507**	**0.0248**	**5.0500e-003**	**0.0299**	**0.0000**	**8.3577**	**8.3577**	**2.7000e-003**	**0.0000**	**8.4253**

3.3 Site Preparation - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6000e-004	1.1000e-004	1.1700e-003	0.0000	3.5000e-004	0.0000	3.6000e-004	9.0000e-005	0.0000	1.0000e-004	0.0000	0.3050	0.3050	1.0000e-005	0.0000	0.3052
Total	**1.6000e-004**	**1.1000e-004**	**1.1700e-003**	**0.0000**	**3.5000e-004**	**0.0000**	**3.6000e-004**	**9.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3050**	**0.3050**	**1.0000e-005**	**0.0000**	**0.3052**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0452	0.0000	0.0452	0.0248	0.0000	0.0248	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0102	0.1060	0.0538	1.0000e-004		5.4900e-003	5.4900e-003		5.0500e-003	5.0500e-003	0.0000	8.3577	8.3577	2.7000e-003	0.0000	8.4252
Total	**0.0102**	**0.1060**	**0.0538**	**1.0000e-004**	**0.0452**	**5.4900e-003**	**0.0507**	**0.0248**	**5.0500e-003**	**0.0299**	**0.0000**	**8.3577**	**8.3577**	**2.7000e-003**	**0.0000**	**8.4252**

3.3 Site Preparation - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.6000e-004	1.1000e-004	1.1700e-003	0.0000	3.5000e-004	0.0000	3.6000e-004	9.0000e-005	0.0000	1.0000e-004	0.0000	0.3050	0.3050	1.0000e-005	0.0000	0.3052
Total	**1.6000e-004**	**1.1000e-004**	**1.1700e-003**	**0.0000**	**3.5000e-004**	**0.0000**	**3.6000e-004**	**9.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.3050**	**0.3050**	**1.0000e-005**	**0.0000**	**0.3052**

3.4 Grading - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0262	0.0000	0.0262	0.0135	0.0000	0.0135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.7200e-003	0.1055	0.0642	1.2000e-004		5.0900e-003	5.0900e-003		4.6900e-003	4.6900e-003	0.0000	10.4235	10.4235	3.3700e-003	0.0000	10.5078
Total	**9.7200e-003**	**0.1055**	**0.0642**	**1.2000e-004**	**0.0262**	**5.0900e-003**	**0.0313**	**0.0135**	**4.6900e-003**	**0.0182**	**0.0000**	**10.4235**	**10.4235**	**3.3700e-003**	**0.0000**	**10.5078**

3.4 Grading - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.5000e-004	1.5600e-003	0.0000	4.7000e-004	0.0000	4.7000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4067	0.4067	1.0000e-005	0.0000	0.4069
Total	**2.1000e-004**	**1.5000e-004**	**1.5600e-003**	**0.0000**	**4.7000e-004**	**0.0000**	**4.7000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4067**	**0.4067**	**1.0000e-005**	**0.0000**	**0.4069**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0262	0.0000	0.0262	0.0135	0.0000	0.0135	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	9.7200e-003	0.1055	0.0642	1.2000e-004		5.0900e-003	5.0900e-003		4.6900e-003	4.6900e-003	0.0000	10.4235	10.4235	3.3700e-003	0.0000	10.5078
Total	**9.7200e-003**	**0.1055**	**0.0642**	**1.2000e-004**	**0.0262**	**5.0900e-003**	**0.0313**	**0.0135**	**4.6900e-003**	**0.0182**	**0.0000**	**10.4235**	**10.4235**	**3.3700e-003**	**0.0000**	**10.5078**

3.4 Grading - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1000e-004	1.5000e-004	1.5600e-003	0.0000	4.7000e-004	0.0000	4.7000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4067	0.4067	1.0000e-005	0.0000	0.4069
Total	**2.1000e-004**	**1.5000e-004**	**1.5600e-003**	**0.0000**	**4.7000e-004**	**0.0000**	**4.7000e-004**	**1.3000e-004**	**0.0000**	**1.3000e-004**	**0.0000**	**0.4067**	**0.4067**	**1.0000e-005**	**0.0000**	**0.4069**

3.5 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0583	0.5276	0.4633	7.4000e-004		0.0307	0.0307		0.0289	0.0289	0.0000	63.6928	63.6928	0.0155	0.0000	64.0812
Total	**0.0583**	**0.5276**	**0.4633**	**7.4000e-004**		**0.0307**	**0.0307**		**0.0289**	**0.0289**	**0.0000**	**63.6928**	**63.6928**	**0.0155**	**0.0000**	**64.0812**

3.5 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.1400e-003	0.1014	0.0200	2.5000e-004	5.5700e-003	4.4000e-004	6.0100e-003	1.6100e-003	4.2000e-004	2.0300e-003	0.0000	23.5320	23.5320	1.1500e-003	0.0000	23.5608
Worker	6.7700e-003	4.7300e-003	0.0507	1.5000e-004	0.0153	1.0000e-004	0.0154	4.0800e-003	9.0000e-005	4.1700e-003	0.0000	13.2338	13.2338	3.3000e-004	0.0000	13.2420
Total	**9.9100e-003**	**0.1061**	**0.0707**	**4.0000e-004**	**0.0209**	**5.4000e-004**	**0.0214**	**5.6900e-003**	**5.1000e-004**	**6.2000e-003**	**0.0000**	**36.7658**	**36.7658**	**1.4800e-003**	**0.0000**	**36.8028**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0583	0.5276	0.4633	7.4000e-004		0.0307	0.0307		0.0289	0.0289	0.0000	63.6927	63.6927	0.0155	0.0000	64.0811
Total	**0.0583**	**0.5276**	**0.4633**	**7.4000e-004**		**0.0307**	**0.0307**		**0.0289**	**0.0289**	**0.0000**	**63.6927**	**63.6927**	**0.0155**	**0.0000**	**64.0811**

3.5 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.1400e-003	0.1014	0.0200	2.5000e-004	5.5700e-003	4.4000e-004	6.0100e-003	1.6100e-003	4.2000e-004	2.0300e-003	0.0000	23.5320	23.5320	1.1500e-003	0.0000	23.5608
Worker	6.7700e-003	4.7300e-003	0.0507	1.5000e-004	0.0153	1.0000e-004	0.0154	4.0800e-003	9.0000e-005	4.1700e-003	0.0000	13.2338	13.2338	3.3000e-004	0.0000	13.2420
Total	**9.9100e-003**	**0.1061**	**0.0707**	**4.0000e-004**	**0.0209**	**5.4000e-004**	**0.0214**	**5.6900e-003**	**5.1000e-004**	**6.2000e-003**	**0.0000**	**36.7658**	**36.7658**	**1.4800e-003**	**0.0000**	**36.8028**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1663	1.5253	1.4503	2.3600e-003		0.0839	0.0839		0.0789	0.0789	0.0000	202.6826	202.6826	0.0489	0.0000	203.9051
Total	**0.1663**	**1.5253**	**1.4503**	**2.3600e-003**		**0.0839**	**0.0839**		**0.0789**	**0.0789**	**0.0000**	**202.6826**	**202.6826**	**0.0489**	**0.0000**	**203.9051**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.3700e-003	0.2961	0.0566	7.8000e-004	0.0177	6.8000e-004	0.0184	5.1300e-003	6.5000e-004	5.7700e-003	0.0000	74.2807	74.2807	3.4600e-003	0.0000	74.3672
Worker	0.0200	0.0135	0.1475	4.5000e-004	0.0488	3.2000e-004	0.0491	0.0130	2.9000e-004	0.0133	0.0000	40.6263	40.6263	9.3000e-004	0.0000	40.6495
Total	**0.0284**	**0.3096**	**0.2041**	**1.2300e-003**	**0.0665**	**1.0000e-003**	**0.0675**	**0.0181**	**9.4000e-004**	**0.0191**	**0.0000**	**114.9069**	**114.9069**	**4.3900e-003**	**0.0000**	**115.0167**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.1663	1.5253	1.4503	2.3600e-003		0.0839	0.0839		0.0789	0.0789	0.0000	202.6824	202.6824	0.0489	0.0000	203.9048
Total	**0.1663**	**1.5253**	**1.4503**	**2.3600e-003**		**0.0839**	**0.0839**		**0.0789**	**0.0789**	**0.0000**	**202.6824**	**202.6824**	**0.0489**	**0.0000**	**203.9048**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.3700e-003	0.2961	0.0566	7.8000e-004	0.0177	6.8000e-004	0.0184	5.1300e-003	6.5000e-004	5.7700e-003	0.0000	74.2807	74.2807	3.4600e-003	0.0000	74.3672
Worker	0.0200	0.0135	0.1475	4.5000e-004	0.0488	3.2000e-004	0.0491	0.0130	2.9000e-004	0.0133	0.0000	40.6263	40.6263	9.3000e-004	0.0000	40.6495
Total	**0.0284**	**0.3096**	**0.2041**	**1.2300e-003**	**0.0665**	**1.0000e-003**	**0.0675**	**0.0181**	**9.4000e-004**	**0.0191**	**0.0000**	**114.9069**	**114.9069**	**4.3900e-003**	**0.0000**	**115.0167**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.8500e-003	0.0976	0.1103	1.7000e-004		5.2100e-003	5.2100e-003		4.8100e-003	4.8100e-003	0.0000	14.7336	14.7336	4.6300e-003	0.0000	14.8493
Paving	3.2800e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0131**	**0.0976**	**0.1103**	**1.7000e-004**		**5.2100e-003**	**5.2100e-003**		**4.8100e-003**	**4.8100e-003**	**0.0000**	**14.7336**	**14.7336**	**4.6300e-003**	**0.0000**	**14.8493**

3.6 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.8000e-004	3.9000e-004	4.2700e-003	1.0000e-005	1.4100e-003	1.0000e-005	1.4200e-003	3.8000e-004	1.0000e-005	3.8000e-004	0.0000	1.1771	1.1771	3.0000e-005	0.0000	1.1778
Total	**5.8000e-004**	**3.9000e-004**	**4.2700e-003**	**1.0000e-005**	**1.4100e-003**	**1.0000e-005**	**1.4200e-003**	**3.8000e-004**	**1.0000e-005**	**3.8000e-004**	**0.0000**	**1.1771**	**1.1771**	**3.0000e-005**	**0.0000**	**1.1778**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.8500e-003	0.0976	0.1103	1.7000e-004		5.2100e-003	5.2100e-003		4.8100e-003	4.8100e-003	0.0000	14.7335	14.7335	4.6300e-003	0.0000	14.8493
Paving	3.2800e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0131**	**0.0976**	**0.1103**	**1.7000e-004**		**5.2100e-003**	**5.2100e-003**		**4.8100e-003**	**4.8100e-003**	**0.0000**	**14.7335**	**14.7335**	**4.6300e-003**	**0.0000**	**14.8493**

3.6 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.8000e-004	3.9000e-004	4.2700e-003	1.0000e-005	1.4100e-003	1.0000e-005	1.4200e-003	3.8000e-004	1.0000e-005	3.8000e-004	0.0000	1.1771	1.1771	3.0000e-005	0.0000	1.1778
Total	**5.8000e-004**	**3.9000e-004**	**4.2700e-003**	**1.0000e-005**	**1.4100e-003**	**1.0000e-005**	**1.4200e-003**	**3.8000e-004**	**1.0000e-005**	**3.8000e-004**	**0.0000**	**1.1771**	**1.1771**	**3.0000e-005**	**0.0000**	**1.1778**

3.7 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1937					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.9700e-003	0.0137	0.0164	3.0000e-005		8.5000e-004	8.5000e-004		8.5000e-004	8.5000e-004	0.0000	2.2979	2.2979	1.6000e-004	0.0000	2.3019
Total	**0.1956**	**0.0137**	**0.0164**	**3.0000e-005**		**8.5000e-004**	**8.5000e-004**		**8.5000e-004**	**8.5000e-004**	**0.0000**	**2.2979**	**2.2979**	**1.6000e-004**	**0.0000**	**2.3019**

3.7 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1000e-004	2.7000e-004	2.9900e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8240	0.8240	2.0000e-005	0.0000	0.8244
Total	**4.1000e-004**	**2.7000e-004**	**2.9900e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**1.0000e-003**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8240**	**0.8240**	**2.0000e-005**	**0.0000**	**0.8244**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.1937					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.9700e-003	0.0137	0.0164	3.0000e-005		8.5000e-004	8.5000e-004		8.5000e-004	8.5000e-004	0.0000	2.2979	2.2979	1.6000e-004	0.0000	2.3019
Total	**0.1956**	**0.0137**	**0.0164**	**3.0000e-005**		**8.5000e-004**	**8.5000e-004**		**8.5000e-004**	**8.5000e-004**	**0.0000**	**2.2979**	**2.2979**	**1.6000e-004**	**0.0000**	**2.3019**

3.7 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.1000e-004	2.7000e-004	2.9900e-003	1.0000e-005	9.9000e-004	1.0000e-005	1.0000e-003	2.6000e-004	1.0000e-005	2.7000e-004	0.0000	0.8240	0.8240	2.0000e-005	0.0000	0.8244
Total	**4.1000e-004**	**2.7000e-004**	**2.9900e-003**	**1.0000e-005**	**9.9000e-004**	**1.0000e-005**	**1.0000e-003**	**2.6000e-004**	**1.0000e-005**	**2.7000e-004**	**0.0000**	**0.8240**	**0.8240**	**2.0000e-005**	**0.0000**	**0.8244**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Provide Riade Sharing Program

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Convenience Market With Gas Pumps	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Regional Shopping Center	0.00	0.00	0.00		
Supermarket	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Convenience Market With Gas	9.50	7.30	7.30	0.80	80.20	19.00	14	21	65
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Regional Shopping Center	9.50	7.30	7.30	16.30	64.70	19.00	54	35	11
Supermarket	9.50	7.30	7.30	6.50	74.50	19.00	34	30	36

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Convenience Market With Gas Pumps	0.494811	0.040252	0.220236	0.128508	0.023782	0.006284	0.029295	0.046215	0.001446	0.001205	0.005961	0.000773	0.001232
Parking Lot	0.494811	0.040252	0.220236	0.128508	0.023782	0.006284	0.029295	0.046215	0.001446	0.001205	0.005961	0.000773	0.001232
Regional Shopping Center	0.494811	0.040252	0.220236	0.128508	0.023782	0.006284	0.029295	0.046215	0.001446	0.001205	0.005961	0.000773	0.001232
Supermarket	0.494811	0.040252	0.220236	0.128508	0.023782	0.006284	0.029295	0.046215	0.001446	0.001205	0.005961	0.000773	0.001232

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	477.7982	477.7982	0.0261	5.3900e-003	480.0558
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	477.7982	477.7982	0.0261	5.3900e-003	480.0558
NaturalGas Mitigated	0.0102	0.0929	0.0780	5.6000e-004		7.0600e-003	7.0600e-003		7.0600e-003	7.0600e-003	0.0000	101.1399	101.1399	1.9400e-003	1.8500e-003	101.7410
NaturalGas Unmitigated	0.0102	0.0929	0.0780	5.6000e-004		7.0600e-003	7.0600e-003		7.0600e-003	7.0600e-003	0.0000	101.1399	101.1399	1.9400e-003	1.8500e-003	101.7410

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Convenience Market With Gas Pumps	19821	1.1000e-004	9.7000e-004	8.2000e-004	1.0000e-005		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005	0.0000	1.0577	1.0577	2.0000e-005	2.0000e-005	1.0640
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	510120	2.7500e-003	0.0250	0.0210	1.5000e-004		1.9000e-003	1.9000e-003		1.9000e-003	1.9000e-003	0.0000	27.2220	27.2220	5.2000e-004	5.0000e-004	27.3837
Supermarket	1.36535e+006	7.3600e-003	0.0669	0.0562	4.0000e-004		5.0900e-003	5.0900e-003		5.0900e-003	5.0900e-003	0.0000	72.8603	72.8603	1.4000e-003	1.3400e-003	73.2933
Total		**0.0102**	**0.0929**	**0.0780**	**5.6000e-004**		**7.0600e-003**	**7.0600e-003**		**7.0600e-003**	**7.0600e-003**	**0.0000**	**101.1400**	**101.1400**	**1.9400e-003**	**1.8600e-003**	**101.7410**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Convenience Market With Gas Pumps	19821	1.1000e-004	9.7000e-004	8.2000e-004	1.0000e-005		7.0000e-005	7.0000e-005		7.0000e-005	7.0000e-005	0.0000	1.0577	1.0577	2.0000e-005	2.0000e-005	1.0640
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	510120	2.7500e-003	0.0250	0.0210	1.5000e-004		1.9000e-003	1.9000e-003		1.9000e-003	1.9000e-003	0.0000	27.2220	27.2220	5.2000e-004	5.0000e-004	27.3837
Supermarket	1.36535e+006	7.3600e-003	0.0669	0.0562	4.0000e-004		5.0900e-003	5.0900e-003		5.0900e-003	5.0900e-003	0.0000	72.8603	72.8603	1.4000e-003	1.3400e-003	73.2933
Total		**0.0102**	**0.0929**	**0.0780**	**5.6000e-004**		**7.0600e-003**	**7.0600e-003**		**7.0600e-003**	**7.0600e-003**	**0.0000**	**101.1400**	**101.1400**	**1.9400e-003**	**1.8600e-003**	**101.7410**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Convenience Market With Gas Pumps	19973.4	4.8185	2.6000e-004	5.0000e-005	4.8412
Parking Lot	38150	9.2034	5.0000e-004	1.0000e-004	9.2469
Regional Shopping Center	514044	124.0096	6.7600e-003	1.4000e-003	124.5955
Supermarket	1.4084e+006	339.7668	0.0185	3.8300e-003	341.3722
Total		**477.7982**	**0.0261**	**5.3800e-003**	**480.0558**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Convenience Market With Gas Pumps	19973.4	4.8185	2.6000e-004	5.0000e-005	4.8412
Parking Lot	38150	9.2034	5.0000e-004	1.0000e-004	9.2469
Regional Shopping Center	514044	124.0096	6.7600e-003	1.4000e-003	124.5955
Supermarket	1.4084e+006	339.7668	0.0185	3.8300e-003	341.3722
Total		**477.7982**	**0.0261**	**5.3800e-003**	**480.0558**

6.0 Area Detail

6.1 Mitigation Measures Area

Use Low VOC Paint - Non-Residential Interior

Use Low VOC Paint - Non-Residential Exterior

Use Low VOC Cleaning Supplies

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.3167	2.0000e-005	1.8400e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.5700e-003	3.5700e-003	1.0000e-005	0.0000	3.8000e-003
Unmitigated	0.3402	2.0000e-005	1.8400e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.5700e-003	3.5700e-003	1.0000e-005	0.0000	3.8000e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0194					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3206					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.7000e-004	2.0000e-005	1.8400e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.5700e-003	3.5700e-003	1.0000e-005	0.0000	3.8000e-003
Total	**0.3402**	**2.0000e-005**	**1.8400e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**3.5700e-003**	**3.5700e-003**	**1.0000e-005**	**0.0000**	**3.8000e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0194					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.2972					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.7000e-004	2.0000e-005	1.8400e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.5700e-003	3.5700e-003	1.0000e-005	0.0000	3.8000e-003
Total	**0.3167**	**2.0000e-005**	**1.8400e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**3.5700e-003**	**3.5700e-003**	**1.0000e-005**	**0.0000**	**3.8000e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

Use Water Efficient Landscaping

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	14.2935	0.2506	6.0300e-003	22.3557
Unmitigated	14.2935	0.2506	6.0300e-003	22.3557

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Convenience Market With Gas Pumps	0.125486 / 0.0769109	0.2686	4.1000e-003	1.0000e-004	0.4006
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	3.22956 / 1.97941	6.9117	0.1056	2.5500e-003	10.3109
Supermarket	4.31439 / 0.133435	7.1133	0.1409	3.3800e-003	11.6442
Total		**14.2935**	**0.2506**	**6.0300e-003**	**22.3557**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Convenience Market With Gas Pumps	0.125486 / 0.0769109	0.2686	4.1000e-003	1.0000e-004	0.4006
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	3.22956 / 1.97941	6.9117	0.1056	2.5500e-003	10.3109
Supermarket	4.31439 / 0.133435	7.1133	0.1409	3.3800e-003	11.6442
Total		**14.2935**	**0.2506**	**6.0300e-003**	**22.3557**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	49.3633	2.9173	0.0000	122.2956
Unmitigated	49.3633	2.9173	0.0000	122.2956

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	45.78	9.2929	0.5492	0.0000	23.0228
Supermarket	197.4	40.0704	2.3681	0.0000	99.2728
Total		**49.3634**	**2.9173**	**0.0000**	**122.2956**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Regional Shopping Center	45.78	9.2929	0.5492	0.0000	23.0228
Supermarket	197.4	40.0704	2.3681	0.0000	99.2728
Total		**49.3634**	**2.9173**	**0.0000**	**122.2956**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

	Total CO2	CH4	N2O	CO2e
Category	MT			
Unmitigated	264.0840	0.0000	0.0000	264.0840

11.2 Net New Trees

Species Class

	Number of Trees	Total CO2	CH4	N2O	CO2e
		MT			
Miscellaneous	373	264.0840	0.0000	0.0000	264.0840
Total		**264.0840**	**0.0000**	**0.0000**	**264.0840**

Environmental Noise Assessment

The Plaza at Blue Oaks Commercial Development

Roseville, California

BAC Job # 2018-026

Prepared For:

Signature Homes, Inc.

Attn: Mr. Stephen M. Hicks
4670 Willow Road, Suite 200
Pleasanton, CA 94588

Prepared By:

Bollard Acoustical Consultants, Inc.

Paul Bollard, President

April 2, 2018

BOLLARD
Acoustical Consultants

Introduction

The proposed Plaza at Blue Oaks Commercial Development (project) is located on the east side of Fiddyment Road, between Blue Oaks Boulevard and Harvey Way in Roseville, California. The development proposes to include a shopping center, ARCO AM/PM facility with car wash, and other commercial uses on three parcels totaling approximately 13 acres. The project site is located adjacent to existing single-family residential uses (south), existing commercial uses (west), and future medium and high-density residential uses (north and east). The project area is shown on Figure 1. The overall project site plan and ARCO AM/PM facility site plan are shown on Figures 2 and 3, respectively.

Due to the proximity of the proposed commercial development to the adjacent existing and future residential uses, the City of Roseville has requested an environmental noise assessment to ensure that the applicable noise standards are satisfied. In response to this request, the project applicant has retained Bollard Acoustical Consultants, Inc. (BAC) to prepare this noise analysis. Specifically, the purposes of this analysis are to quantify noise levels associated with the proposed on-site commercial-related activities (i.e., on-site truck circulation, loading dock activities, and car wash operations), to assess the state of compliance of those noise levels with the applicable City of Roseville noise standards, and if necessary, to recommend measures to reduce those noise levels to acceptable limits at the nearest noise-sensitive uses.

Noise Fundamentals and Terminology

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard, and thus are called sound. Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in levels (dB) correspond closely to human perception of relative loudness. Appendix A contains definitions of Acoustical Terminology. Figure 4 shows common noise levels associated with various sources.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-weighing network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels in decibels.

Legend

Project Border

(#) Long-Term Noise Measurement Locations

N

Scale (feet)

0 150 300

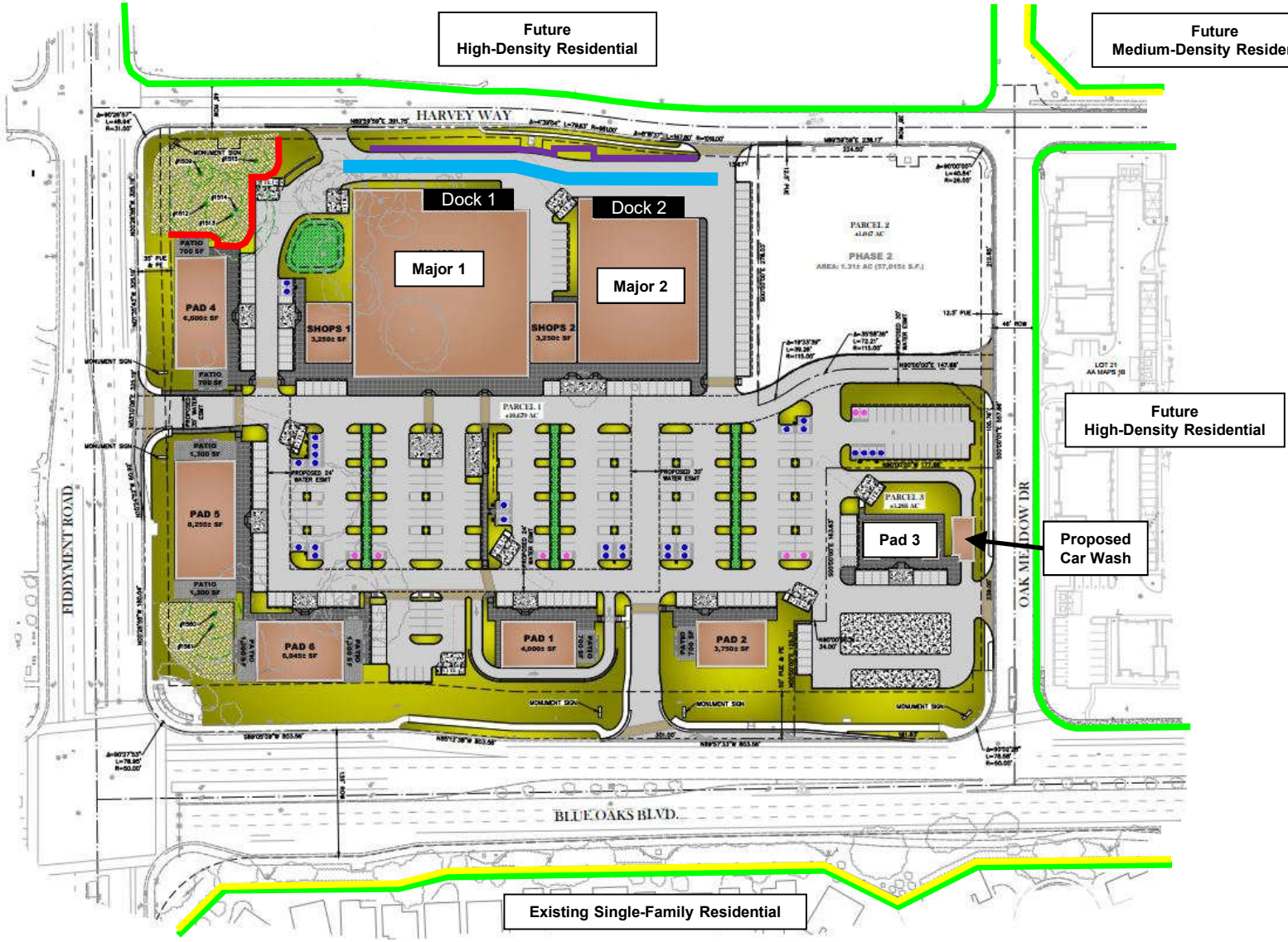
The Plaza at Blue Oaks Development

Roseville, California

Project Area

Figure 1

BOLLARD Acoustical Consultants



Legend

- Parcel Boundaries
- Existing 6-Foot Tall Solid Noise Barriers
- Proposed Delivery Truck Lane
- Proposed 11-Foot Tall Retaining Wall
- On-Site Truck Circulation & Loading Dock Noise Mitigation - Solid Noise Barrier

N

Scale (Feet)

0 50 100

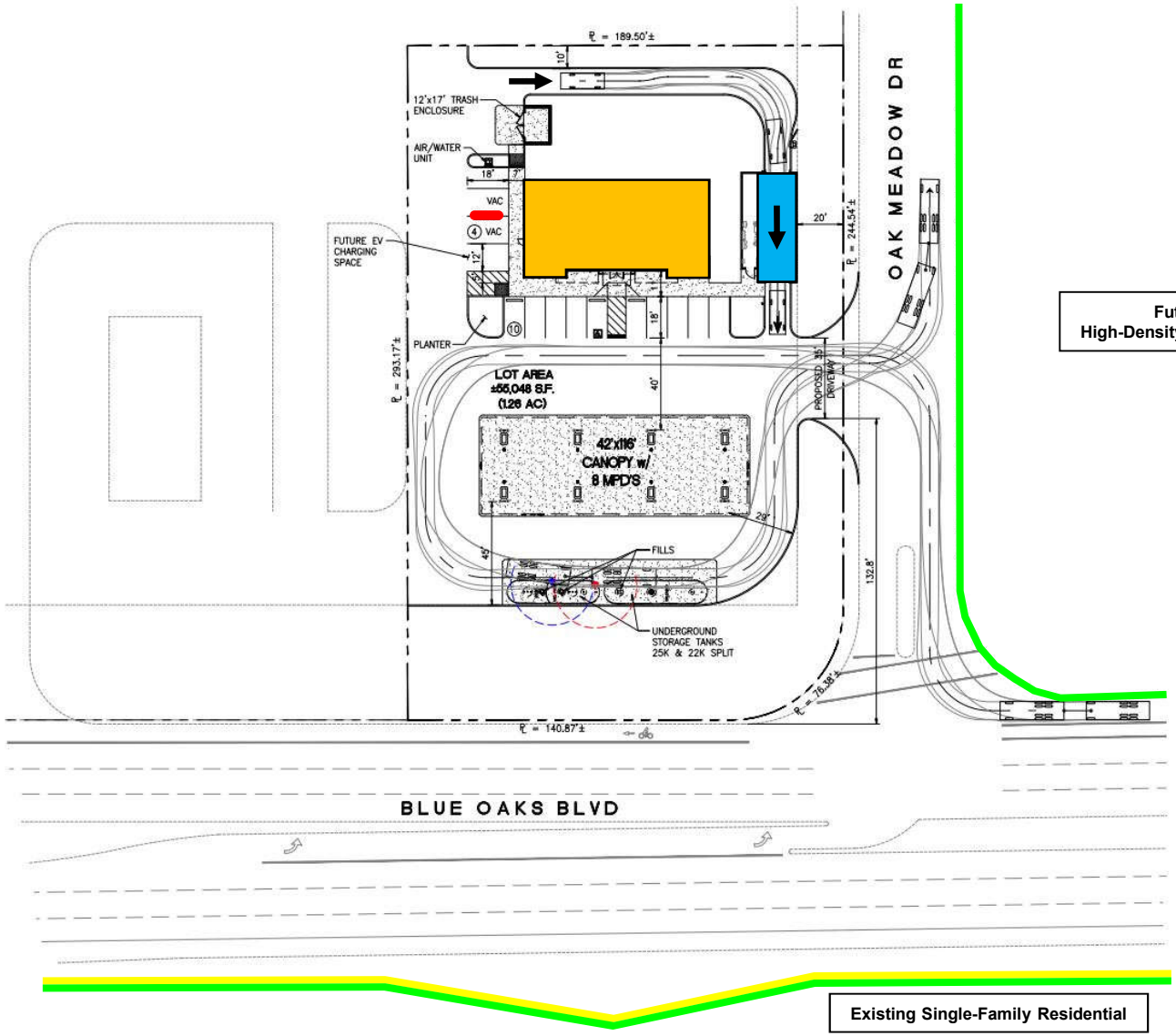
The Plaza at Blue Oaks Development

Roseville, California

Overall Project Site Plan

Figure 2

BOLLARD Acoustical Consultants



Legend

- Parcel Boundaries
- Existing 6-Foot Tall Solid Noise Barrier
- Proposed ARCO AM/PM Minimart
- Proposed Car Wash Tunnel
- Proposed Vacuum Systems

N

Scale (Feet)

0 30 60

The Plaza at Blue Oaks Development

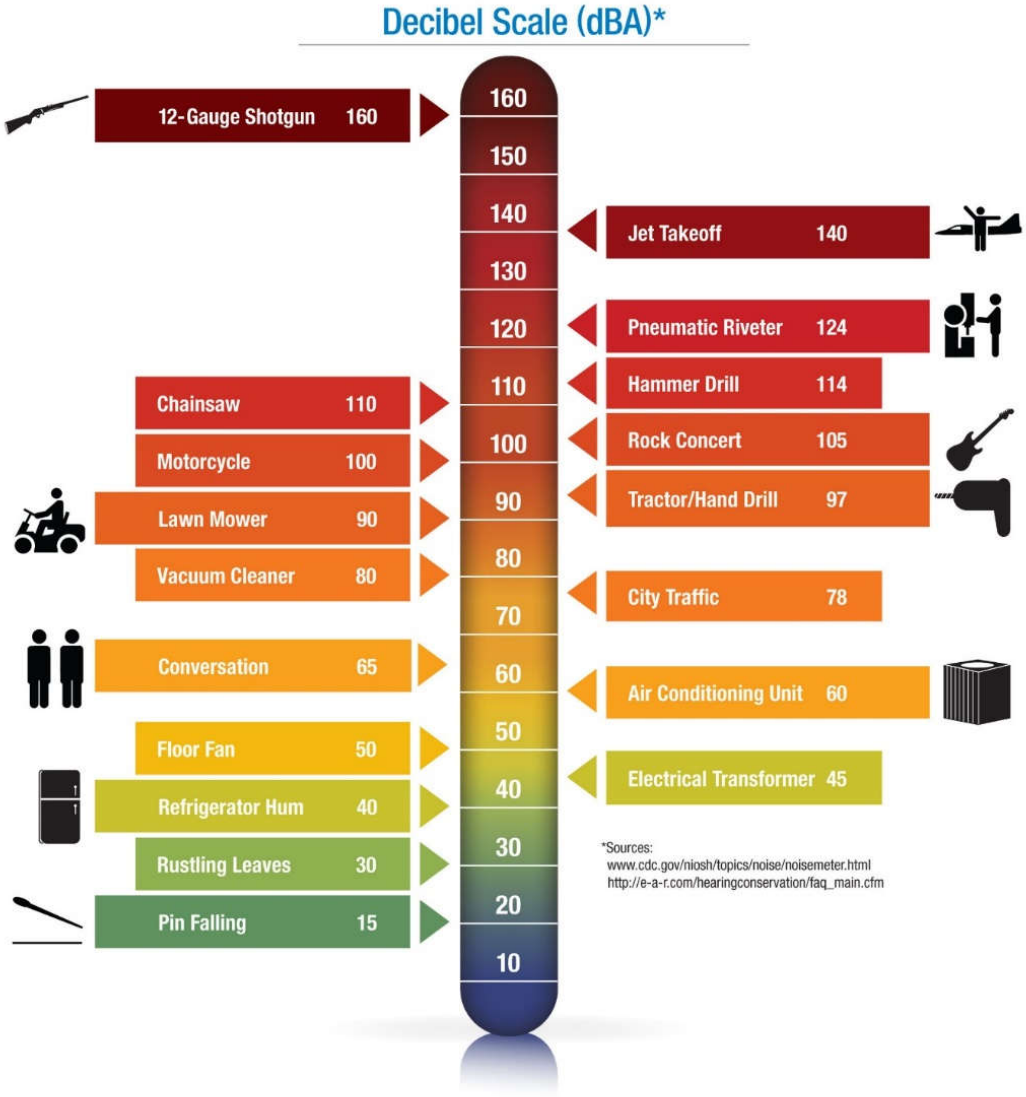
Roseville, California

Project Site Plan – ARCO AM/PM Facility

Figure 3

BOLLARD Acoustical Consultants

Figure 4. Noise levels associated with common noise sources.



Community noise is commonly described in terms of the "ambient" noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level (L_{eq}) over a given time period (usually one hour). The L_{eq} is the foundation of the Day-Night Average Level noise descriptor, L_{dn}, and shows very good correlation with community response to noise.

The Day-Night Average Level (L_{dn}) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10 p.m. to 7 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment. L_{dn}-based noise standards are commonly used to assess noise impacts associated with traffic, railroad and aircraft noise sources.

Criteria for Acceptable Noise Exposure

City of Roseville General Plan Noise Element 2035

The Noise Element of the City of Roseville General Plan establishes non-transportation noise exposure limits as summarized below in Table 1 (Table IX-3 of the Noise Element). These limits are applicable to non-transportation noise sources (i.e., on-site truck movements, loading docks, and car wash operations) affecting existing noise-sensitive land uses.

Table 1
Performance Standards For Non-Transportation Noise Sources
or Projects Affected by Non-Transportation Noise Sources
(As Measured at the Property Line of the Noise-Sensitive Uses)
City of Roseville General Plan Noise Element

Noise Level Descriptor	Daytime (7 a.m. - 10 p.m.)	Nighttime (10 p.m. - 7 a.m.)
Hourly L_{eq}, dB	50	45
Maximum Level (L_{max}), dB	70	65

Notes:

-Each of the noise limits specified above should be lowered by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. Such noises are generally considered by residents to be particularly annoying and are a primary source of noise complaints.

-These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

-No Standards have been included for interior noise levels. Standard construction practices should, with exterior noise levels identified, result in acceptable interior noise levels.

Source: City of Roseville General Plan Noise Element 2035, Table IX-3

Noise Standards Applied to the Project

The nearest noise-sensitive land uses to the project site are existing and future residential developments located north, south, and east of the project site. Because the hours of operation of the future commercial uses are not known at this time, it was assumed that each of the evaluated noise sources could potentially occur during any hour within a 24-hour period. In reality, it is likely that the majority of the future commercial uses would not operate during nighttime hours (10 p.m. to 7 a.m.). Based on this conservative assumption, the City of Roseville daytime and nighttime noise level standards for noise-sensitive (residential) land uses shown in Table 1 were applied the project noise sources.

Existing Ambient Noise Environment

The existing ambient noise level environment in the immediate project vicinity is primarily defined by traffic on Fiddyment Road and Blue Oaks Boulevard. To quantify the existing ambient noise environment in the project vicinity, BAC conducted a continuous (24-hour) noise level measurements at two (2) locations on the project site from February 14-15, 2018. The noise measurement locations are shown on Figure 1, identified as Sites 1 and 2.

Larson-Davis Laboratories (LDL) Model 820 precision integrating sound level meters were used to complete the noise level measurements. The meters were calibrated before use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy off the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters (ANSI S1.4).

The results of the measurements are shown numerically and graphically in Appendices B and C, and are summarized below in Table 2. Photographs of the measurement sites are provided in Appendix D.

Table 2
Summary of Long-Term Ambient Noise Monitoring Results[1]
The Plaza at Blue Oaks Commercial Development – Roseville, California
February 14-15, 2018

			Average Measured Hourly Noise Levels (dB)					
			Daytime (7 a.m. to 10 p.m.)			Nighttime (10 p.m. to 7 a.m.)		
Site	Date	L_{dn}, dB	L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
1	2/15	56	50-55 (54)	49-55 (52)	61-73 (66)	42-53 (48)	38-50 (43)	56-71 (63)
2	2/14 – 2/15	57	50-57 (55)	47-56 (52)	64-77 (69)	45-56 (49)	39-54 (44)	59-72 (66)

Notes:
[1] Long-term ambient noise monitoring locations are shown on Figure 1, identified as Sites 1 and 2.
Source: Bollard Acoustical Consultants, Inc. (2018)

The Table 2 data indicate that measured average noise levels at the project site during daytime and nighttime hours were 54-55 dB L_{eq} and 48-49 dB L_{eq}, respectively. Maximum noise levels at the project site during daytime and nighttime hours were 66-69 dB L_{max} and 63-66 dB L_{max}, respectively.

Project Noise Generation

Noise generated by project-related activities were quantified through a combination of use of reference noise level measurements and application of accepted noise modeling techniques. Primary stationary noise sources associated with the proposed development include on-site truck circulation and loading dock activities from deliveries to businesses in buildings Major 1 and 2 at the northern end of the site, and car wash operations from the ARCO AM/PM facility located at the southeastern end of the site. Predicted noise levels resulting from each source are evaluated in the following sections. The predicted project noise levels take into account existing 6-foot tall noise barriers located adjacent to the residential developments to the northeast and south of the project site. Figure 2 shows the locations of the proposed noise sources, buildings, and existing noise barriers adjacent to the project site.

Evaluation of On-Site Truck Circulation Noise Levels

The project proposes a truck lane to be used for primary for deliveries to the businesses located in buildings Major 1 (grocery store) and Major 2. The locations of the proposed delivery truck lane and nearest residential uses are identified on Figure 2.

To quantify on-site truck circulation noise exposure at the nearest residential uses, BAC utilized file data for comparable commercial centers. For a conservative assessment of daily on-site truck circulation noise levels, it was assumed that 1-2 heavy trucks and 4 medium duty trucks/vans would deliver products to the stores at buildings Major 1 and 2 during a typical day. For the purposes of predicting hourly average noise levels for comparison against the city's hourly average (L_{eq}) noise standard, it was assumed that 1 heavy truck and 2 medium duty trucks could have store deliveries during the same hour.

BAC file data indicate that heavy truck passbys produce an average Sound Exposure Level (SEL) of approximately 90 dB at a distance of 50 feet, with medium duty trucks (including side step vans), producing a SEL of approximately 76 dB. In addition, the file data also indicate a single event maximum sound level for slow-moving heavy-duty trucks and medium-duty trucks of 75 dB and 70 dB L_{max} (respectively), at a reference distance of 50 feet. Based on these levels, assuming 1 semi-trailer delivery and 2 medium duty truck deliveries during any given hour, and assuming standard sound wave spreading loss (-4.5 dB per doubling of distance from a moving point source), on-site truck circulation noise exposure at the property lines of the nearest residential uses was calculated and the results of those calculations relative to the city's noise standards are presented in Tables 3 and 4.

The predicted on-site truck circulation noise levels at the nearest residential use to the northeast take into consideration the shielding provided by the existing 6-foot tall noise barrier along the development boundary, as indicated in Figure 2. To account for the screening provided by the existing barrier, an offset of -7 dB was conservatively applied to calculated noise levels at this land use.

Table 3
Predicted On-Site Truck Circulation Noise Levels vs. City Hourly L_{eq} Noise Standards
The Plaza at Blue Oaks Commercial Development – Roseville, California

Property Line	Distance from Passby Route (ft)	Predicted Combined Truck Passby Noise Level, L_{eq} (dB)[1]	Compliance with City Standard?	
			Daytime	Nighttime
North	100	50	Yes	No
East	350	42	Yes	Yes
Northeast	365	35	Yes	Yes
City of Roseville Noise Level Standards, Hourly L_{eq} (dB):			**50**	**45**

Notes:
[1] Predicted combined truck (heavy and medium) circulation noise levels at the residential use to the northeast take into consideration the shielding provided by the existing 6-foot tall noise barrier along the development boundary, and have been conservatively adjusted by -7 dB to account for this screening.
Source: Bollard Acoustical Consultants, Inc. (2018)

Table 4
Predicted On-Site Truck Circulation Noise Levels vs. City Maximum L_{max} Noise Standards
The Plaza at Blue Oaks Commercial Development – Roseville, California

Property Line	Distance from Passby Route, (ft)	Predicted Truck Passby Noise Level, L_{max} (dB)[1]		Compliance with City Standard?	
		Heavy-Truck (HT)	Medium Truck (MT)	Daytime (HT/MT)	Nighttime (HT/MT)
North	100	70	65	Yes/Yes	No/Yes
East	350	62	57	Yes/Yes	Yes/Yes
Northeast	365	55	50	Yes/Yes	Yes/Yes
City of Roseville Noise Level Standards, Maximum L_{max} (dB):				**70**	**65**

Notes:
[1] Predicted truck circulation noise levels at the residential use to the northeast take into consideration the shielding provided by the existing 6-foot tall noise barrier along the development boundary, and have been conservatively adjusted by -7 dB to account for this screening.
Source: Bollard Acoustical Consultants, Inc. (2018)

As indicated in Table 3, predicted combined truck passby noise levels at the property lines of the nearest residential uses would satisfy the City of Roseville 50 dB L_{eq} daytime noise level standard. The Table 3 data also shows that predicted combined truck passby noise levels would satisfy the City of Roseville 45 dB L_{eq} nighttime noise level standard at the nearest residential uses to the east and northeast. However, the predicted combined truck passby noise level of 50 dB L_{eq} at the nearest proposed residential uses to the north would exceed the City of Roseville 45 dB L_{eq} nighttime noise level standard. As a result, additional consideration of on-site truck circulation noise mitigation measures would be necessary in order to satisfy the

City of Roseville 45 dB L_{eq} nighttime noise level standard at the nearest residential use to the north.

The Table 4 data indicate that predicted heavy and medium-truck passby noise levels at the property lines of the nearest residential uses would satisfy the City of Roseville 70 dB L_{max} daytime noise level standard. In addition, predicted medium-truck passby noise levels would also satisfy the city's nighttime noise level standard at the nearest residential uses. However, the Table 4 data indicates that heavy-truck passby noise levels are predicted to exceed the city's nighttime noise level standard by 5 dB at the property line of the nearest residential use to the north. As a result, additional consideration of heavy-truck passby noise mitigation measures would be necessary in order to satisfy the City of Roseville 65 dB L_{max} nighttime noise level standard at the nearest residential use to the north.

On-Site Truck Circulation Noise Mitigation Measures

Noise exposure from on-site truck circulation is expected to satisfy the applicable City of Roseville daytime noise level standards of 50 dB L_{eq} and 70 dB L_{max} at the nearest residential uses. However, should truck deliveries occur during nighttime hours (10 p.m. to 7 a.m.), truck passby noise levels are predicted to exceed the City of Roseville 45 dB L_{eq} and 65 dB L_{max} nighttime noise level standards at the nearest residential use to the north.

To mitigate on-site truck circulation noise exposure to a state of compliance with the City of Roseville nighttime noise level standards of 45 dB L_{eq} and 65 dB L_{max} at the nearest residential use to the north, the effectiveness of a solid noise barrier between the proposed truck lane and residential development to the north was evaluated. The results from the barrier analysis are provided in Appendices E-1 and E-2, and are summarized in Table 5 relative to the applicable City of Roseville noise standards.

Table 5
Predicted On-Site Truck Circulation Noise Barrier Effectiveness vs. City Standards
The Plaza at Blue Oaks Commercial Development – Roseville, California

Barrier Height (ft)[1]	Resulting Source Noise Level at Residential Use to North, dB[2]		Compliance with Nighttime Standards? (Combined/HT)
	Combined Truck Passby, L_{eq}	HT Truck Passby, L_{max}	
6	46	66	No/No
7	45	65	Yes/Yes
City of Roseville Nighttime Noise Level Standards, L_{eq}/L_{max} (dB):			45 / 65

Notes:
[1] Figure 2 shows the location of the recommended noise barrier.
[2] Complete results of the barrier analysis are provided in Appendices E-1 and E-2.
Source: Bollard Acoustical Consultants, Inc. (2018)

The Table 5 data show that the construction of a solid noise barrier measuring a minimum of 7-feet in height at the location shown on Figure 2 would be required to satisfy the applicable City of Roseville nighttime noise criteria at the adjacent residential use to the north. Figure 2 shows the location of the noise barrier. Alternatively, truck deliveries would need to be restricted to daytime hours (7 a.m. to 10 p.m.) if a noise barrier is not constructed as indicated above.

Evaluation of Loading Dock Noise Levels

The project proposes two commercial delivery loading docks on the northern end of the project site, identified as Docks 1 and 2 on Figure 2. To predict noise levels generated by loading dock activity at the project site, BAC once again utilized file data for comparable commercial centers. BAC file data indicate a commercial loading dock noise level of 55 dB L_{eq} and 70 dB L_{max} at a distance of 100 feet for typical operations. Assuming standard sound wave spreading loss (-6 dB per doubling of distance from a stationary source), loading dock noise exposure at the nearest residential property lines was calculated and the results of those calculations relative to the city's noise standards are presented in Tables 6 and 7.

Table 6
Predicted Loading Dock Noise Levels vs. City Hourly L_{eq} Noise Standards
The Plaza at Blue Oaks Commercial Development – Roseville, California

	Distance from Loading Docks (ft)		Predicted Hourly Noise Level, L_{eq} (dB)[1]		Compliance with City Standard?	
Property Line	Dock 1	Dock 2	Dock 1	Dock 2	Daytime (Dock 1/Dock2)	Nighttime (Dock 1/Dock 2)
North	125	120	53	53	No/No	No/No
East	560	400	40	43	Yes/Yes	Yes/Yes
Northeast	590	430	33	35	Yes/Yes	Yes/Yes
City of Roseville Noise Level Standard, Hourly L_{eq} (dB):					50	45

Notes:

[1] Predicted loading dock noise levels at the residential use to the northeast take into consideration the shielding provided by the existing 6-foot tall noise barrier along the development boundary, and have been conservatively adjusted by -7 dB to account for this screening.

Source: Bollard Acoustical Consultants, Inc. (2018)

Table 7
Predicted Loading Dock Noise Levels vs. City Maximum L_{max} Noise Standards
The Plaza at Blue Oaks Commercial Development – Roseville, California

	Distance from Loading Docks (ft)		Predicted Maximum Noise Level, L_{max} (dB)[1]		Compliance with City Standard?	
Property Line	Dock 1	Dock 2	Dock 1	Dock 2	Daytime (Dock 1/Dock2)	Nighttime (Dock 1/Dock 2)
North	125	120	68	68	Yes/Yes	No/No
East	560	400	55	58	Yes/Yes	Yes/Yes
Northeast	590	430	48	50	Yes/Yes	Yes/Yes
City of Roseville Noise Level Standard, Maximum L_{max} (dB):					70	65

Notes:

[1] Predicted loading dock noise levels at the residential use to the northeast take into consideration the shielding provided by the existing 6-foot tall noise barrier along the development boundary, and have been conservatively adjusted by -7 dB to account for this screening.

Source: Bollard Acoustical Consultants, Inc. (2018)

As indicated in Table 6, predicted loading dock noise levels at the property lines of the nearest residential uses to the east and southeast would satisfy the City of Roseville 50 and 45 dB L_{eq} daytime and nighttime noise level standards (respectively). However, at the adjacent residential use to the north, loading dock noise levels are expected to exceed the applicable City of Roseville daytime and nighttime noise level criteria. As a result, additional consideration of loading dock noise mitigation measures would be necessary in order to satisfy the City of Roseville 50 and 45 dB L_{eq} daytime and nighttime noise level standards at the nearest residential use to the north.

The Table 7 data indicate that predicted loading dock noise levels at the property lines of the nearest residential uses would satisfy the City of Roseville 70 dB L_{max} daytime noise level standard. In addition, predicted loading dock noise exposure is also expected to satisfy the city's nighttime maximum noise level standard at the nearest residential uses to the east and northeast. However, the Table 7 data indicates that loading dock noise levels are predicted to exceed the city's 65 dB L_{max} nighttime noise level standard at the property line of the adjacent residential use to the north. As a result, additional consideration of loading dock noise mitigation measures would be necessary in order to satisfy the City of Roseville 65 dB L_{max} nighttime noise level standard at the nearest residential use to the north.

Loading Dock Noise Mitigation Measures

Noise exposure from loading dock activities is expected to satisfy the applicable City of Roseville daytime and nighttime hourly and maximum noise level standards at the nearest residential uses to the east and southeast. In addition, predicted loading dock noise exposure will also satisfy the city's daytime 70 dB L_{max} noise level standard at the nearest residential use to the north. However, noise levels from loading dock activities are predicted to exceed the City

of Roseville 50 and 45 dB L_{eq} daytime and nighttime noise standards (respectively), and 65 dB L_{max} nighttime noise level standard at the nearest proposed residential uses to the north.

To mitigate loading dock noise exposure to a state of compliance with the applicable City of Roseville noise level criteria at the adjacent residential use to the north, the effectiveness of a solid noise barrier at the location indicated on Figure 2 was evaluated. The results from the barrier analysis are provided in Appendices E-3 through E-6, and are summarized below in Table 8 relative to the applicable City of Roseville noise standards.

Table 8
Predicted Loading Dock Noise Barrier Effectiveness vs. City Standards
The Plaza at Blue Oaks Commercial Development – Roseville, California

Barrier Height (ft)[1]	Resulting Source Noise Level at Residential Use to North, dB[2]		Compliance with City Standards?	
	Loading Docks 1 & 2		Daytime (L_{eq}/L_{max})	Nighttime (L_{eq}/L_{max})
	L_{eq}	L_{max}		
6	48	63	Yes/Yes	No/No
7	47	62	Yes/Yes	No/Yes
8	46	61	Yes/Yes	No/Yes
9	45	61	Yes/Yes	Yes/Yes
City of Roseville Noise Level Standards, L_{eq}/L_{max} (dB):			**50 / 70**	**45 / 65**

Notes:
[1] Figure 2 shows the location of the noise barrier.
[2] Complete results of the barrier analysis are provided in Appendices E-3 through E-6.
Source: Bollard Acoustical Consultants, Inc. (2018)

The Table 8 data shows varies noise barrier heights required to satisfy the City of Roseville noise criteria at the adjacent residential use to the north. As shown in Table 8, loading dock activities would need to be restricted to daytime hours (7 a.m. to 10 p.m.) if a noise barrier less than 9-feet in height is constructed at the location shown on Figure 2.

Based on the proposed location of Loading Dock 2, it is expected that the residential use to the north will receive partial shielding from the recommended noise barrier. Due to the reduced level of shielding from the noise barrier, it is recommended that delivery activities at Loading Dock 2 be limited to daytime hours (7 a.m. to 10 p.m.). The restriction of activities at Loading Dock 2 during nighttime hours (10 p.m. to 7 a.m.) will minimize the potential for an exceedance of the City of Roseville nighttime noise level standards at the adjacent residential use to the north.

Evaluation of Car Wash Dryer Noise Levels

The project proposes an ARCO AM/PM facility with a car wash located at the southeastern end of the commercial development. The location of the car wash and nearest residential uses are shown on Figure 3.

Based on the experience of Bollard Acoustical Consultants, noise levels generated by car wash facilities are primarily due to the drying portion of the operation. According to information obtained from the equipment supplier, the proposed car wash will utilize a Ryko 3-Fan Slimline Dryer Model #6050-D. The manufacturer's specifications, provided as Appendix F, indicate that the reference sound level varies relative to the tunnel entrance, exit, and off-axis positions. Figure 3 illustrates the location of the proposed car wash tunnel, and the direction vehicles will move through the tunnel (north to south). Based on the manufacturer reference noise data sheet (Appendix F), and the proposed orientation of the car wash, the worst-case dyer noise exposure at the future high-density residential development to the east will occur at a position 90 degrees off-axis from the car wash tunnel entrance, and 45 degrees off-axis from the tunnel exit. Because the car wash tunnel exit is proposed to be south-facing, the existing residential development to the south will receive direct (0 degrees off-axis) dryer noise exposure.

When the car wash is at its worst-case maximum capacity, the dryers are anticipated to operate for no more than 15 minutes during that hour. The reference noise levels provided in Appendix F represent maximum (L_{max}) dryer noise levels. Because the dryers would be in operation for no more than 15 minutes during any hour, average (L_{eq}) noise levels would be approximately 6 dB less than maximum noise levels. Assuming standard spherical spreading loss (-6 dB per doubling of distance), and 15 minutes of operation during worst-case hour, car wash dryer noise exposure at the nearest residential uses was calculated and the results of those calculations relative to the city's noise standards are presented in Tables 9 and 10.

The predicted car wash dryer noise levels at the existing residential development to the south take into consideration the shielding provided by the existing 6-foot tall noise barrier along the development boundary, as indicated in Figures 2 and 3. To account for the screening provided by the existing barrier, an offset of -7 dB was conservatively applied to calculated noise levels at this land use.

Table 9
Predicted Car Wash Dyer Noise Levels vs. City Hourly L_{eq} Noise Standards
The Plaza at Blue Oaks Commercial Development – Roseville, California

Property Line	Reference Noise Level	Distance to Property Line (ft)[1]	Predicted Noise Level, L_{eq} (dB)[2,3]	Compliance with City Standard?	
				Daytime	Nighttime
East	65 dB at 30 feet (entrance, 90° off-axis)	65	52	No	No
East	76 dB at 40 feet (exit, 45° off-axis)	100	62	No	No
South	74 dB at 70 feet (exit, in line)	320	48	Yes	No
City of Roseville Noise Level Standards, Hourly L_{eq} (dB):				50	45

Notes:
[1] Distances from car wash dryer equipment to nearest property lines were scaled using the provided site plans.
[2] The predicted equipment noise levels at the residential use to the south take into consideration the shielding provided by an existing 6-foot tall solid noise barrier along the development boundary, and have been conservatively adjusted by -7 dB to account for this shielding.
[3] Hourly average L_{eq} based on 15 minutes of dryer operation during a worst-case hour.

Source: Bollard Acoustical Consultants, Inc. (2018)

Table 10
Predicted Car Wash Dryer Noise Levels vs. City Maximum L_{max} Noise Standards
The Plaza at Blue Oaks Commercial Development – Roseville, California

Property Line	Reference Noise Level	Distance to Property Line (ft)[1]	Predicted Noise Level, L_{max} (dB)[2,3]	Compliance with City Standard?	
				Daytime	Nighttime
East	65 dB at 30 feet (entrance, 90° off-axis)	65	58	Yes	Yes
East	76 dB at 40 feet (exit, 45° off-axis)	100	68	Yes	No
South	74 dB at 70 feet (exit, in line)	320	54	Yes	Yes
City of Roseville Noise Level Standards, Maximum L_{max} (dB):				70	65

Notes:
[1] Distances from car wash dryer equipment to nearest property lines were scaled using the provided site plans.
[2] The predicted equipment noise levels at the residential use to the south take into consideration the shielding provided by an existing 6-foot tall solid noise barrier along the development boundary, and have been conservatively adjusted by -7 dB to account for this shielding.

Source: Bollard Acoustical Consultants, Inc. (2018)

The Table 9 data indicate that predicted car wash dryer hourly average noise levels at the nearest residential property line to the south would satisfy the City of Roseville 50 dB L_{eq} daytime noise level standard, but exceed the city's 45 dB L_{eq} nighttime criteria. Further, predicted car wash dryer (entrance and exit) noise levels would also exceed the City of Roseville daytime and nighttime noise level criteria at the adjacent residential property line to the east.

As indicated in Table 10, predicted car wash dryer noise levels at the property lines of the nearest residential uses to the east and south would satisfy the City of Roseville 70 dB L_{max} daytime noise level standard. In addition, predicted car wash dryer noise exposure is also expected to satisfy the city's 65 dB L_{max} nighttime noise level standard at the nearest residential use to the south. However, the Table 10 data indicates that car wash dryer (exit) noise levels are predicted to exceed the city's 65 dB L_{max} nighttime noise level standard at the property line of the adjacent residential use to the east.

Car Wash Dryer Noise Mitigation Measures

Car wash dryer noise exposure at the nearest residential property lines is predicted to exceed the City of Roseville daytime and nighttime noise criteria. To mitigate these identified exceedances, the effectiveness of installing car wash entrance and exit doors was considered. Specifically, equipment manufacturer BayWatch offers tunnel doors that provide approximately 14 dB of dryer noise reduction when doors are in the closed position (air tight seal) during wash cycles. The equipment manufacturer reference noise data sheet is provided in Appendix G. Assuming an offset of -14 dB from the reference noise levels shown in Tables 9 and 10 to account for the tunnel doors being in the closed position during the drying cycle of the car wash (air-tight seal), dryer noise levels were predicted at the property lines of the adjacent residential uses. The results of this analysis are summarized in Table 11.

Table 11
Predicted Car Wash Dryer Noise Levels – Mitigated
The Plaza at Blue Oaks Commercial Development – Roseville, California

Property Line	Reference Noise Level	Distance to Property Line (ft)	Offset, dB	Predicted Noise Levels (dB)[1]	
				L_{eq}[2]	L_{max}
East	65 dB at 30 feet (entrance, 90° off-axis)	65	-14	38	44
East	76 dB at 40 feet (exit, 45° off-axis)	100	-14	48	54
South	74 dB at 70 feet (exit, in line)	320	-14	34	40

Notes:
[1] Predicted dryer noise levels take into consideration the noise reduction provided by closed entrance and exit doors during drying cycle (air-tight seal), and have been offset by -14 dB to account for this noise reduction.
[2] Hourly average L_{eq} based on 15 minutes of dryer operation during a worst-case hour.
Source: Bollard Acoustical Consultants, Inc. (2018)

Provided the project incorporates the recommended car wash entrance and exit doors, and that the doors are kept in the closed position with an air tight seal during wash cycles, car wash noise exposure at the adjacent residential property lines to the east and south would satisfy the City of Roseville daytime noise level standards. However, even after implementation of the recommended car wash doors, hourly average car wash noise levels could still exceed the city's 45 dB L_{eq} nighttime noise level standard by 3 dB at the residential property line to the east. Thus, if the recommended car wash entry and exit doors provide 14 dB of noise reduction, car wash operations should be limited to daytime hours (7 a.m. to 10 p.m.). However, should the applicant opt for nighttime car wash operations (10 p.m. to 7 a.m.), the recommended tunnel entrance and exit doors would need to provide a minimum noise level reduction of 17 dB.

Evaluation of Car Wash Vacuum Noise Levels

Based on the site plans, the project proposes two (2) vacuum units on the eastern side of the ARCO AM/PM facility building (see Figure 3). According to information obtained from the equipment distributor, the project proposes two JE Adams Super Vac (3-motor) Model #9200 series vacuum units. The manufacturer's specifications are provided as Appendix H. For the purposes of this analysis, it was assumed that the two vacuums would be in operation concurrently and continuously for the duration of an hour (worst-case hour). Because the vacuums were assumed to be in continuous operation for a full hour, hourly average (L_{eq}) and maximum (L_{max}) noise levels would be equivalent. Based upon the manufacturer's data, the proposed location of the vacuum units, and assuming the continuous use of the vacuums for a given hour, vacuum noise exposure at the nearest residential property lines was calculated and the results of those calculations are presented below in Table 12.

The predicted vacuum noise levels at the residential use to the south take into consideration the shielding provided by an existing 6-foot noise barrier along the development boundary, and have been conservatively adjusted by -7 dB to account for this shielding. In addition, because the proposed intervening ARCO AM/PM building would break line of sight of the vacuum units, predicted vacuum noise levels at the adjacent residential use the east were conservatively adjusted by -10 dB to account for this screening.

Table 12
Predicted Vacuum Noise Levels[1]
The Plaza at Blue Oaks Commercial Development – Roseville, California

Property Line	Reference Noise Level[2]	Distance to Property Line (feet)	Offset (dB)[3]	Predicted Vacuum Noise Levels, L_{eq}/ L_{max} (dB)[4]
East	65 dBA at 40 feet	205	-10	41
South		330	-7	40
City of Roseville Daytime Noise Level Standards, L_{eq}/L_{max} (dB):				50 / 70
City of Roseville Nighttime Noise Level Standards, L_{eq}/L_{max} (dB):				45 / 65

Notes:

1 The proposed vacuum system location is illustrated on Figure 3.
2 The two proposed vacuums were assumed to be operating concurrently.
3 Offsets of -10 and -7 dB were applied to account for the shielding provided by the proposed intervening ARCO AM/PM building (east) and existing 6-foot tall solid noise barrier (south), respectively.
4 Because the vacuums were assumed to be in continuous operation for a full hour, hourly average (L_{eq}) and maximum (L_{max}) noise levels would be equivalent.

Source: Bollard Acoustical Consultants, Inc. (2018)

As shown in Table 12, predicted vacuum operation noise levels at the residential property lines to the south and west would satisfy the City of Roseville average and maximum daytime and nighttime noise level criteria. As a result, no further consideration of noise mitigation measures would be warranted for this aspect of the project.

Conclusions

This analysis concludes that noise generated by on-site truck circulation, loading docks, and car wash dryer operations at the proposed The Plaza at Blue Oaks Commercial Development project could potentially exceed the applicable City of Roseville noise level limits at the nearest residential uses. In order to comply with the applicable noise criteria, the following noise mitigation measures are recommended:

On-Site Truck Circulation Noise

Noise exposure from on-site truck circulation is expected to exceed the applicable City of Roseville nighttime noise criteria at the adjacent residential use to the north. In order to comply with the city's nighttime noise criteria at the nearest residential use to the north, a solid noise barrier measuring a minimum of 7-feet in height will be required at the location shown on Figure

2. Alternatively, commercial truck deliveries would need to be restricted to daytime hours (7 a.m. to 10 p.m.) if a noise barrier is not constructed as prescribed.

Loading Dock Noise

Noise exposure from loading dock activities is expected to exceed the City of Roseville daytime and nighttime noise criteria the adjacent residential use to the north. In order to comply with the city's noise criteria at the residential use to the north, a solid noise barrier will be required at the location shown on Figure 2. Specific barrier heights required to comply with the city's daytime and nighttime noise criteria are shown in Table 8. In addition, because it is expected that the residential use to the north will receive a reduced level of shielding from the required noise barrier, it is recommended that delivery activities at Loading Dock 2 be limited to daytime hours (7 a.m. to 10 p.m.). The restriction of delivery activities at Loading Dock 2 during nighttime hours (10 p.m. to 7 a.m.) will minimize the potential for an exceedance of the City of Roseville nighttime noise level standards at the residential land use to the north.

Car Wash Dryer Noise

Car wash dryer noise exposure at the residential uses to the east and south is predicted to exceed the City of Roseville daytime and nighttime noise level criteria. In order to comply with the City of Roseville daytime noise criteria, the installation of car wash entrance and exit doors would be required. As an example, car wash entrance and exit doors offered by BayWatch provide up to approximately 14 dB of dryer noise reduction (see Appendix G). In order to maximize the effectiveness of the equipment, the car wash entrance and exit doors must be kept in the closed position during wash cycles to create an air tight seal. Provided that the project implement car wash entrance and exit doors that provide a minimum of 14 dB of dryer noise level reduction, project car wash dryer noise exposure is expected to comply with the City of Roseville daytime noise criteria. However, in order to comply with the City of Roseville nighttime noise criteria, the recommended tunnel entrance and exit doors would need to provide a minimum noise level reduction of 17 dB.

Following implementation of the measures recommended above, it is BAC's professional opinion that the project will be satisfactory relative to the applicable City of Roseville noise criteria and would not result in adverse noise impacts at the adjacent residential uses. Ultimately, each use operating within the Plaza at Blue Oaks Commercial Development will be responsible for operating in compliance with the noise standards of the City of Roseville.

This concludes BAC's noise assessment for the proposed Plaza at Blue Oaks Commercial Development in Roseville, California. Please contact BAC at (916) 663-0500 or paulb@bacnoise.com with any questions regarding this assessment.

Appendix A

Acoustical Terminology

Acoustics The science of sound.

Ambient Noise The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.

Attenuation The reduction of an acoustic signal.

A-Weighting A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.

Decibel or dB Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.

CNEL Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.

Frequency The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.

Ldn Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.

Leq Equivalent or energy-averaged sound level.

Lmax The highest root-mean-square (RMS) sound level measured over a given period of time.

Loudness A subjective term for the sensation of the magnitude of sound.

Masking The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.

Noise Unwanted sound.

Peak Noise The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the Maximum level, which is the highest RMS level.

RT_{60} The time it takes reverberant sound to decay by 60 dB once the source has been removed.

Sabin The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.

SEL A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy of the event into a 1-s time period.

Threshold of Hearing The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.

Threshold of Pain Approximately 120 dB above the threshold of hearing.

Appendix B-1
The Plaza at Blue Oaks Commercial Development
Ambient Noise Monitoring Results - Site 1
Thursday, February 15, 2018

Hour	Leq	Lmax	L50	L90
0:00	44	56	41	34
1:00	44	63	38	29
2:00	44	59	38	30
3:00	42	58	38	32
4:00	45	59	42	34
5:00	49	62	47	40
6:00	53	69	50	46
7:00	54	65	54	50
8:00	54	67	53	49
9:00	53	63	52	49
10:00	54	66	53	49
11:00	54	68	54	51
12:00	55	62	55	51
13:00	54	71	53	50
14:00	53	70	52	49
15:00	54	62	54	50
16:00	54	68	53	49
17:00	54	71	53	50
18:00	53	73	52	47
19:00	52	61	50	46
20:00	52	68	50	45
21:00	50	61	49	44
22:00	50	71	48	42
23:00	48	67	45	38

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	55	50	54	53	42	48
Lmax (Maximum)	73	61	66	71	56	63
L50 (Median)	55	49	52	50	38	43
L90 (Background)	51	44	49	46	29	36

Computed Ldn, dB	56
% Daytime Energy	86%
% Nighttime Energy	14%

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Acoustical Consultants

Appendix B-2
The Plaza at Blue Oaks Commercial Development
Ambient Noise Monitoring Results - Site 2
2/14/18 - 2/15/18

Hour	Leq	Lmax	L50	L90
12:00	53	68	50	45
13:00	51	64	49	46
14:00	52	69	50	47
15:00	54	70	53	49
16:00	54	66	52	49
17:00	54	67	53	49
18:00	53	64	52	48
19:00	51	66	49	46
20:00	50	65	49	45
21:00	50	66	49	45
22:00	50	75	47	42
23:00	48	70	45	36
0:00	46	60	43	34
1:00	47	64	40	28
2:00	46	67	39	29
3:00	45	59	39	32
4:00	47	63	43	34
5:00	52	68	49	41
6:00	56	72	54	49
7:00	57	66	56	53
8:00	57	77	56	52
9:00	56	68	55	51
10:00	56	74	55	51
11:00	56	74	55	52

	Statistical Summary					
	Daytime (7 a.m. - 10 p.m.)			Nighttime (10 p.m. - 7 a.m.)		
	High	Low	Average	High	Low	Average
Leq (Average)	57	50	55	56	45	49
Lmax (Maximum)	77	64	69	72	59	66
L50 (Median)	56	47	52	54	39	44
L90 (Background)	53	42	48	49	28	35

Computed Ldn, dB	57
% Daytime Energy	84%
% Nighttime Energy	16%

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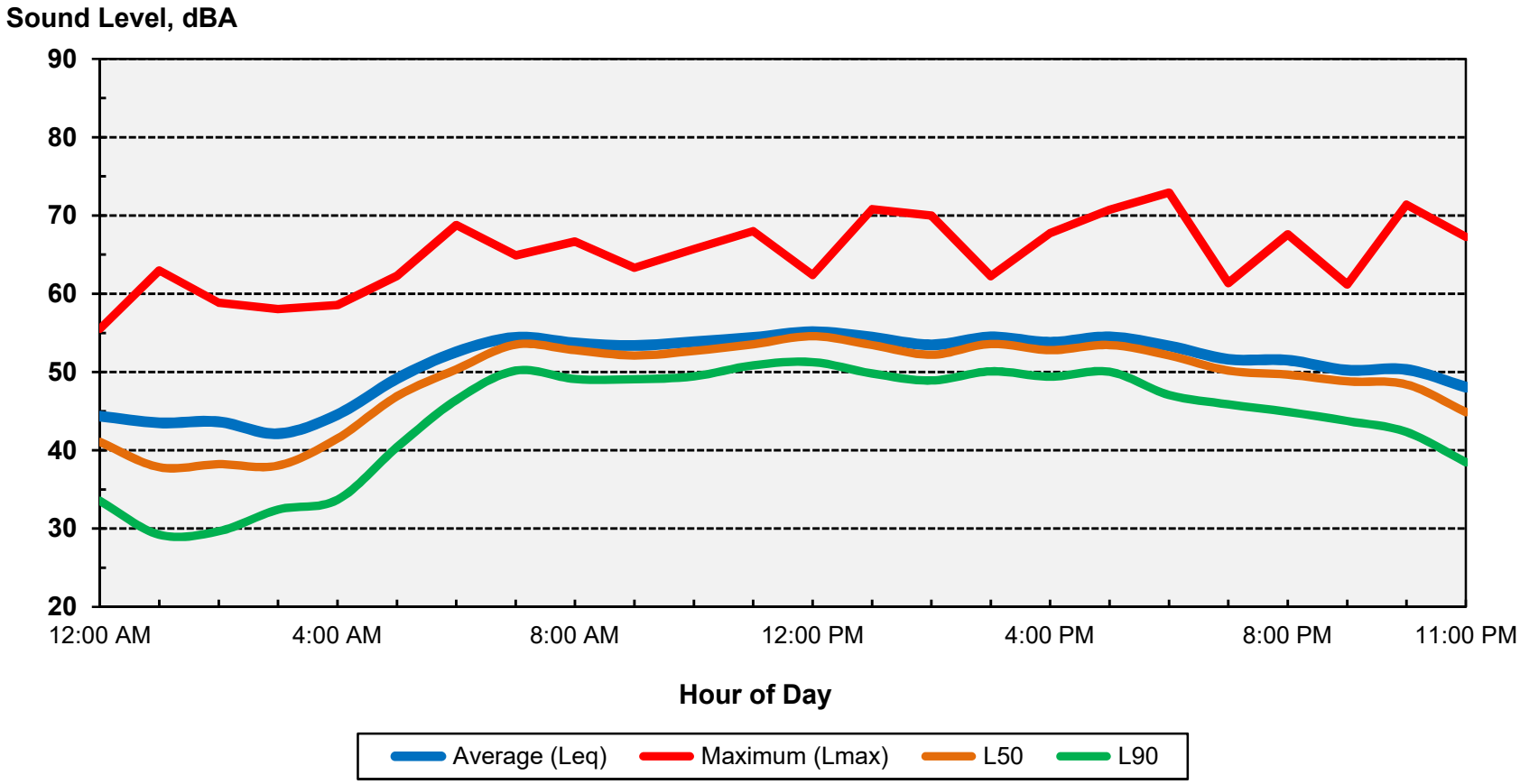
Appendix C-1
The Plaza at Blue Oaks Commercial Development
Ambient Noise Monitoring Results - Site 1
Thursday, February 15, 2018



Ldn: 56 dB

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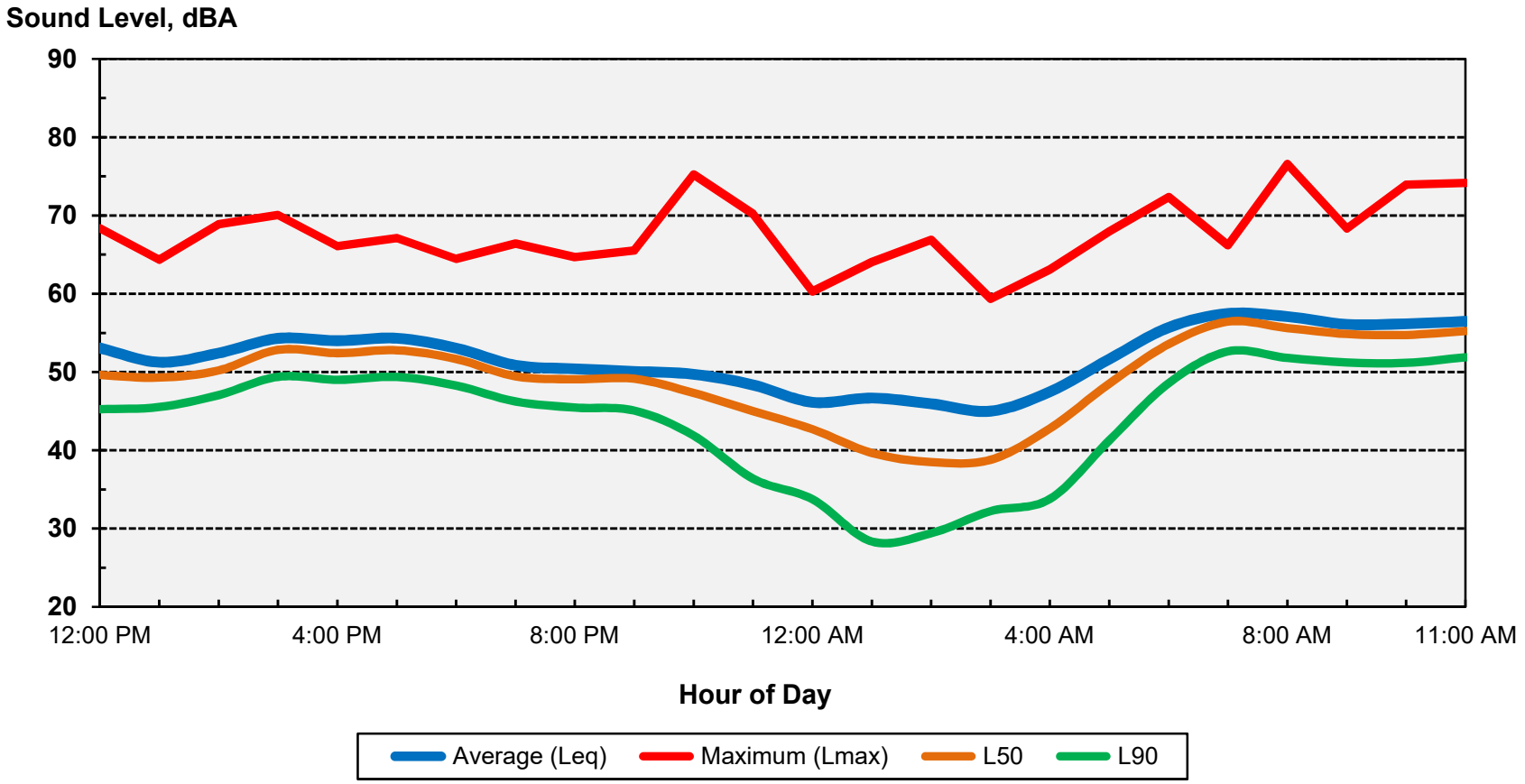
Appendix C-2
The Plaza at Blue Oaks Commercial Development
Ambient Noise Monitoring Results - Site 2
2/14/18 - 2/15/18



Ldn: 57 dB

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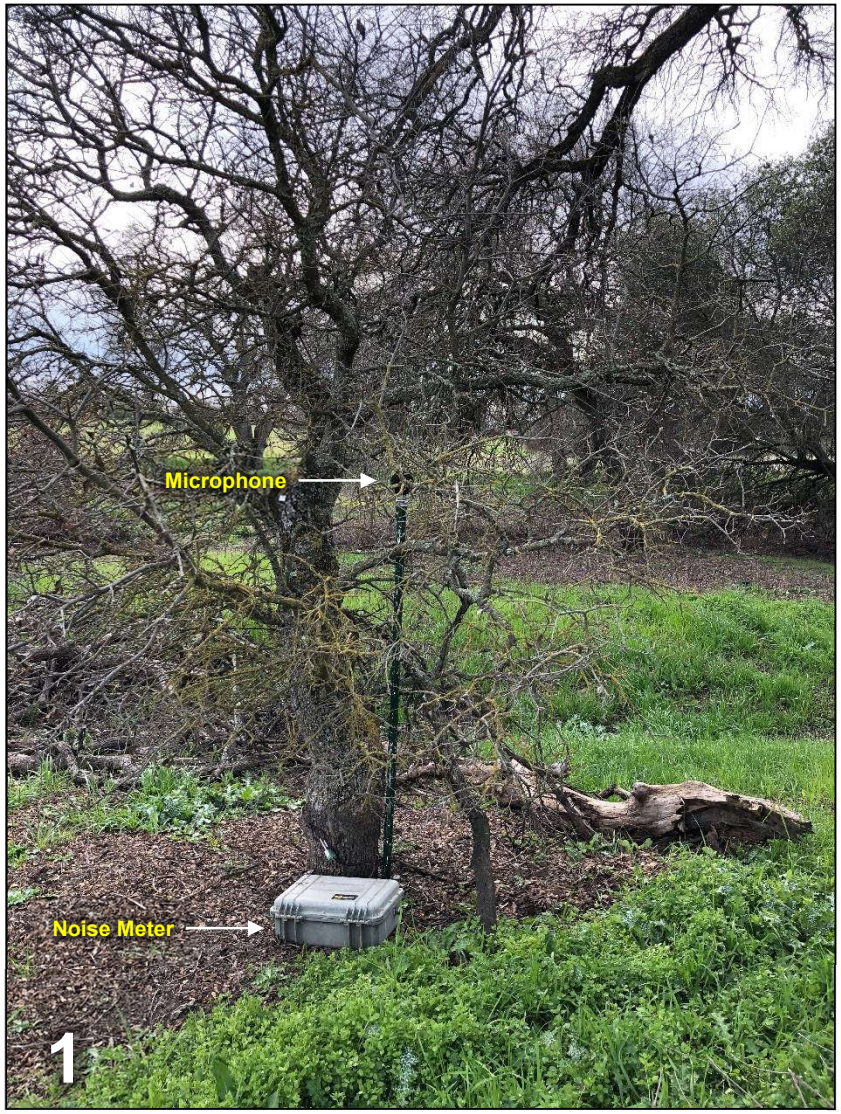


Notes:

1. Long-term noise measurement Site 1, facing southeast
2. Long-term noise measurement Site 2, facing north

The Plaza at Blue Oaks Development
Roseville, California

Noise Measurement Site Photos

Appendix D

BOLLARD Acoustical Consultants

Appendix E-1
Barrier Insertion Loss Calculation

Project Information:

Job Number: 2018-026
Project Name: The Plaza at Blue Oaks Commercial Development
Location(s): Property Line

Noise Level Data:

Source Description: On-Site Truck Circulation - Combined Truck
Source Noise Level, Leq (dBA): 50
Source Frequency (Hz): 500
Source Height (ft): 104

Site Geometry:

Receiver Description: Property Line - North
Source to Barrier Distance (C_1): 20
Barrier to Receiver Distance (C_2)[1]: 80

Pad/Ground Elevation at Receiver: 96
Receiver Elevation: 101
Base of Barrier Elevation: 96
Starting Barrier Height 6

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height (ft)	Insertion Loss, dB	Noise Level, dB	Barrier Breaks Line of Site to Source?
102	6	-4.2	45.8	No
103	7	-4.9	45.1	No
104	8	-5.0	45.0	Yes
105	9	-5.7	44.3	Yes
106	10	-6.7	43.3	Yes
107	11	-7.7	42.3	Yes
108	12	-8.9	41.1	Yes
109	13	-9.8	40.2	Yes
110	14	-10.5	39.5	Yes
111	15	-11.3	38.7	Yes
112	16	-12.1	37.9	Yes

Notes: [1] Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s).

Appendix E-2
Barrier Insertion Loss Calculation

Project Information:

Job Number: 2018-026
Project Name: The Plaza at Blue Oaks Commercial Development
Location(s): Property Line

Noise Level Data:

Source Description: On-Site Truck Circulation - Heavy Truck
Source Noise Level, Lmax (dBA): 70
Source Frequency (Hz): 500
Source Height (ft): 104

Site Geometry:

Receiver Description: Property Line - North
Source to Barrier Distance (C_1): 20
Barrier to Receiver Distance (C_2)[1]: 80

Pad/Ground Elevation at Receiver: 96
Receiver Elevation: 101
Base of Barrier Elevation: 96
Starting Barrier Height 6

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height (ft)	Insertion Loss, dB	Noise Level, dB	Barrier Breaks Line of Site to Source?
102	6	-4.2	65.8	No
103	7	-4.9	65.1	No
104	8	-5.0	65.0	Yes
105	9	-5.7	64.3	Yes
106	10	-6.7	63.3	Yes
107	11	-7.7	62.3	Yes
108	12	-8.9	61.1	Yes
109	13	-9.8	60.2	Yes
110	14	-10.5	59.5	Yes
111	15	-11.3	58.7	Yes
112	16	-12.1	57.9	Yes

Notes: [1] Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s).

Appendix E-3
Barrier Insertion Loss Calculation

Project Information:

Job Number: 2018-026
Project Name: The Plaza at Blue Oaks Commercial Development
Location(s): Property Line

Noise Level Data:

Source Description: Loading Dock 1
Source Noise Level, Leq (dBA): 53
Source Frequency (Hz): 500
Source Height (ft): 100

Site Geometry:

Receiver Description: Property Line - North
Source to Barrier Distance (C_1): 55
Barrier to Receiver Distance (C_2)[1]: 70

Pad/Ground Elevation at Receiver: 96
Receiver Elevation: 101
Base of Barrier Elevation: 96
Starting Barrier Height 6

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height (ft)	Insertion Loss, dB	Noise Level, dB	Barrier Breaks Line of Site to Source?
102	6	-5.3	47.7	Yes
103	7	-5.9	47.1	Yes
104	8	-6.7	46.3	Yes
105	9	-7.4	45.6	Yes
106	10	-8.2	44.8	Yes
107	11	-9.0	44.0	Yes
108	12	-9.7	43.3	Yes
109	13	-10.3	42.7	Yes
110	14	-10.9	42.1	Yes
111	15	-11.3	41.7	Yes
112	16	-12.1	40.9	Yes

Notes: [1] Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s).

Appendix E-4
Barrier Insertion Loss Calculation

Project Information:

Job Number: 2018-026
Project Name: The Plaza at Blue Oaks Commercial Development
Location(s): Property Line

Noise Level Data:

Source Description: Loading Dock 1
Source Noise Level, Lmax (dBA): 68
Source Frequency (Hz): 500
Source Height (ft): 100

Site Geometry:

Receiver Description: Property Line - North
Source to Barrier Distance (C_1): 55
Barrier to Receiver Distance (C_2)[1]: 70

Pad/Ground Elevation at Receiver: 96
Receiver Elevation: 101
Base of Barrier Elevation: 96
Starting Barrier Height 6

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height (ft)	Insertion Loss, dB	Noise Level, dB	Barrier Breaks Line of Site to Source?
102	6	-5.3	62.7	Yes
103	7	-5.9	62.1	Yes
104	8	-6.7	61.3	Yes
105	9	-7.4	60.6	Yes
106	10	-8.2	59.8	Yes
107	11	-9.0	59.0	Yes
108	12	-9.7	58.3	Yes
109	13	-10.3	57.7	Yes
110	14	-10.9	57.1	Yes
111	15	-11.3	56.7	Yes
112	16	-12.1	55.9	Yes

Notes: [1] Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s).

Appendix E-5
Barrier Insertion Loss Calculation

Project Information:

Job Number: 2018-026
Project Name: The Plaza at Blue Oaks Commercial Development
Location(s): Property Line

Noise Level Data:

Source Description: Loading Dock 2
Source Noise Level, Leq (dBA): 53
Source Frequency (Hz): 500
Source Height (ft): 100

Site Geometry:

Receiver Description: Property Line - North
Source to Barrier Distance (C_1): 55
Barrier to Receiver Distance (C_2)[1]: 65

Pad/Ground Elevation at Receiver: 96
Receiver Elevation: 101
Base of Barrier Elevation: 96
Starting Barrier Height 6

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height (ft)	Insertion Loss, dB	Noise Level, dB	Barrier Breaks Line of Site to Source?
102	6	-5.3	47.7	Yes
103	7	-5.9	47.1	Yes
104	8	-6.7	46.3	Yes
105	9	-7.5	45.5	Yes
106	10	-8.2	44.8	Yes
107	11	-9.1	43.9	Yes
108	12	-9.8	43.2	Yes
109	13	-10.3	42.7	Yes
110	14	-10.9	42.1	Yes
111	15	-11.5	41.5	Yes
112	16	-12.1	40.9	Yes

Notes: [1] Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s).

Appendix E-6
Barrier Insertion Loss Calculation

Project Information:

Job Number: 2018-026
Project Name: The Plaza at Blue Oaks Commercial Development
Location(s): Property Line

Noise Level Data:

Source Description: Loading Dock 2
Source Noise Level, Lmax (dBA): 68
Source Frequency (Hz): 500
Source Height (ft): 100

Site Geometry:

Receiver Description: Property Line - North
Source to Barrier Distance (C_1): 55
Barrier to Receiver Distance (C_2)[1]: 65

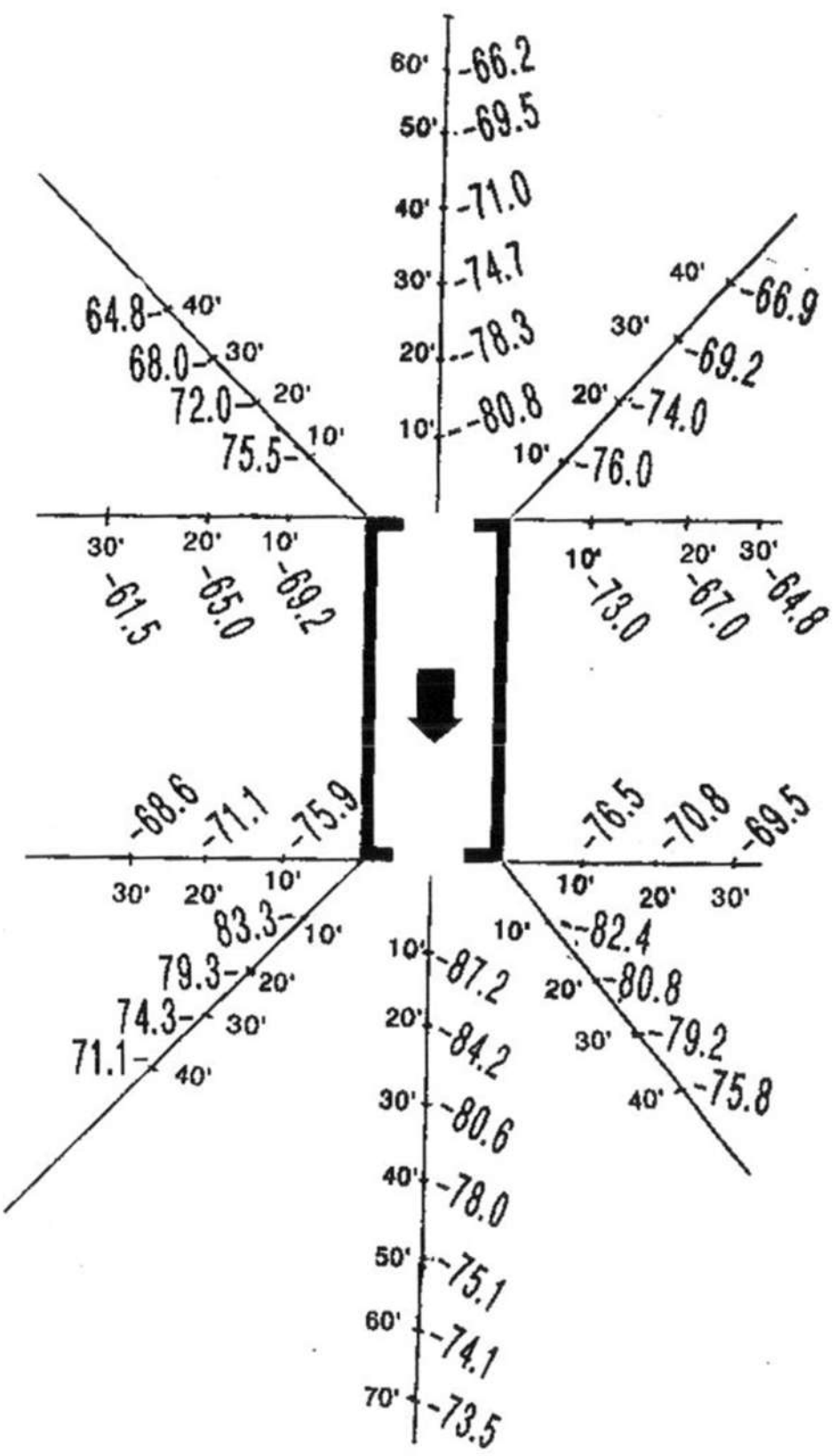
Pad/Ground Elevation at Receiver: 96
Receiver Elevation: 101
Base of Barrier Elevation: 96
Starting Barrier Height 6

Barrier Effectiveness:

Top of Barrier Elevation (ft)	Barrier Height (ft)	Insertion Loss, dB	Noise Level, dB	Barrier Breaks Line of Site to Source?
102	6	-5.3	62.7	Yes
103	7	-5.9	62.1	Yes
104	8	-6.7	61.3	Yes
105	9	-7.5	60.5	Yes
106	10	-8.2	59.8	Yes
107	11	-9.1	58.9	Yes
108	12	-9.8	58.2	Yes
109	13	-10.3	57.7	Yes
110	14	-10.9	57.1	Yes
111	15	-11.5	56.5	Yes
112	16	-12.1	55.9	Yes

Notes: [1] Standard receiver elevation is five feet above grade/pad elevations at the receiver location(s).

Appendix F



RYKO Mfg.3–Fan Slimline Dryer

BayWatch
CAR WASH DOOR SOLUTIONS

Sound Level Measurements for BayWatch Polycarbonate Doors With Mark VII AquaJet XT

Car Wash w/ On-Board Dryer (30hp)

Feet From Door	Entry Door Open	Entry Door Closed
10’	93 db	80 db
20’	90 db	76 db
25’	88 db	74 db
30’	85 db	71 db
50’	80 db	66 db

WE WORK HARDER TO PROVIDE YOU SOLUTIONS

SUPER VAC WITH BILL VALIDATOR & DIGITAL DISPLAY

MODEL #	VACUUM	MOTORS	VAULT READY	STAINLESS STEEL DOME	LIGHTED DOME	BILL ACCEPTOR	COIN ACCEPTOR	ETL APPROVED	OPTIONAL DECAL PKG.	WEIGHT	AMPS REQ.	VOLTAGE
9200-1	•	2		Small		•	•	•	•	139	20	120
9200-1VR	•	2	•	Small		•	•	•	•	139	20	120
9200-1LD	•	2			•	•	•	•	•	139	20	120
9200-1VRLD	•	2	•		•	•	•	•	•	139	20	120
9200-3	•	3		Large		•	•	•	•	155	30	120
9200-3VR	•	3	•	Large		•	•	•	•	155	30	120
9200-3LD	•	3			•	•	•	•	•	155	30	120
9200-3VRLD	•	3	•		•	•	•	•	•	155	30	120

FEATURES

- Double service doors offer easy access to clean out compartment and 4 filter bag system (Replacement Item #8076)
- Digital display timer with built-in coin counter, scrolls messages, prices for service and counts down remaining time (Replacement Item #8000-10)
- Visual and audible last coin alarm
- Coin box secured with pin lock (Replacement Item #8638)
- Faceplate secured with 2 Medeco cam locks (Replacement Item #8953)
- Hose: 2" x 15', swivel cuff and nozzle included (15', 25', and 50' available in 1 1/2" or 2")
- Coinco bill acceptor takes $1.00 and $5.00 bills (Replacement Item #8130-6)
- Imonex coin acceptor takes quarters (Replacement Item #8149)
- Lighted dome available in red, blue, yellow, dark green, light green, purple and white
- Optional coin mechs, motors, colored hoses, extra security, and clean-out containers are available

PROGRAMMER

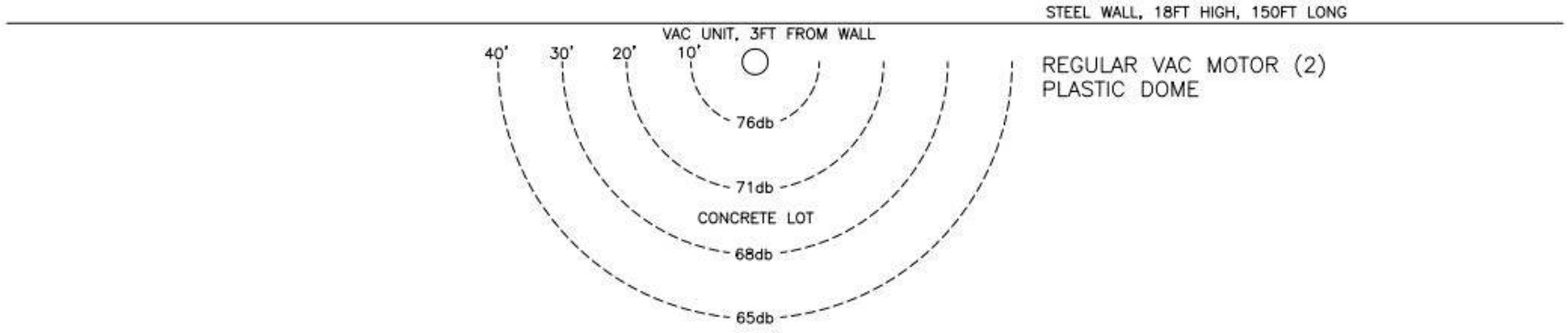
8000-30 Remote control programmer for digital display, 8 oz.

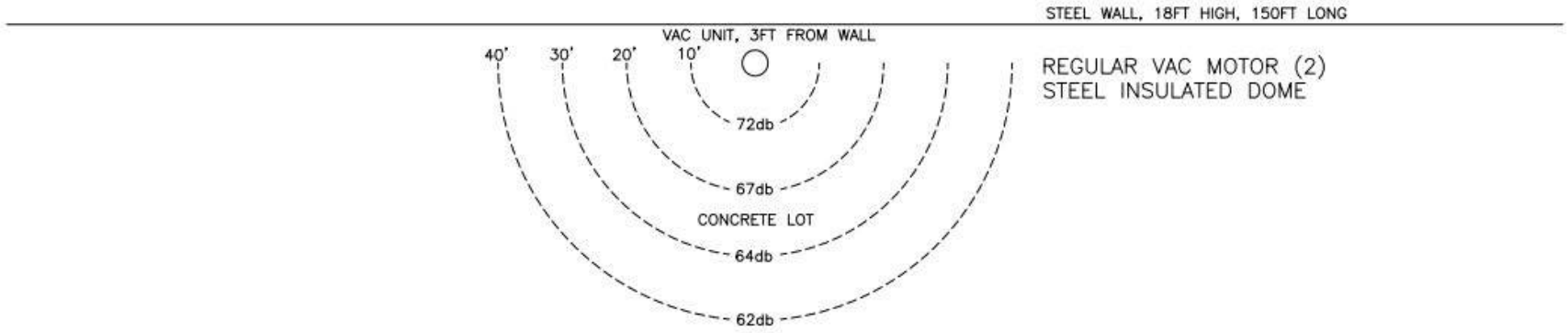
DECALS

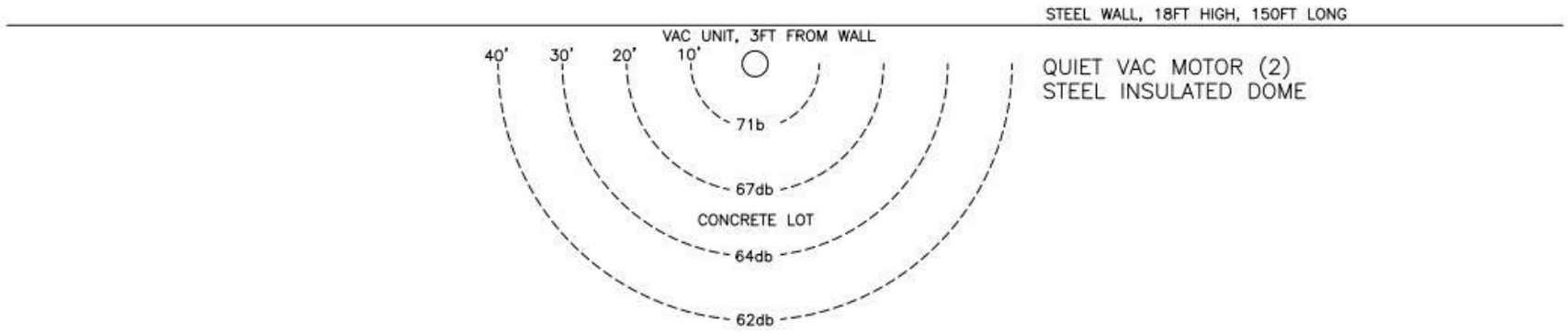
9200-11 Yellow decals
9200-12 Blue decals
9200-13 Violet decals
9200-14 Black decals (standard)

SUPER VAC 9200-1LD SHOWN WITH OPTIONAL BLUE DOME, BLUE HOSE, BLUE DECAL PACKAGE, SERVICE DOORS SECURITY COVER, AND COIN BOX SECURITY PACKAGE

Appendix H-2


STEEL WALL, 18FT HIGH, 150FT LONG
VAC UNIT, 3FT FROM WALL
40'
30'
20'
10'
76db
71db
CONCRETE LOT
68db
65db
REGULAR VAC MOTOR (2)
PLASTIC DOME


STEEL WALL, 18FT HIGH, 150FT LONG
VAC UNIT, 3FT FROM WALL
40'
30'
20'
10'
72db
67db
CONCRETE LOT
64db
62db
REGULAR VAC MOTOR (2)
STEEL INSULATED DOME


STEEL WALL, 18FT HIGH, 150FT LONG
VAC UNIT, 3FT FROM WALL
40'
30'
20'
10'
71b
67db
CONCRETE LOT
64db
62db
QUIET VAC MOTOR (2)
STEEL INSULATED DOME

Kimley»Horn

Memorandum

To: Matt Todd

From: Matt Weir, P.E., T.E., PTOE
Robert Paderna, P.E.

Re: *The Plaza at Blue Oaks*
Traffic Evaluation
Roseville, California

Date: April 6, 2018

Per your request and authorization, we have prepared this traffic evaluation for the above referenced project.

Project Understanding

Kimley-Horn understands that a 13.35-acre neighborhood shopping center is proposed for the vacant site located in the northeast corner of the Blue Oaks Boulevard intersection with Fiddyment Road in the Fiddyment Ranch Development of the City of Roseville. According to the project applicant, the project is proposed to be constructed in two phases, with Phase 2 excluded from the initial Design Review Permit application which is the trigger for this traffic analysis. The proposed project consists of a 35,000-square foot (sf) grocery anchor store, an approximately 20,000-sf major retail store, a gas station (approximately 3,050-sf convenience store with 12 fueling pumps), and seven additional buildings ranging in size from 3,250-sf to 6,045-sf. Access to the project is proposed to be from all four surrounding roadways; one right-in/right-out driveway along Blue Oaks Boulevard, one right-in/right-out driveway along Fiddyment Road, two full access driveways along Harvey Way, and two full access driveways along Oak Meadow Drive. The project site plan is provided in **Exhibit 1**.

The purpose of this analysis is to evaluate the proposed project's access points and localized circulation, including throat depths, tapers, storage, and driveway treatments that are necessary to ensure safe and efficient operations.

Study Facilities and Evaluation Parameters

The following ten intersections (see **Exhibit 2**) were identified in consultation with the City and are included in this access evaluation. **Exhibit 3** details the study intersections' geometries while **Exhibit 4** presents the Existing (2018) conditions AM and PM peak hour traffic volumes, collected on February 27 and March 6 to March 8, 2018. Raw traffic counts are provided in **Attachment A**. For each location, traffic/access control and the primary evaluation parameter(s) are described below:

1. Blue Oaks Boulevard @ Fiddyment Road
   - Existing traffic signal
   - Primary consideration is anticipated mix of volumes with project volumes, with a focus on the left- and u-turn movements, and vehicle delay and queuing
2. Blue Oaks Boulevard @ Site Access Driveway
   - Proposed right-in/right-out driveway
   - Primary considerations are the minimum required throat depth (MRTD) and the size of the right-turn deceleration lane

3. Blue Oaks Boulevard @ Oak Meadow Drive
    - Existing side-street stop controlled (SSSC) intersection
    - Primary consideration is anticipated mix of volumes with project volumes, with a focus on the southbound queue in relation to the South Project Access Driveway intersection
4. Blue Oaks Boulevard @ Orchard View Road
    - Existing traffic signal
    - Primary consideration is anticipated mix of volumes with project volumes, with a focus on the left- and u-turn movements
5. Fiddyment Road @ Project Access Driveway Intersection
    - Proposed right-in/right-out driveway
    - Primary considerations are the minimum required throat depth (MRTD) and the need for a right-turn deceleration lane
6. Harvey Way @ Fiddyment Road
    - Existing SSSC intersection
    - Primary consideration is the anticipated mix of volumes with project volumes, with a focus on the southbound left-turn movement onto Harvey Way
7. Harvey Way @ West Project Access Driveway
    - Access initially assumed to be full access
    - Primary considerations are the need for turn restrictions and the MRTD
8. Harvey Way @ Oak Meadow Drive
    - Existing SSSC intersection
    - Primary consideration is the anticipated mix of volumes with project volumes, with a focus on the need for all-way stop control (AWSC)
9. Harvey Way @ Orchard View Road
    - Existing SSSC intersection
    - Primary consideration is the anticipated mix of volumes with project volumes, with a focus on the need for AWSC
10. Oak Meadow Drive @ South Project Access Driveway
    - Access initially assumed to be full access
    - Primary considerations are the need for turn restrictions and the MRTD

This analysis did not include the eastern project driveway along Harvey Way and the northern project driveway along Oak Meadow Drive as these driveway intersections are not anticipated to affect the operations at the adjacent offsite city intersections.

The access evaluation was conducted for the weekday AM and PM peak hours under Existing (2018) plus Proposed Project conditions. Kimley-Horn applied methods defined in the *Highway Capacity Manual (HCM),* using Synchro 9 traffic analysis software.

Assessment of Proposed Project

Trip Generation

The number of trips anticipated to be generated by the proposed project were approximated using *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE). **Table 1** presents the trip generation data for the proposed project.

Table 1 – Proposed Project Trip Generation

	Size (KSF/ Fueling Pumps)	Daily Trips	AM Peak Hour			PM Peak Hour		
			Total	In	Out	Total	In	Out
Supermarket (850)	35	3738	134	80	54	323	165	158
Shopping Center (820)	55.2	2082	52	32	20	210	101	109
Gas Station with Convenience Store (960)	12 (Fueling Pumps)	2766	337	169	168	276	138	138
Subtotal Trips		**8,586**	**523**	**281**	**242**	**809**	**404**	**405**
Supermarket Pass-by Trip Reduction : PM Peak-Hour (36%)		0	0	0	0	-116	-59	-57
Shopping Center Pass-by Trip Reduction: PM Peak-hour (34%)		0	0	0	0	-71	-34	-37
Gas Station with Convenience Store Passby Trip Reduction: AM Peak-Hour (62%), PM Peak-Hour (56%)		0	-208	-104	-104	-154	-77	-77
Net New Project Trips		**8,586**	**315**	**177**	**138**	**468**	**234**	**234**

Source: Trip Generation Manual, 10th Edition, ITE

As reflected in **Table 1**, the proposed project is anticipated to generate 315 new AM peak-hour and 468 new PM peak-hour trips. A pass by trip reduction of 208 and 341 trips was applied during the AM and PM peak-hours, respectively, in accordance with the procedures contained in the *Trip Generation Handbook*, *3rd Edition*.

Trip Distribution

The distribution of new project trips was developed based on existing project area roadway volumes, general knowledge of project area traffic patterns, the proposed project layout, guidance from *Transportation and Land Development, 2nd Edition* published by ITE, and engineering judgment. Project trips were assigned to the study intersections and the surrounding roadway network according to these patterns. The assignment of project trips to the site driveways accounts for the turn restrictions at project driveways along Blue Oaks Boulevard and Fiddyment Road.

The trip distribution percentages are presented in **Exhibit 5**. Project only volumes are reflected in **Exhibit 6**. Existing (2018) plus Proposed Project volumes are reflected in **Exhibit 7**.

Traffic Assessment Methodology

As previously discussed, the focus of this traffic evaluation is on vehicle queuing entering the site and the Minimum Required Throat Depth (MRTD) at each project site driveway. For this evaluation, the City's guidelines[1] were referenced to determine the driveways' MRTD.

Synchro was used to evaluate the anticipated operations at the signalized study intersections at Blue Oaks Boulevard/Fiddyment Road (Intersection #1) and Blue Oaks Boulevard/Orchard View Road (Intersection #4) under Existing (2018) plus Proposed Project conditions.

[1] *Section 4 Traffic Impact Studies, City of Roseville Design Standards*, January 2016.

Additionally, an evaluation of the warrants for All-Way Stop Control (AWSC) was evaluated at the side-street stop controlled study intersections at Harvey Way/Oak Meadow Drive (Intersection #8) and Harvey Way/Orchard View Road (Intersection #9). This AWSC warrant evaluation was performed in accordance with the guidance contained in Section 2B.07 of the *California Manual on Uniform Traffic Control Devices (CMUTCD), 2014 Edition, Revision 3 (March 9, 2017)*.

Signalized Intersection Operations and Queuing

In an effort to confirm the adequacy of the existing configuration at the intersections of Blue Oaks Boulevard/Fiddyment Road (Intersection #1) and Blue Oaks Boulevard/Orchard View Road (Intersection #4), Synchro was used to determine the anticipated 95th percentile vehicle queues, delay, and Level of Service (LOS) under Existing (2018) plus Proposed Project conditions. **Table 2** summarizes the delay and LOS at the two signalized study intersections. Analysis worksheets are provided in **Attachment B**.

Table 2 – Intersection Level of Service for Existing (2018) plus Proposed Project Conditions

Intersection	Control	Peak Hour	Existing (2018)		Existing (2018) plus Proposed Project	
			Delay (sec)	LOS	Delay (sec)	LOS
#1 Blue Oaks Boulevard @ Fiddyment Road	Signal	AM	27.2	C	29.3	C
		PM	29.5	C	33.2	C
#4 Blue Oaks Boulevard @ Orchard View Road	Signal	AM	3.8	A	4.2	A
		PM	3.2	A	4.1	A

As shown in **Table 2**, the project intersections are shown to operate at or above acceptable LOS C during both peak-hours.

As congestion increases it is common for traffic at signals and stop signs to form lines of stopped (or queued) vehicles. Queue lengths were determined for each lane and measure the distance that vehicles will back up in each direction approaching an intersection. The 95th percentile queues were calculated for the two signalized study intersections by using 95th percentile traffic to account for fluctuations in traffic and represents a condition where 95 percent of the time during the peak period, traffic volumes and related queuing will be at, or less, than determined by the analysis. **Table 3** presents a summary of the queuing results. Analysis worksheets are provided in **Attachment B.**

Table 3 – Intersection Queuing for Existing (2018) plus Proposed Project Conditions

Intersection / Analysis Scenario	Movement	AM Peak-Hour		PM Peak-Hour	
		Available Storage (ft)	95th % Queue (ft)	Available Storage (ft)	95th % Queue (ft)
#1 Blue Oaks Boulevard @ Fiddyment Road	**NBR**				
Existing (2018)		245	69	245	61
Existing (2018) plus Project			74		64
	SBL				
Existing (2018)		245	78	245	70
Existing (2018) plus Project			93		87
	EBL				
Existing (2018)		235	24	235	12
Existing (2018) plus Project			29		20
	WBL				
Existing (2018)		235	142	235	226
Existing (2018) plus Project			182		300
#2 Blue Oaks Boulevard @ Site Access Driveway	**SBR**				
Existing (2018)		N/A		N/A	
Existing (2018) plus Project		140	18	140	45
	WBR				
Existing (2018)		N/A		N/A	
Existing (2018) plus Project		360	0	360	0
#3 Blue Oaks Boulevard @ Oak Meadow Drive	**SBR**				
Existing (2018)		120	0	120	3
Existing (2018) plus Project			8		23
	EBL				
Existing (2018)		265	0	265	0
Existing (2018) plus Project			5		8
	WBR				
Existing (2018)		240	0	240	0
Existing (2018) plus Project			0		0
#4 Blue Oaks Boulevard @ Orchard View Road	**SBL**				
Existing (2018)		240	33	240	29
Existing (2018) plus Project			43		49
#5 Fiddyment Road @ Project Access Driveway	**WBR**				
Existing (2018)		N/A		N/A	
Existing (2018) plus Project		130	18	130	38

Note: Shaded results reflect locations where 95th percentile queues exceed available storage capacity

Table 3 – Intersection Queuing for Existing (2018) plus Proposed Project Conditions (Continued)

Intersection / Analysis Scenario	Movement	AM Peak-Hour		PM Peak-Hour	
		Available Storage (ft)	95th % Queue (ft)	Available Storage (ft)	95th % Queue (ft)
#6 Harvey Way @ Fiddyment Road	**NBR**				
Existing (2018)		220	0	220	0
Existing (2018) plus Project			0		0
	SBL				
Existing (2018)		250	3	250	0
Existing (2018) plus Project			13		15
	WBR				
Existing (2018)		235	3	235	3
Existing (2018) plus Project			3		3
	WBLT				
Existing (2018)		180	5	180	3
Existing (2018) plus Project			128		275
#7 Harvey Way @ West Project Access Driveway	**NBLR**				
Existing (2018)		N/A		N/A	
Existing (2018) plus Project		40	5	40	10
#8 Harvey Way @ Oak Meadow Drive	**NBR**				
Existing (2018)		220	0	220	0
Existing (2018) plus Project			3		5
#9 Harvey Way @ Orchard View Road	**EBR**				
Existing (2018)		370	3	370	3
Existing (2018) plus Project			5		5
#10 Oak Meadow Drive @ South Project Access Driveway	**EBR**				
Existing (2018)		N/A		N/A	
Existing (2018) plus Project		25	5	25	8
#10 Oak Meadow Drive @ South Project Access Driveway	**NBL**				
Existing (2018)		N/A		N/A	
Existing (2018) plus Project		120	3	120	5
#10 Oak Meadow Drive @ South Project Access Driveway	**SBR**				
Existing (2018)		N/A		N/A	
Existing (2018) plus Project		200	0	200	0

Note: Shaded results reflect locations where 95th percentile queues exceed available storage capacity

As shown in **Table 3**, two project intersections are anticipated to experience 95th percentile queues that exceed available storage at the following locations:

- Blue Oaks Boulevard and Fiddyment Road (Intersection #1)
  - WBL movement during the PM peak-hour
- Harvey Way and Fiddyment Road (Intersection #6)
  - WBLT movement during the PM peak-hour

Minimum Required Throat Depth (MRTD)

MRTDs were calculated for four site driveways (Intersections #2, #5, #7, and #10) under Existing (2018) plus Proposed Project conditions. **Table 4** and **Table 5** summarize the findings of the MRTD evaluation based on the City's guidelines for the AM and PM peaks, respectively. Analysis worksheets are provided in **Attachment C**.

Table 4 – MRTD at site driveways (AM Peak-Hour)

INT	TS	Approach Volume	ConflVol (Left)	ConflVol (Right)	LT Out	RT Out	RT%	Minimum Required Throat Depth (MRTD)
2	1	105		159				100
5	1	118		219				100
7	0	62	51	20	62	0	0%	25
10	0	46	77	8	10	36	78%	25

Table 5 – MRTD at site driveways (PM Peak-Hour)

INT	TS	Approach Volume	ConflVol (Left)	ConflVol (Right)	LT Out	RT Out	RT%	Minimum Required Throat Depth (MRTD)
2	1	175		266				125
5	1	195		222				150
7	0	102	38	23	102	0	0%	75
10	0	77	108	16	18	59	77%	25

The following is a summary of this evaluation:

- Intersection #2 (right-in/right-out), as currently proposed per **Exhibit 1**, has a throat depth of 140-feet, which is greater than the minimum required distance of 125-feet (PM peak-hour) that was calculated for the outbound right-turn. Based on the calculations the existing throat depth is sufficient under these conditions.
- Intersection #5 (right-in/right-out), as currently proposed per **Exhibit 1**, has a throat depth of 130-feet, which is less than the minimum required distance of 150 feet (PM peak-hour) that was calculated for the outbound right-turn. Based on the calculations the existing throat depth is insufficient under these conditions.
- Intersection #7 (full access), as currently proposed per **Exhibit 1**, has a throat depth of 35-feet, which is less than the minimum distance of 75 feet (PM peak-hour) that was calculated for the outbound right- and left-turns. Based on the calculations the existing throat depth is insufficient under these conditions.
- Intersection #10 (full access), as currently proposed per **Exhibit 1**, has a throat depth of 25-feet, which is equal to the minimum distance of 25-feet (PM peak-hour) that was calculated for the outbound right- and left-turns. Based on the calculations the existing throat depth is sufficient under these conditions.

All Way Stop Control (AWSC) Warrant Evaluation

According to Section 2B.07 of the *California Manual on Uniform Traffic Control Devices (CMUTCD)*, the total vehicle volumes entering the intersection along the main street approaches must average at least 300 vehicles over an eight-hour period to satisfy AWSC warrants. The volumes for Harvey Way at Oak Meadow Drive (Intersection # 8) and Harvey Way at Orchard View Drive (Intersection #9) are below this threshold for both the AM and PM peak-hours. Therefore, an AWSC warrant would not be satisfied at Intersections #8 and #9 under the Existing (2018) plus Proposed Project conditions.

Right- Turn Deceleration Lane

According to the City's guidelines[2], a right-turn deceleration lane is required when all four of the following conditions are satisfied:

A. The driveway is located on an arterial or expressway.
B. Right turn ingress volume is expected to exceed fifty (50) during peak hour flows on the roadway. For right turn ingress volumes between ten (10) and fifty (50) a right turn curb taper shall be constructed in conformance with the Standard Drawings.
C. There is ample room and frontage to fit a deceleration lane as determined by the City Engineer.
D. The travel speed of the roadway, as determined by the City Engineer, equals or exceeds 45 mph.

The requirements and conditions at the project driveways along Blue Oaks Boulevard (Intersection #2) and Fiddyment Road (Intersection #5) are summarized in **Table 6**.

Table 6 – Right Turn Deceleration Lanes

Project Driveway	Time Period	Located on Arterial or Expressway?	Right Turn Volume	Right Turn Volume over 50?	Ample Room and Frontage?	85th Percentile Travel Speed	Travel Speed ≥ 45 mph?	Deceleration Lane Appropriate?
Project Driveway #2	AM	Yes	156	Yes	Yes	51.9	Yes	Yes
	PM	Yes	233	Yes	Yes	51.9	Yes	Yes
Project Driveway #5	AM	Yes	81	Yes	Yes	52.3	Yes	Yes
	PM	Yes	121	Yes	Yes	52.3	Yes	Yes

Based on these guidelines, both driveways satisfy the need for a right turn deceleration lane. According to the Section 201 of the Highway Design Manual[3] and the posted speed limit of 45 mph, the required stopping sight distance is 360 feet. Therefore, a 360-foot right-turn deceleration lane would be appropriate for both Intersection #2 (westbound) and Intersection #5 (northbound). The distance between the project driveway along Blue Oaks Boulevard (Intersection #2) and the intersection of Blue Oaks Boulevard and Oak Meadow Drive (Intersection #3) is approximately 360 feet. The right-turn deceleration lane featured in the proposed project site plan should be lengthened to accommodate this stopping sight distance. There is approximately 320 feet available between project driveway along Fiddyment Road (Intersection #5) and the intersection of Blue Oaks Boulevard and Fiddyment (Intersection #1) to the south. Given the existing bus-only striping and the site frontage design as illustrated on the project site plan, there is adequate lateral space to include a right-turn deceleration lane before the driveway. However, there is not adequate space for the entire 360 feet in length to achieve a deceleration lane that meets calculated stopping sight distance.

Conclusions

The following are the primary conclusions based on the analyses discussed herein:

- The signalized intersections at Blue Oaks Boulevard at Fiddyment Road (Intersection #1) and Blue Oak Boulevard at Orchard View (Intersection #4) both operate at LOS C or better during the Existing (2018) plus Project conditions.
- The available storage capacity at the study intersections is sufficient to accommodate the 95-percentile queue lengths under Existing (2018) plus Project conditions, with the exception of the westbound left-turn movement at Blue Oaks Boulevard and Fiddyment Road (Intersection #1) and the westbound left-thru movement at Harvey Way and Fiddyment Road (Intersection #6) during the PM peak hour.

[2] *Section 5 Traffic Impact Studies, City of Roseville Design Standards*, January 2016.
[3] *Section 201, Highway Design Manual, Caltrans*, December 2015.

- The 95th percentile queue for the westbound left-turn at Blue Oaks Boulevard and Fiddyment Road (Intersection #1) is anticipated to exceed the available storage by approximately 3 vehicles. These vehicles are expected to be accommodated within the existing taper and not extend into the adjacent through lane. Additionally, this calculated queue length is conservative as it represents a condition where 95 percent of the time during the peak period, queues will be at or less than the value reported in Synchro. It is recommended that the City monitor queuing at this intersection approach during the peak hours and perform signal timing adjustments as needed.
- The 95th percentile queue for the westbound left-turn at Harvey Way and Fiddyment Road (Intersection #6) is anticipated to exceed the available storage by approximately 4 vehicles. This condition may restrict access for vehicles making a northbound left-turn out from the project driveway along Harvey Drive (Intersection #7) and potentially result in on-site queues at the project driveway which would block inbound vehicles from Harvey Drive. It is recommended that the western project driveway along Harvey Way (Intersection #7) be restricted to right-turn in/out movements with installation of a narrow-raised median along Harvey Way and the addition of appropriate signing and striping at the driveway approach. This driveway access restriction will extend the storage capacity of the westbound approach back to the easterly driveway along Harvey Way, resulting in sufficient storage capacity. Vehicles assumed to make a left-turn out of the western project driveway would be rerouted to the site driveways along Fiddyment Road (Intersection #5) and eastern project driveway along Harvey Road. The rerouted vehicles are anticipated to be adequately accommodated at these project driveways.

- The volumes at the intersections of Harvey Way at Oak Meadow Drive (Intersection # 8) and Harvey Way at Orchard View Drive (Intersection #9) do not satisfy AWSC warrants. The existing SSSC control at both intersections are appropriate under the Existing (2018) plus Project conditions.
- The site driveway along Fiddyment Road (Intersection #5) and western site driveway along Harvey Way (Intersection #7) have deficient Minimum Required Throat Depth (MRTD). At Intersection #5, the MRTD exceeds the available throat depth by one vehicle length. The MRTD should be provided by installing "KEEP CLEAR" signing and pavement marking within the driveway intersection with the upstream drive aisle to minimize the potential for driveway blockage. There is also a MRTD deficiency at the western project driveway along Harvey Way (Intersection #7). However, this deficiency will also be resolved by restricting driveway access to right-turn in/out movements. The outbound vehicles will be rerouted to the site driveways along Fiddyment Road (Intersection #5) and eastern project driveway along Harvey Road, as described above.
- Right-turn deceleration lanes are appropriate for the project driveways along Blue Oaks Boulevard (Intersection #2) and Fiddyment Road (Intersection #5). As shown on the proposed project site plan, the design accommodates a northbound right-turn deceleration lane along Fiddyment Road, however the available distance is less than the required stopping sight distance. The deceleration lane along westbound Blue Oaks Boulevard approaching Intersection #2 should be lengthened to 360 feet to adequately accommodate slowing vehicles entering the site.

Attachments:

Exhibit 1 – Project Site Plan
Exhibit 2 – Study Intersections
Exhibit 3 – Study Intersections, Traffic Control, and Lane Geometries
Exhibit 4 – Existing (2018) Peak-Hour Volumes
Exhibit 5 – Project Trip Distribution
Exhibit 6 – Project Only Volumes
Exhibit 7 – Existing (2018) plus Proposed Project Volumes

Attachment A – Traffic Count Data Sheets
Attachment B – Signalized Intersection Queuing and Operations Synchro Analysis Worksheets
Attachment C – Minimum Required Throat Depth (MRTD) Analysis Worksheet

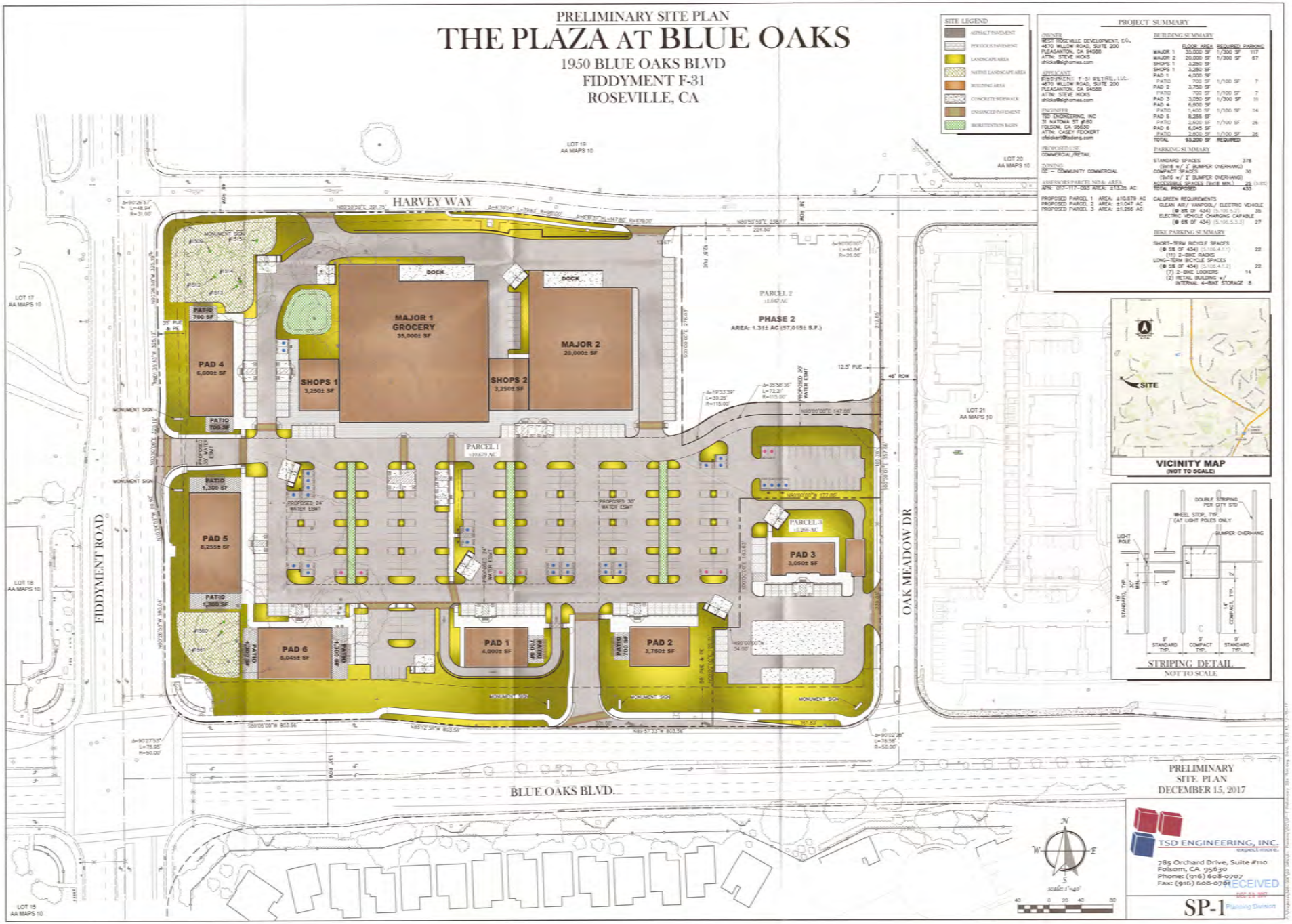


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Exhibit 1
Project Site Plan

The Plaza at Blue Oaks

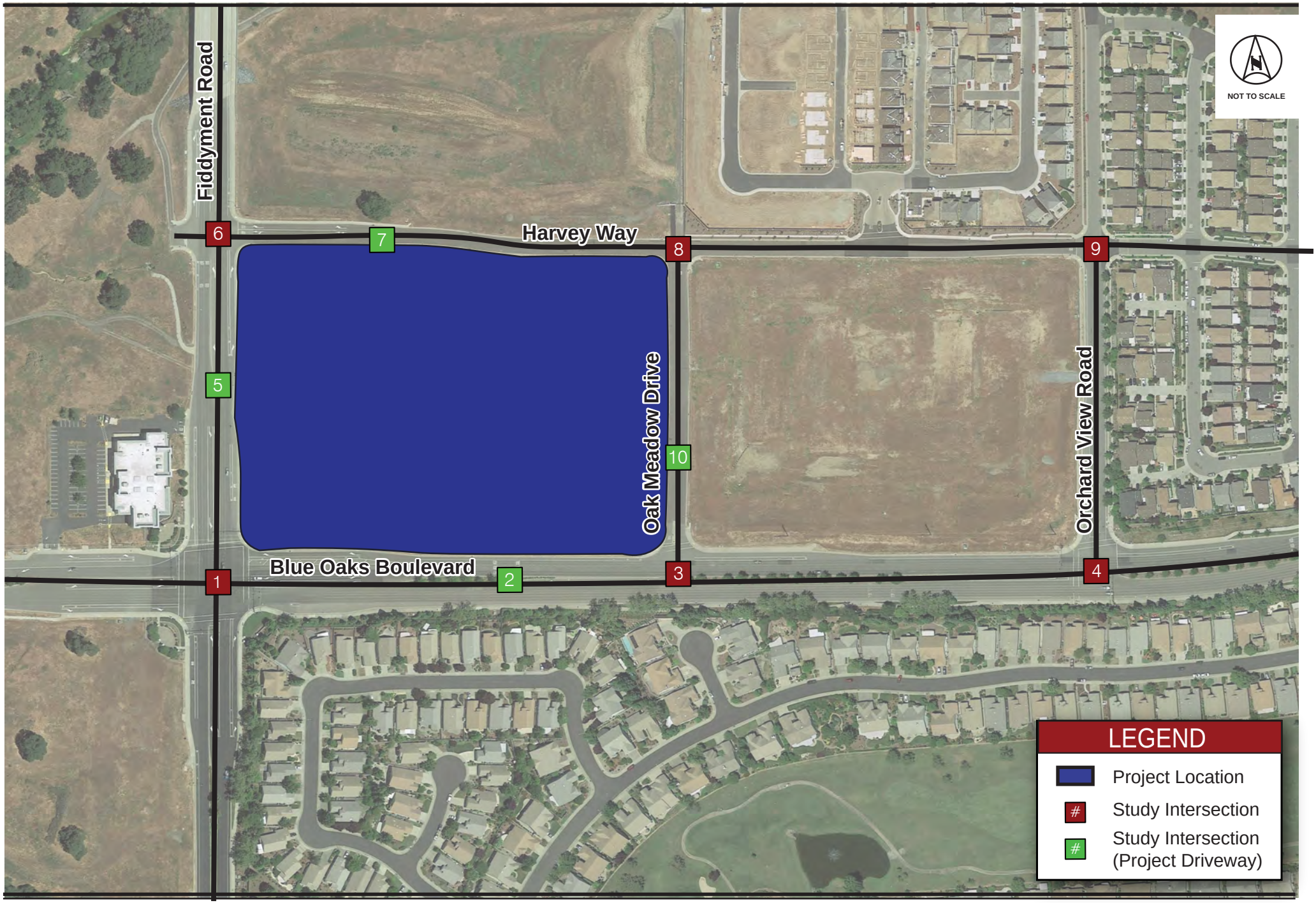

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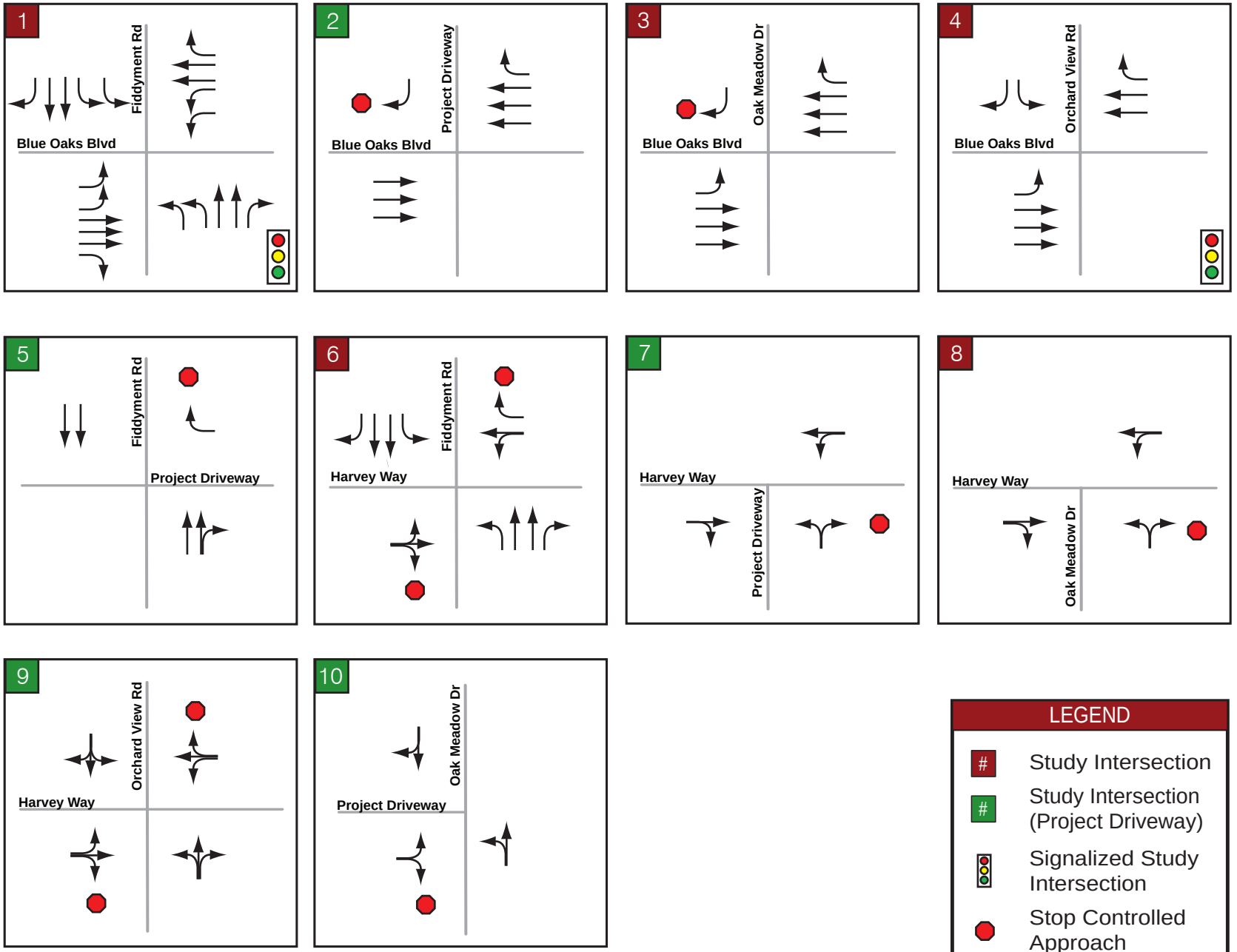
Exhibit 2
Study Intersections


1
Fiddyment Rd
Blue Oaks Blvd
2
Project Driveway
Blue Oaks Blvd
3
Oak Meadow Dr
Blue Oaks Blvd
4
Orchard View Rd
Blue Oaks Blvd
5
Fiddyment Rd
Project Driveway
6
Fiddyment Rd
Harvey Way
7
Harvey Way
Project Driveway
8
Harvey Way
Oak Meadow Dr
9
Orchard View Rd
Harvey Way
10
Oak Meadow Dr
Project Driveway
LEGEND
Study Intersection
Study Intersection (Project Driveway)
Signalized Study Intersection
Stop Controlled Approach

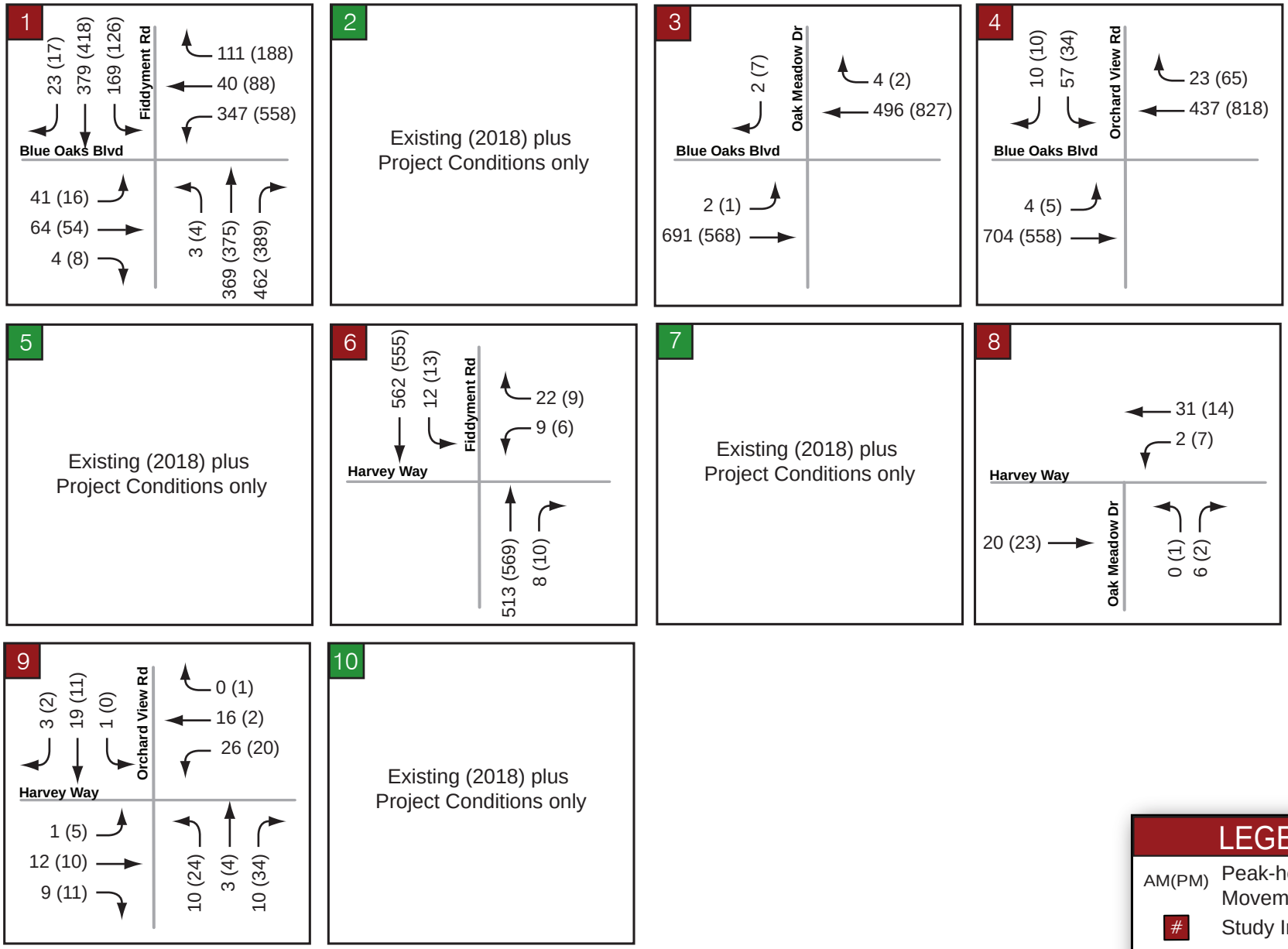


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Exhibit 4
Existing (2018) Peak-Hour Volumes

The Plaza at Blue Oaks

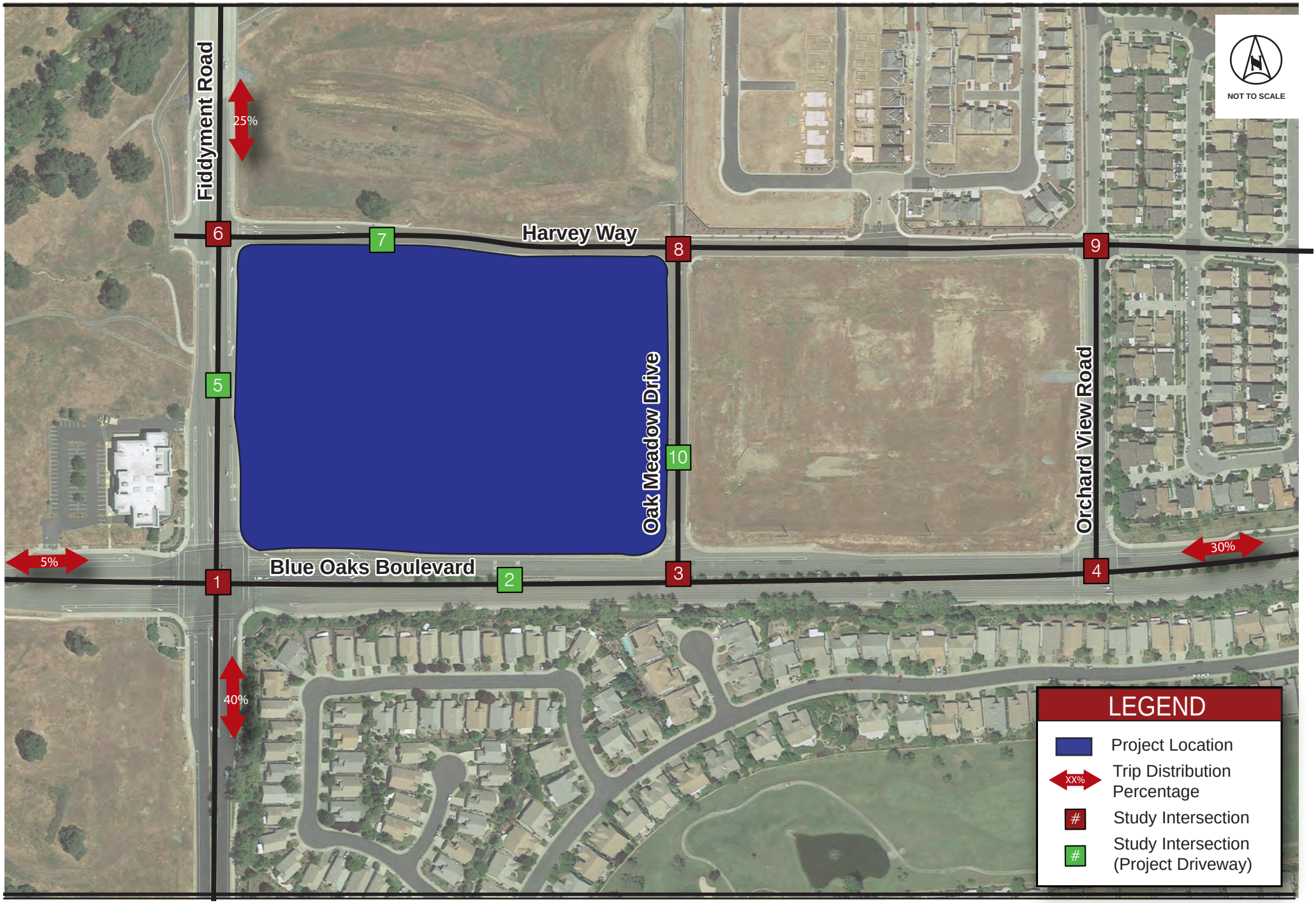

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Exhibit 5
Proposed Project Trip Distribution

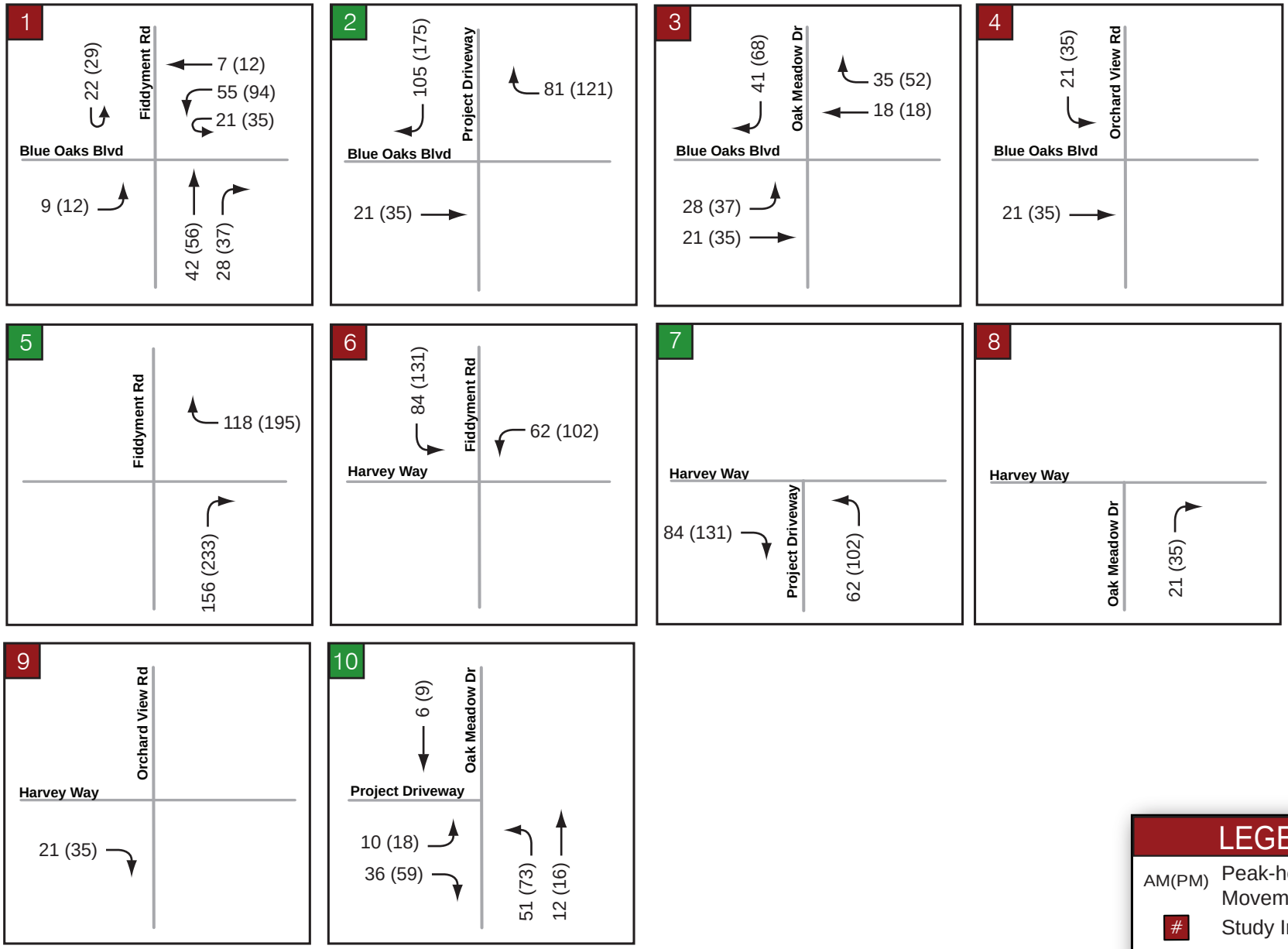

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Exhibit 6
Project Only Volumes

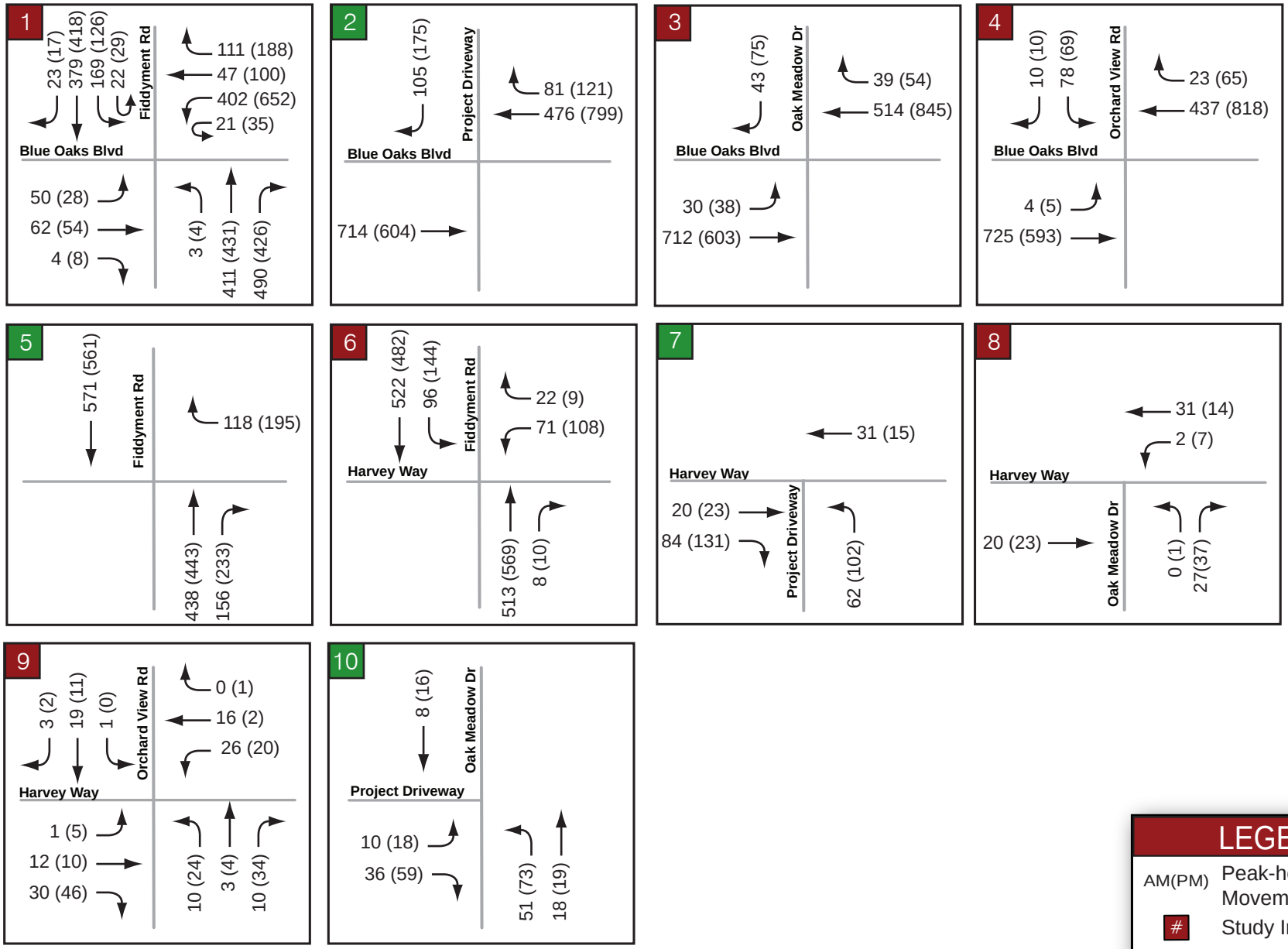

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Exhibit 7

Existing (2018) plus Proposed Project Volumes

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Attachment A

Traffic Count Data Sheets

Turning Movement Volume Report

Report Date: 3/15/2018 11:18:46 AM

From 3/6/2018 to 3/8/2018

Intersection: 154

	N				S				E				W				
Time	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Int Total
03/06/18 00:00-00:15				0	1		0	1	0	5		5		15	0	15	21
03/06/18 00:15-00:30				0	0		0	0	0	7		7		5	1	6	13
03/06/18 00:30-00:45				0	0		1	1	0	6		6		9	0	9	16
03/06/18 00:45-01:00				0	0		0	0	0	6		6		7	1	8	14
03/06/18 01:00-01:15				0	0		0	0	0	0		0		4	0	4	4
03/06/18 01:15-01:30				0	0		0	0	0	2		2		6	1	7	9
03/06/18 01:30-01:45				0	0		0	0	0	2		2		3	0	3	5
03/06/18 01:45-02:00				0	0		0	0	0	2		2		3	0	3	5
03/06/18 02:00-02:15				0	0		0	0	0	4		4		3	0	3	7
03/06/18 02:15-02:30				0	0		0	0	0	0		0		2	0	2	2
03/06/18 02:30-02:45				0	0		0	0	0	5		5		6	0	6	11
03/06/18 02:45-03:00				0	0		0	0	0	3		3		2	0	2	5
03/06/18 03:00-03:15				0	1		0	1	0	5		5		4	0	4	10
03/06/18 03:15-03:30				0	0		0	0	0	4		4		3	0	3	7
03/06/18 03:30-03:45				0	2		0	2	1	5		6		5	0	5	13
03/06/18 03:45-04:00				0	1		0	1	0	7		7		3	2	5	13
03/06/18 04:00-04:15				0	3		0	3	0	14		14		3	0	3	20
03/06/18 04:15-04:30				0	0		1	1	0	7		7		6	0	6	14
03/06/18 04:30-04:45				0	1		0	1	0	12		12		7	1	8	21
03/06/18 04:45-05:00				0	3		0	3	0	19		19		5	1	6	28
03/06/18 05:00-05:15				0	6		0	6	0	30		30		5	1	6	42
03/06/18 05:15-05:30				0	3		1	4	0	29		29		9	0	9	42
03/06/18 05:30-05:45				0	4		0	4	0	40		40		10	0	10	54
03/06/18 05:45-06:00				0	6		0	6	0	45		45		16	0	16	67
03/06/18 06:00-06:15				0	7		0	7	0	63		63		17	0	17	87
03/06/18 06:15-06:30				0	7		0	7	0	52		52		52	3	55	114
03/06/18 06:30-06:45				0	4		1	5	0	63		63		51	2	53	121
03/06/18 06:45-07:00				0	7		5	12	0	87		87		92	6	98	197
03/06/18 07:00-07:15				0	7		2	9	0	105		105		95	5	100	214
03/06/18 07:15-07:30				0	12		4	16	0	142		142		111	3	114	272
03/06/18 07:30-07:45				0	19		3	22	1	202		203		103	3	106	331
03/06/18 07:45-08:00				0	15		3	18	0	197		197		115	4	119	334
03/06/18 08:00-08:15				0	17		1	18	0	206		206		112	8	120	344
03/06/18 08:15-08:30				0	8		4	12	3	131		134		106	7	113	259
03/06/18 08:30-08:45				0	10		5	15	0	160		160		106	4	110	285
03/06/18 08:45-09:00				0	17		3	20	0	173		173		120	5	125	318
03/06/18 09:00-09:15				0	13		0	13	1	160		161		98	4	102	276
03/06/18 09:15-09:30				0	7		1	8	1	137		138		85	5	90	236
03/06/18 09:30-09:45				0	9		1	10	0	99		99		73	2	75	184
03/06/18 09:45-10:00				0	8		0	8	0	84		84		66	2	68	160
03/06/18 10:00-10:15				0	4		2	6	0	97		97		64	3	67	170
03/06/18 10:15-10:30				0	7		0	7	1	102		103		87	6	93	203
03/06/18 10:30-10:45				0	9		7	16	2	82		84		65	5	70	170
03/06/18 10:45-11:00				0	5		0	5	1	98		99		88	3	91	195
03/06/18 11:00-11:15				0	9		1	10	0	95		95		79	6	85	190
03/06/18 11:15-11:30				0	10		2	12	0	88		88		71	2	73	173
03/06/18 11:30-11:45				0	8		0	8	1	86		87		82	13	95	190
03/06/18 11:45-12:00				0	11		2	13	0	103		103		102	5	107	223
03/06/18 12:00-12:15				0	5		2	7	0	88		88		98	3	101	196
03/06/18 12:15-12:30				0	11		1	12	1	89		90		86	6	92	194
03/06/18 12:30-12:45				0	7		2	9	0	83		83		89	11	100	192
03/06/18 12:45-13:00				0	4		4	8	0	84		84		101	8	109	201
03/06/18 13:00-13:15				0	2		2	4	1	96		97		92	5	97	198

03/06/18 13:15-13:30				0	6		0	6	1	90		91		83	8	91	188
03/06/18 13:30-13:45				0	5		2	7	0	96		96		97	9	106	209
03/06/18 13:45-14:00				0	6		1	7	0	100		100		113	5	118	225
03/06/18 14:00-14:15				0	5		2	7	1	83		84		94	9	103	194
03/06/18 14:15-14:30				0	14		3	17	0	100		100		115	5	120	237
03/06/18 14:30-14:45				0	3		6	9	1	105		106		103	6	109	224
03/06/18 14:45-15:00				0	8		1	9	2	91		93		128	5	133	235
03/06/18 15:00-15:15				0	12		0	12	0	98		98		166	6	172	282
03/06/18 15:15-15:30				0	6		2	8	1	114		115		144	15	159	282
03/06/18 15:30-15:45				0	9		2	11	2	131		133		184	8	192	336
03/06/18 15:45-16:00				0	11		1	12	4	113		117		143	10	153	282
03/06/18 16:00-16:15				0	4		1	5	0	104		104		156	15	171	280
03/06/18 16:15-16:30				0	5		0	5	0	120		120		156	3	159	284
03/06/18 16:30-16:45				0	6		1	7	0	137		137		165	12	177	321
03/06/18 16:45-17:00				0	6		4	10	1	122		123		166	12	178	311
03/06/18 17:00-17:15				0	9		0	9	0	125		125		184	12	196	330
03/06/18 17:15-17:30				0	8		5	13	1	127		128		206	15	221	362
03/06/18 17:30-17:45				0	7		5	12	3	124		127		195	18	213	352
03/06/18 17:45-18:00				0	8		2	10	0	168		168		190	20	210	388
03/06/18 18:00-18:15				0	11		1	12	2	140		142		160	6	166	320
03/06/18 18:15-18:30				0	4		1	5	2	134		136		155	18	173	314
03/06/18 18:30-18:45				0	10		0	10	1	106		107		138	17	155	272
03/06/18 18:45-19:00				0	3		0	3	0	129		129		139	12	151	283
03/06/18 19:00-19:15				0	6		1	7	0	94		94		126	12	138	239
03/06/18 19:15-19:30				0	2		3	5	2	84		86		105	15	120	211
03/06/18 19:30-19:45				0	5		3	8	3	50		53		112	10	122	183
03/06/18 19:45-20:00				0	5		0	5	1	43		44		125	7	132	181
03/06/18 20:00-20:15				0	6		0	6	2	47		49		103	5	108	163
03/06/18 20:15-20:30				0	1		0	1	2	36		38		86	6	92	131
03/06/18 20:30-20:45				0	8		2	10	1	51		52		76	6	82	144
03/06/18 20:45-21:00				0	1		0	1	1	34		35		76	4	80	116
03/06/18 21:00-21:15				0	0		0	0	1	26		27		63	7	70	97
03/06/18 21:15-21:30				0	2		1	3	1	35		36		68	7	75	114
03/06/18 21:30-21:45				0	2		1	3	0	31		31		76	7	83	117
03/06/18 21:45-22:00				0	3		0	3	1	31		32		51	5	56	91
03/06/18 22:00-22:15				0	5		0	5	0	17		17		34	3	37	59
03/06/18 22:15-22:30				0	0		0	0	0	20		20		42	6	48	68
03/06/18 22:30-22:45				0	2		0	2	0	19		19		23	1	24	45
03/06/18 22:45-23:00				0	2		0	2	1	16		17		20	1	21	40
03/06/18 23:00-23:15				0	0		1	1	0	11		11		22	3	25	37
03/06/18 23:15-23:30				0	0		0	0	0	8		8		23	2	25	33
03/06/18 23:30-23:45				0	0		0	0	0	6		6		22	2	24	30
03/06/18 23:45-00:00				0	2		0	2	0	12		12		17	2	19	33
03/07/18 00:00-00:15				0	0		1	1	0	4		4		21	0	21	26
03/07/18 00:15-00:30				0	0		0	0	0	3		3		19	0	19	22
03/07/18 00:30-00:45				0	0		0	0	0	5		5		11	2	13	18
03/07/18 00:45-01:00				0	0		0	0	0	5		5		6	1	7	12
03/07/18 01:00-01:15				0	0		0	0	0	2		2		5	2	7	9
03/07/18 01:15-01:30				0	0		0	0	0	2		2		8	0	8	10
03/07/18 01:30-01:45				0	0		0	0	0	2		2		2	0	2	4
03/07/18 01:45-02:00				0	0		0	0	0	3		3		5	0	5	8
03/07/18 02:00-02:15				0	0		0	0	0	2		2		5	0	5	7
03/07/18 02:15-02:30				0	0		0	0	0	1		1		0	0	0	1
03/07/18 02:30-02:45				0	0		0	0	0	1		1		5	0	5	6
03/07/18 02:45-03:00				0	0		0	0	0	3		3		4	0	4	7
03/07/18 03:00-03:15				0	0		0	0	0	2		2		6	0	6	8
03/07/18 03:15-03:30				0	1		0	1	1	4		5		6	0	6	12
03/07/18 03:30-03:45				0	1		0	1	0	1		1		2	0	2	4
03/07/18 03:45-04:00				0	2		0	2	0	10		10		3	0	3	15
03/07/18 04:00-04:15				0	2		0	2	0	9		9		3	0	3	14

03/07/18 04:15-04:30				0	0		1	1	0	8		8		5	1	6	15
03/07/18 04:30-04:45				0	2		0	2	0	14		14		5	1	6	22
03/07/18 04:45-05:00				0	2		0	2	0	21		21		4	1	5	28
03/07/18 05:00-05:15				0	5		0	5	0	29		29		10	0	10	44
03/07/18 05:15-05:30				0	2		0	2	0	22		22		12	0	12	36
03/07/18 05:30-05:45				0	7		0	7	0	35		35		19	0	19	61
03/07/18 05:45-06:00				0	7		0	7	0	49		49		21	0	21	77
03/07/18 06:00-06:15				0	9		0	9	0	59		59		21	0	21	89
03/07/18 06:15-06:30				0	4		0	4	0	60		60		53	3	56	120
03/07/18 06:30-06:45				0	13		0	13	1	66		67		41	4	45	125
03/07/18 06:45-07:00				0	6		7	13	0	88		88		71	4	75	176
03/07/18 07:00-07:15				0	12		4	16	0	110		110		83	7	90	216
03/07/18 07:15-07:30				0	10		5	15	0	112		112		96	3	99	226
03/07/18 07:30-07:45				0	18		6	24	1	182		183		85	6	91	298
03/07/18 07:45-08:00				0	13		1	14	1	182		183		117	7	124	321
03/07/18 08:00-08:15				0	12		1	13	0	178		178		107	9	116	307
03/07/18 08:15-08:30				0	13		1	14	1	127		128		107	4	111	253
03/07/18 08:30-08:45				0	15		4	19	1	157		158		95	5	100	277
03/07/18 08:45-09:00				0	9		2	11	2	176		178		117	4	121	310
03/07/18 09:00-09:15				0	21		2	23	0	156		156		101	2	103	282
03/07/18 09:15-09:30				0	6		1	7	1	117		118		83	5	88	213
03/07/18 09:30-09:45				0	4		0	4	1	97		98		59	7	66	168
03/07/18 09:45-10:00				0	6		1	7	0	101		101		80	5	85	193
03/07/18 10:00-10:15				0	9		1	10	0	96		96		79	2	81	187
03/07/18 10:15-10:30				0	7		1	8	0	98		98		47	5	52	158
03/07/18 10:30-10:45				0	5		2	7	0	75		75		74	4	78	160
03/07/18 10:45-11:00				0	8		1	9	0	100		100		76	6	82	191
03/07/18 11:00-11:15				0	9		0	9	0	69		69		78	2	80	158
03/07/18 11:15-11:30				0	8		0	8	0	81		81		75	8	83	172
03/07/18 11:30-11:45				0	5		2	7	0	77		77		99	15	114	198
03/07/18 11:45-12:00				0	12		0	12	0	93		93		87	4	91	196
03/07/18 12:00-12:15				0	8		1	9	0	119		119		94	7	101	229
03/07/18 12:15-12:30				0	6		0	6	0	84		84		88	9	97	187
03/07/18 12:30-12:45				0	6		0	6	1	83		84		102	3	105	195
03/07/18 12:45-13:00				0	8		0	8	0	95		95		94	9	103	206
03/07/18 13:00-13:15				0	3		0	3	0	92		92		97	5	102	197
03/07/18 13:15-13:30				0	9		0	9	1	81		82		97	9	106	197
03/07/18 13:30-13:45				0	7		0	7	0	85		85		112	5	117	209
03/07/18 13:45-14:00				0	5		0	5	0	94		94		93	7	100	199
03/07/18 14:00-14:15				0	6		1	7	1	79		80		100	3	103	190
03/07/18 14:15-14:30				0	7		1	8	0	74		74		88	1	89	171
03/07/18 14:30-14:45				0	6		1	7	0	81		81		119	8	127	215
03/07/18 14:45-15:00				0	6		4	10	0	94		94		125	9	134	238
03/07/18 15:00-15:15				0	6		2	8	0	102		102		99	2	101	211
03/07/18 15:15-15:30				0	5		4	9	1	117		118		170	11	181	308
03/07/18 15:30-15:45				0	9		2	11	1	151		152		158	7	165	328
03/07/18 15:45-16:00				0	10		2	12	3	126		129		195	12	207	348
03/07/18 16:00-16:15				0	9		2	11	0	111		111		150	10	160	282
03/07/18 16:15-16:30				0	11		0	11	0	113		113		174	13	187	311
03/07/18 16:30-16:45				0	9		0	9	2	144		146		188	6	194	349
03/07/18 16:45-17:00				0	4		3	7	1	123		124		190	17	207	338
03/07/18 17:00-17:15				0	4		2	6	0	133		133		181	15	196	335
03/07/18 17:15-17:30				0	10		2	12	1	141		142		222	15	237	391
03/07/18 17:30-17:45				0	10		0	10	1	135		136		254	14	268	414
03/07/18 17:45-18:00				0	6		2	8	2	160		162		239	17	256	426
03/07/18 18:00-18:15				0	6		1	7	3	122		125		197	15	212	344
03/07/18 18:15-18:30				0	4		2	6	2	117		119		187	18	205	330
03/07/18 18:30-18:45				0	8		1	9	0	125		125		172	17	189	323
03/07/18 18:45-19:00				0	12		0	12	1	133		134		143	7	150	296
03/07/18 19:00-19:15				0	10		3	13	3	88		91		112	12	124	228

03/07/18 19:15-19:30				0	4		0	4	1	75		76		131	12	143	223	
03/07/18 19:30-19:45				0	3		0	3	1	57		58		97	10	107	168	
03/07/18 19:45-20:00				0	4		0	4	1	65		66		92	4	96	166	
03/07/18 20:00-20:15				0	3		2	5	1	49		50		90	18	108	163	
03/07/18 20:15-20:30				0	4		0	4	0	38		38		105	5	110	152	
03/07/18 20:30-20:45				0	2		1	3	0	36		36		70	9	79	118	
03/07/18 20:45-21:00				0	3		0	3	0	36		36		95	4	99	138	
03/07/18 21:00-21:15				0	3		0	3	0	31		31		74	7	81	115	
03/07/18 21:15-21:30				0	1		0	1	0	30		30		65	14	79	110	
03/07/18 21:30-21:45				0	2		0	2	1	29		30		77	7	84	116	
03/07/18 21:45-22:00				0	5		0	5	0	27		27		62	3	65	97	
03/07/18 22:00-22:15				0	6		1	7	0	29		29		56	2	58	94	
03/07/18 22:15-22:30				0	0		1	1	1	16		17		36	3	39	57	
03/07/18 22:30-22:45				0	0		0	0	0	26		26		23	2	25	51	
03/07/18 22:45-23:00				0	1		0	1	0	9		9		22	1	23	33	
03/07/18 23:00-23:15				0	1		0	1	0	16		16		19	0	19	36	
03/07/18 23:15-23:30				0	1		0	1	1	9		10		28	2	30	41	
03/07/18 23:30-23:45				0	0		0	0	0	10		10		25	3	28	38	
03/07/18 23:45-00:00				0	0		0	0	0	12		12		17	2	19	31	
03/08/18 00:00-00:15				0	1		0	1	1	10		11		9	2	11	23	
03/08/18 00:15-00:30				0	1		0	1	0	9		9		10	2	12	22	
03/08/18 00:30-00:45				0	1		0	1	0	4		4		8	2	10	15	
03/08/18 00:45-01:00				0	0		0	0	0	6		6		12	0	12	18	
03/08/18 01:00-01:15				0	0		0	0	0	7		7		8	1	9	16	
03/08/18 01:15-01:30				0	0		0	0	0	4		4		5	0	5	9	
03/08/18 01:30-01:45				0	0		0	0	0	3		3		3	1	4	7	
03/08/18 01:45-02:00				0	0		0	0	0	1		1		6	0	6	7	
03/08/18 02:00-02:15				0	0		0	0	0	0		0		1	0	1	1	
03/08/18 02:15-02:30				0	0		0	0	0	3		3		3	1	4	7	
03/08/18 02:30-02:45				0	0		0	0	0	0		0		4	1	5	5	
03/08/18 02:45-03:00				0	0		0	0	0	3		3		1	0	1	4	
03/08/18 03:00-03:15				0	0		0	0	0	3		3		3	0	3	6	
03/08/18 03:15-03:30				0	0		0	0	0	7		7		2	0	2	9	
03/08/18 03:30-03:45				0	1		1	2	1	7		8		4	0	4	14	
03/08/18 03:45-04:00				0	2		0	2	0	9		9		2	1	3	14	
03/08/18 04:00-04:15				0	2		0	2	0	10		10		3	0	3	15	
03/08/18 04:15-04:30				0	0		0	0	0	7		7		6	1	7	14	
03/08/18 04:30-04:45				0	2		0	2	0	8		8		7	0	7	17	
03/08/18 04:45-05:00				0	4		0	4	0	23		23		7	2	9	36	
03/08/18 05:00-05:15				0	0		0	0	0	35		35		8	0	8	43	
03/08/18 05:15-05:30				0	5		0	5	0	15		15		11	0	11	31	
03/08/18 05:30-05:45				0	4		0	4	0	37		37		14	0	14	55	
03/08/18 05:45-06:00				0	3		1	4	0	51		51		24	1	25	80	
03/08/18 06:00-06:15				0	4		1	5	0	65		65		26	1	27	97	
03/08/18 06:15-06:30				0	10		0	10	0	51		51		44	3	47	108	
03/08/18 06:30-06:45				0	5		0	5	0	65		65		43	5	48	118	
03/08/18 06:45-07:00				0	11		5	16	0	75		75		68	6	74	165	
03/08/18 07:00-07:15				0	11		6	17	0	109		109		86	5	91	217	
03/08/18 07:15-07:30				0	14		4	18	0	140		140		82	3	85	243	
03/08/18 07:30-07:45				0	13		3	16	1	193		194		111	4	115	325	
03/08/18 07:45-08:00				0	10		1	11	0	202		202		124	3	127	340	
03/08/18 08:00-08:15				0	16		2	18	0	192		192		124	3	127	337	
03/08/18 08:15-08:30				0	14		1	15	0	117		117		94	7	101	233	
03/08/18 08:30-08:45				0	13		2	15	2	172		174		107	6	113	302	
03/08/18 08:45-09:00				0	12		2	14	1	186		187		106	5	111	312	
03/08/18 09:00-09:15				0	11		1	12	1	186		187		84	2	86	285	
03/08/18 09:15-09:30				0	12		0	12	1	126		127		78	8	86	225	
03/08/18 09:30-09:45				0	10		0	10	1	110		111		80	2	82	203	
03/08/18 09:45-10:00				0	13		0	13	0	98		98		86	4	90	201	
03/08/18 10:00-10:15				0	7		0	7	0	92		92		75	8	83	182	

03/08/18 10:15-10:30				0	5		1	6	0	104		104		67	5	72	182
03/08/18 10:30-10:45				0	8		1	9	0	110		110		68	5	73	192
03/08/18 10:45-11:00				0	6		1	7	0	74		74		91	5	96	177
03/08/18 11:00-11:15				0	4		5	9	0	87		87		83	5	88	184
03/08/18 11:15-11:30				0	12		2	14	0	79		79		78	5	83	176
03/08/18 11:30-11:45				0	11		3	14	0	100		100		87	2	89	203
03/08/18 11:45-12:00				0	10		0	10	0	90		90		88	6	94	194
03/08/18 12:00-12:15				0	3		2	5	0	96		96		109	10	119	220
03/08/18 12:15-12:30				0	5		0	5	1	90		91		99	8	107	203
03/08/18 12:30-12:45				0	11		0	11	1	92		93		103	5	108	212
03/08/18 12:45-13:00				0	5		2	7	0	91		91		103	9	112	210
03/08/18 13:00-13:15				0	5		0	5	0	88		88		112	7	119	212
03/08/18 13:15-13:30				0	3		0	3	0	90		90		97	5	102	195
03/08/18 13:30-13:45				0	9		1	10	0	99		99		102	10	112	221
03/08/18 13:45-14:00				0	4		2	6	1	100		101		98	6	104	211
03/08/18 14:00-14:15				0	4		2	6	0	83		83		128	7	135	224
03/08/18 14:15-14:30				0	6		0	6	0	80		80		94	2	96	182
03/08/18 14:30-14:45				0	9		4	13	0	83		83		117	9	126	222
03/08/18 14:45-15:00				0	6		0	6	1	98		99		128	7	135	240
03/08/18 15:00-15:15				0	12		1	13	0	102		102		129	6	135	250
03/08/18 15:15-15:30				0	5		3	8	1	121		122		175	13	188	318
03/08/18 15:30-15:45				0	11		1	12	0	123		123		172	6	178	313
03/08/18 15:45-16:00				0	8		1	9	1	123		124		178	9	187	320
03/08/18 16:00-16:15				0	5		1	6	0	136		136		189	13	202	344
03/08/18 16:15-16:30				0	3		2	5	0	140		140		161	11	172	317
03/08/18 16:30-16:45				0	11		2	13	1	123		124		149	11	160	297
03/08/18 16:45-17:00				0	8		2	10	1	122		123		186	11	197	330
03/08/18 17:00-17:15				0	10		2	12	0	139		139		193	14	207	358
03/08/18 17:15-17:30				0	8		1	9	2	118		120		207	13	220	349
03/08/18 17:30-17:45				0	9		2	11	1	143		144		188	17	205	360
03/08/18 17:45-18:00				0	10		2	12	1	156		157		190	19	209	378
03/08/18 18:00-18:15				0	12		1	13	2	125		127		155	14	169	309
03/08/18 18:15-18:30				0	5		1	6	0	121		121		138	15	153	280
03/08/18 18:30-18:45				0	8		1	9	4	133		137		168	24	192	338
03/08/18 18:45-19:00				0	6		1	7	2	110		112		139	11	150	269
03/08/18 19:00-19:15				0	8		1	9	0	113		113		125	10	135	257
03/08/18 19:15-19:30				0	4		0	4	0	77		77		105	5	110	191
03/08/18 19:30-19:45				0	7		1	8	0	71		71		112	12	124	203
03/08/18 19:45-20:00				0	1		0	1	1	57		58		89	14	103	162
03/08/18 20:00-20:15				0	11		0	11	1	39		40		112	8	120	171
03/08/18 20:15-20:30				0	4		0	4	0	50		50		90	5	95	149
03/08/18 20:30-20:45				0	4		1	5	1	32		33		73	8	81	119
03/08/18 20:45-21:00				0	4		0	4	1	40		41		88	3	91	136
03/08/18 21:00-21:15				0	2		1	3	0	35		35		94	4	98	136
03/08/18 21:15-21:30				0	1		0	1	0	40		40		72	8	80	121
03/08/18 21:30-21:45				0	3		1	4	0	37		37		72	6	78	119
03/08/18 21:45-22:00				0	3		0	3	2	32		34		52	5	57	94
03/08/18 22:00-22:15				0	6		1	7	0	18		18		48	9	57	82
03/08/18 22:15-22:30				0	2		0	2	0	28		28		31	6	37	67
03/08/18 22:30-22:45				0	0		1	1	0	38		38		38	5	43	82
03/08/18 22:45-23:00				0	2		2	4	0	12		12		20	3	23	39
03/08/18 23:00-23:15				0	1		0	1	0	12		12		33	2	35	48
03/08/18 23:15-23:30				0	0		0	0	1	14		15		22	0	22	37
03/08/18 23:30-23:45				0	1		0	1	0	12		12		20	2	22	35
03/08/18 23:45-00:00				0	0		2	2	0	7		7		20	2	22	31
Summary	0	0	0	0	1559	0	289	1848	129	20509	0	20638	0	22303	1556	23859	46345

National Data & Surveying Services Intersection Turning Movement Count

Location: Oak Meadow Dr & Blue Oaks Blvd
City: Roseville
Control: 1-Way Stop(SB)

Project ID: 18-07057-001
Date: 2/27/2018

Total

NS/EW Streets:	Oak Meadow Dr				Oak Meadow Dr				Blue Oaks Blvd				Blue Oaks Blvd				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	1	3	0	0	0	4	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	1	56	0	0	0	52	0	0	109
6:15 AM	0	0	0	0	0	0	0	0	1	67	0	0	0	47	1	0	116
6:30 AM	0	0	0	0	0	0	0	0	1	89	0	0	0	68	2	0	160
6:45 AM	0	0	0	0	0	0	1	0	2	106	0	1	0	91	4	0	205
7:00 AM	0	0	0	0	0	0	1	0	0	153	0	0	0	109	0	0	263
7:15 AM	0	0	0	0	0	0	0	0	1	164	0	0	0	121	1	0	287
7:30 AM	0	0	0	0	0	0	1	0	0	186	0	0	0	132	1	0	320
7:45 AM	0	0	0	0	0	0	0	0	0	188	0	0	0	134	0	0	322
8:00 AM	0	0	0	0	0	0	0	0	2	131	0	0	0	116	1	0	250
8:15 AM	0	0	0	0	0	0	0	0	1	161	0	0	0	108	0	0	270
8:30 AM	0	0	0	0	0	0	1	0	2	192	0	0	0	110	1	0	306
8:45 AM	0	0	0	0	0	0	1	0	0	136	0	0	0	100	0	0	237
9:00 AM																	0
9:15 AM																	0
9:30 AM																	0
9:45 AM																	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	5	0	11	1629	0	1	0	1188	11	0	2845
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	0.67%	99.27%	0.00%	0.06%	0.00%	99.08%	0.92%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	2	0	1	691	0	0	0	496	2	0	1192
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.250	0.919	0.000	0.000	0.000	0.925	0.500	0.000	0.925
					0.500				0.920				0.929				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	1	3	0	0	0	4	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	2	0	0	146	0	0	0	135	1	0	284
4:15 PM	0	0	0	0	0	0	0	0	1	131	0	1	0	158	0	0	291
4:30 PM	0	0	0	0	0	0	1	0	1	130	0	0	0	153	1	0	286
4:45 PM	0	0	0	0	0	0	0	0	0	138	0	0	0	174	0	0	312
5:00 PM	0	0	0	0	0	0	0	0	0	120	0	0	0	189	0	0	309
5:15 PM	0	0	0	0	0	0	2	0	0	146	0	0	0	200	0	0	348
5:30 PM	0	0	0	0	0	0	5	0	1	147	0	0	0	213	2	0	368
5:45 PM	0	0	0	0	0	0	0	0	0	155	0	0	0	192	0	0	347
6:00 PM	0	0	0	0	0	0	0	0	0	97	0	0	0	160	0	0	257
6:15 PM	0	0	0	0	0	0	0	0	0	115	0	0	0	143	0	0	258
6:30 PM	0	0	0	0	0	0	1	0	0	123	0	0	0	152	0	0	276
6:45 PM	0	0	0	0	0	0	0	0	0	87	0	0	0	114	0	0	201
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	11	0	3	1535	0	1	0	1983	4	0	3537
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	0.19%	99.74%	0.00%	0.06%	0.00%	99.80%	0.20%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	7	0	1	568	0	0	0	794	2	0	1372
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.350	0.000	0.250	0.916	0.000	0.000	0.000	0.932	0.250	0.000	0.932
					0.350				0.918				0.926				

Turning Movement Volume Report

Report Date: 3/15/2018 11:14:25 AM

From 3/6/2018 to 3/8/2018

Intersection: 155

	N				S				E				W				
Time	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Int Total
03/06/18 00:00-00:15	0	13	2	15	3	11	0	14	0	0	0	0	6	2	7	15	44
03/06/18 00:15-00:30	0	3	4	7	3	16	1	20	0	0	0	0	2	1	2	5	32
03/06/18 00:30-00:45	0	6	5	11	0	23	0	23	0	1	0	1	6	3	1	10	45
03/06/18 00:45-01:00	0	8	5	13	0	10	0	10	2	1	0	3	3	3	1	7	33
03/06/18 01:00-01:15	0	4	0	4	0	11	0	11	0	0	0	0	4	0	0	4	19
03/06/18 01:15-01:30	0	6	1	7	2	17	0	19	0	0	0	0	3	0	3	6	32
03/06/18 01:30-01:45	0	9	1	10	0	7	0	7	0	0	0	0	2	0	1	3	20
03/06/18 01:45-02:00	0	6	2	8	0	13	0	13	0	0	0	0	2	1	0	3	24
03/06/18 02:00-02:15	0	2	2	4	1	9	0	10	0	0	0	0	2	1	0	3	17
03/06/18 02:15-02:30	0	1	0	1	0	9	0	9	0	0	0	0	1	0	0	1	11
03/06/18 02:30-02:45	0	7	4	11	0	14	0	14	0	1	0	1	4	2	1	7	33
03/06/18 02:45-03:00	0	4	2	6	1	11	0	12	0	0	0	0	2	0	0	2	20
03/06/18 03:00-03:15	0	2	5	7	0	6	0	6	0	0	0	0	3	0	1	4	17
03/06/18 03:15-03:30	0	6	5	11	0	4	0	4	0	0	0	0	3	0	0	3	18
03/06/18 03:30-03:45	0	2	4	6	0	5	0	5	0	1	0	1	2	0	1	3	15
03/06/18 03:45-04:00	0	3	6	9	1	7	1	9	0	0	0	0	3	0	0	3	21
03/06/18 04:00-04:15	0	8	9	17	1	7	0	8	0	4	0	4	2	0	2	4	33
03/06/18 04:15-04:30	0	4	5	9	2	9	0	11	0	1	0	1	6	0	0	6	27
03/06/18 04:30-04:45	0	7	10	17	1	11	0	12	0	1	0	1	6	0	2	8	38
03/06/18 04:45-05:00	0	7	12	19	2	5	0	7	0	5	0	5	5	0	0	5	36
03/06/18 05:00-05:15	0	9	17	26	9	12	0	21	0	3	0	3	4	0	1	5	55
03/06/18 05:15-05:30	0	18	16	34	15	16	0	31	1	3	0	4	7	1	2	10	79
03/06/18 05:30-05:45	0	22	16	38	16	19	1	36	0	4	0	4	9	0	1	10	88
03/06/18 05:45-06:00	0	33	27	60	12	28	0	40	1	6	0	7	13	1	2	16	123
03/06/18 06:00-06:15	0	39	42	81	11	36	0	47	2	11	1	14	15	0	2	17	159
03/06/18 06:15-06:30	0	33	35	68	12	38	0	50	0	5	0	5	38	5	6	49	172
03/06/18 06:30-06:45	0	53	41	94	20	53	0	73	0	8	0	8	40	3	7	50	225
03/06/18 06:45-07:00	1	72	64	137	14	85	3	102	5	9	2	16	74	1	22	97	352
03/06/18 07:00-07:15	0	87	76	163	23	83	0	106	3	15	1	19	56	7	27	90	378
03/06/18 07:15-07:30	0	79	95	174	34	108	0	142	1	14	0	15	73	2	35	110	441
03/06/18 07:30-07:45	1	93	150	244	34	103	5	142	4	19	0	23	87	4	17	108	517
03/06/18 07:45-08:00	1	96	128	225	44	101	2	147	7	23	0	30	91	10	20	121	523
03/06/18 08:00-08:15	0	81	151	232	40	75	2	117	2	13	1	16	79	10	28	117	482
03/06/18 08:15-08:30	0	93	92	185	32	78	5	115	8	12	0	20	74	10	26	110	430
03/06/18 08:30-08:45	0	112	110	222	29	100	1	130	12	27	0	39	74	7	24	105	496
03/06/18 08:45-09:00	2	83	102	187	60	112	17	189	18	13	1	32	94	9	29	132	540
03/06/18 09:00-09:15	0	77	121	198	35	81	13	129	7	13	0	20	75	13	15	103	450
03/06/18 09:15-09:30	1	70	77	148	41	52	2	95	2	12	0	14	47	8	31	86	343
03/06/18 09:30-09:45	0	61	65	126	31	49	0	80	1	8	0	9	48	6	24	78	293
03/06/18 09:45-10:00	0	54	59	113	23	63	0	86	1	6	0	7	40	2	25	67	273
03/06/18 10:00-10:15	0	53	60	113	29	34	0	63	0	7	0	7	39	9	21	69	252
03/06/18 10:15-10:30	1	55	53	109	44	42	0	86	3	6	0	9	57	9	26	92	296
03/06/18 10:30-10:45	0	37	53	90	22	54	0	76	1	9	0	10	43	4	25	72	248
03/06/18 10:45-11:00	0	58	51	109	39	43	1	83	1	10	0	11	48	9	24	81	284
03/06/18 11:00-11:15	0	46	49	95	32	69	4	105	2	13	0	15	49	4	35	88	303
03/06/18 11:15-11:30	0	45	55	100	35	41	5	81	1	2	0	3	41	4	27	72	256
03/06/18 11:30-11:45	2	60	47	109	29	41	0	70	2	10	1	13	41	8	30	79	271
03/06/18 11:45-12:00	1	57	58	116	34	39	2	75	2	12	0	14	55	7	45	107	312
03/06/18 12:00-12:15	3	57	47	107	31	50	4	85	1	9	0	10	59	14	27	100	302
03/06/18 12:15-12:30	0	50	53	103	36	51	2	89	0	7	0	7	46	10	32	88	287
03/06/18 12:30-12:45	1	54	39	94	30	38	4	72	3	16	1	20	49	6	39	94	280
03/06/18 12:45-13:00	0	62	59	121	19	58	2	79	5	7	0	12	58	12	32	102	314
03/06/18 13:00-13:15	3	61	59	123	32	59	0	91	2	9	0	11	51	14	29	94	319
03/06/18 13:15-13:30	0	56	56	112	25	42	5	72	1	9	0	10	53	13	24	90	284

03/06/18 13:30-13:45	2	60	57	119	34	51	1	86	3	13	0	16	54	12	31	97	318	
03/06/18 13:45-14:00	1	48	59	108	34	58	7	99	2	8	1	11	74	16	28	118	336	
03/06/18 14:00-14:15	0	44	55	99	26	65	1	92	2	3	0	5	59	11	27	97	293	
03/06/18 14:15-14:30	0	61	58	119	33	65	2	100	1	10	1	12	65	10	33	108	339	
03/06/18 14:30-14:45	1	46	63	110	22	67	2	91	3	19	0	22	71	13	36	120	343	
03/06/18 14:45-15:00	1	69	65	135	20	85	3	108	1	12	3	16	84	18	26	128	387	
03/06/18 15:00-15:15	0	70	66	136	20	80	1	101	5	17	2	24	98	21	53	172	433	
03/06/18 15:15-15:30	1	98	76	175	26	107	5	138	14	10	0	24	84	20	54	158	495	
03/06/18 15:30-15:45	0	108	94	202	30	144	22	196	11	9	0	20	107	22	42	171	589	
03/06/18 15:45-16:00	0	87	73	160	39	121	4	164	4	7	1	12	100	20	33	153	489	
03/06/18 16:00-16:15	0	83	69	152	21	98	5	124	2	16	0	18	99	21	42	162	456	
03/06/18 16:15-16:30	0	77	85	162	33	127	3	163	3	9	2	14	92	9	39	140	479	
03/06/18 16:30-16:45	1	92	98	191	28	83	2	113	6	8	1	15	122	22	38	182	501	
03/06/18 16:45-17:00	1	88	80	169	32	91	5	128	3	11	1	15	117	19	45	181	493	
03/06/18 17:00-17:15	0	88	83	171	34	86	1	121	3	13	2	18	113	28	48	189	499	
03/06/18 17:15-17:30	2	91	89	182	27	110	4	141	5	7	0	12	126	23	60	209	544	
03/06/18 17:30-17:45	0	79	101	180	18	102	2	122	2	8	2	12	133	21	47	201	515	
03/06/18 17:45-18:00	0	94	120	214	36	93	6	135	2	14	2	18	123	21	42	186	553	
03/06/18 18:00-18:15	1	93	96	190	30	71	3	104	1	14	0	15	104	25	34	163	472	
03/06/18 18:15-18:30	1	82	98	181	28	66	0	94	2	8	1	11	80	29	42	151	437	
03/06/18 18:30-18:45	0	91	77	168	21	69	1	91	0	7	0	7	90	18	49	157	423	
03/06/18 18:45-19:00	1	80	92	173	25	53	0	78	2	15	1	18	77	17	42	136	405	
03/06/18 19:00-19:15	2	65	53	120	23	42	0	65	2	14	2	18	75	17	37	129	332	
03/06/18 19:15-19:30	1	56	65	122	12	36	0	48	1	10	0	11	68	16	24	108	289	
03/06/18 19:30-19:45	0	57	39	96	9	23	1	33	1	4	1	6	77	14	26	117	252	
03/06/18 19:45-20:00	0	40	34	74	7	26	3	36	1	2	0	3	57	21	41	119	232	
03/06/18 20:00-20:15	2	29	34	65	14	36	1	51	0	5	0	5	55	19	33	107	228	
03/06/18 20:15-20:30	0	27	27	54	6	30	0	36	0	5	0	5	48	15	20	83	178	
03/06/18 20:30-20:45	0	46	36	82	11	24	1	36	0	4	0	4	52	12	22	86	208	
03/06/18 20:45-21:00	0	48	31	79	1	31	0	32	1	4	0	5	35	11	29	75	191	
03/06/18 21:00-21:15	0	25	19	44	4	27	2	33	1	1	0	2	41	8	14	63	142	
03/06/18 21:15-21:30	0	25	24	49	6	28	2	36	0	5	0	5	43	12	15	70	160	
03/06/18 21:30-21:45	0	28	21	49	7	32	0	39	0	4	0	4	51	11	15	77	169	
03/06/18 21:45-22:00	0	17	25	42	5	33	0	38	1	2	0	3	30	11	14	55	138	
03/06/18 22:00-22:15	1	22	15	38	1	21	0	22	2	2	0	4	22	6	5	33	97	
03/06/18 22:15-22:30	2	16	8	26	9	23	1	33	0	2	1	3	22	5	16	43	105	
03/06/18 22:30-22:45	0	18	15	33	4	17	0	21	1	1	0	2	11	6	7	24	80	
03/06/18 22:45-23:00	0	21	10	31	1	23	0	24	0	4	0	4	18	1	1	20	79	
03/06/18 23:00-23:15	0	23	9	32	1	18	0	19	0	1	0	1	14	4	5	23	75	
03/06/18 23:15-23:30	0	14	5	19	2	18	0	20	0	1	0	1	16	0	3	19	59	
03/06/18 23:30-23:45	0	10	5	15	1	13	0	14	0	1	0	1	19	5	2	26	56	
03/06/18 23:45-00:00	0	20	10	30	1	11	1	13	0	0	0	0	10	3	3	16	59	
03/07/18 00:00-00:15	0	10	3	13	1	18	0	19	1	1	0	2	12	0	10	22	56	
03/07/18 00:15-00:30	0	9	2	11	0	15	0	15	0	0	0	0	10	5	4	19	45	
03/07/18 00:30-00:45	0	7	3	10	2	32	0	34	0	1	0	1	5	3	4	12	57	
03/07/18 00:45-01:00	2	5	2	9	1	9	0	10	0	1	0	1	4	0	2	6	26	
03/07/18 01:00-01:15	0	5	1	6	1	12	1	14	0	0	0	0	1	1	2	4	24	
03/07/18 01:15-01:30	1	12	1	14	0	12	0	12	0	1	0	1	5	1	3	9	36	
03/07/18 01:30-01:45	0	3	0	3	2	7	0	9	0	0	0	0	1	0	1	2	14	
03/07/18 01:45-02:00	0	11	3	14	0	12	0	12	0	0	0	0	3	0	2	5	31	
03/07/18 02:00-02:15	0	2	1	3	0	10	0	10	0	2	0	2	3	0	2	5	20	
03/07/18 02:15-02:30	0	3	1	4	0	12	0	12	0	0	0	0	0	0	0	0	16	
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03/07/18 02:45-03:00	0	6	2	8	1	11	0	12	0	0	0	0	3	1	0	4	24	
03/07/18 03:00-03:15	0	3	4	7	0	12	0	12	0	0	0	0	5	0	2	7	26	
03/07/18 03:15-03:30	0	2	1	3	0	11	0	11	0	3	0	3	4	0	1	5	22	
03/07/18 03:30-03:45	0	2	2	4	0	8	0	8	0	0	0	0	3	0	0	3	15	
03/07/18 03:45-04:00	0	6	7	13	2	11	0	13	0	0	0	0	2	1	0	3	29	
03/07/18 04:00-04:15	0	5	4	9	2	7	0	9	0	3	0	3	3	0	0	3	24	
03/07/18 04:15-04:30	0	3	7	10	2	13	0	15	0	1	1	2	5	1	0	6	33	

03/07/18 04:30-04:45	0	9	11	20	2	8	0	10	0	1	0	1	5	0	0	5	36	
03/07/18 04:45-05:00	1	8	13	22	5	10	0	15	0	2	0	2	4	0	0	4	43	
03/07/18 05:00-05:15	0	13	17	30	10	17	0	27	0	3	0	3	8	0	2	10	70	
03/07/18 05:15-05:30	0	15	13	28	8	13	0	21	1	3	0	4	10	0	1	11	64	
03/07/18 05:30-05:45	0	26	20	46	12	17	1	30	1	4	0	5	14	1	4	19	100	
03/07/18 05:45-06:00	0	24	28	52	15	31	0	46	0	6	0	6	14	3	4	21	125	
03/07/18 06:00-06:15	0	30	38	68	15	32	0	47	1	7	0	8	16	2	2	20	143	
03/07/18 06:15-06:30	0	41	36	77	18	43	0	61	0	4	0	4	37	3	11	51	193	
03/07/18 06:30-06:45	0	54	45	99	17	59	0	76	0	9	0	9	28	4	10	42	226	
03/07/18 06:45-07:00	1	78	69	148	12	79	4	95	2	5	1	8	52	1	22	75	326	
03/07/18 07:00-07:15	0	90	79	169	25	102	1	128	2	7	0	9	65	2	19	86	392	
03/07/18 07:15-07:30	0	71	68	139	34	96	1	131	3	18	0	21	70	3	22	95	386	
03/07/18 07:30-07:45	0	86	139	225	35	85	3	123	4	17	0	21	66	1	24	91	460	
03/07/18 07:45-08:00	0	84	113	197	47	81	0	128	3	19	0	22	82	12	30	124	471	
03/07/18 08:00-08:15	0	88	130	218	37	78	2	117	4	15	0	19	75	7	19	101	455	
03/07/18 08:15-08:30	2	86	80	168	32	84	0	116	5	16	1	22	76	8	28	112	418	
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03/07/18 08:45-09:00	0	96	102	198	62	128	20	210	23	12	0	35	70	8	34	112	555	
03/07/18 09:00-09:15	3	69	99	171	46	83	14	143	8	11	1	20	74	7	23	104	438	
03/07/18 09:15-09:30	0	82	75	157	34	55	3	92	2	7	0	9	61	8	25	94	352	
03/07/18 09:30-09:45	0	54	62	116	25	42	2	69	0	17	0	17	38	3	22	63	265	
03/07/18 09:45-10:00	1	61	61	123	34	45	2	81	4	4	0	8	46	7	27	80	292	
03/07/18 10:00-10:15	0	44	56	100	33	48	0	81	2	9	1	12	51	10	25	86	279	
03/07/18 10:15-10:30	0	51	57	108	31	46	0	77	2	11	0	13	30	1	17	48	246	
03/07/18 10:30-10:45	1	51	50	102	21	45	5	71	2	7	0	9	55	3	16	74	256	
03/07/18 10:45-11:00	0	58	56	114	31	43	1	75	2	10	0	12	47	10	19	76	277	
03/07/18 11:00-11:15	1	49	41	91	23	44	1	68	3	4	0	7	41	4	38	83	249	
03/07/18 11:15-11:30	1	57	51	109	20	65	2	87	4	7	0	11	35	4	36	75	282	
03/07/18 11:30-11:45	1	62	44	107	30	46	3	79	2	8	0	10	50	14	37	101	297	
03/07/18 11:45-12:00	0	63	56	119	34	47	3	84	2	8	0	10	42	6	38	86	299	
03/07/18 12:00-12:15	2	62	62	126	46	51	3	100	5	7	0	12	45	14	38	97	335	
03/07/18 12:15-12:30	1	53	47	101	34	58	1	93	0	7	0	7	54	7	37	98	299	
03/07/18 12:30-12:45	2	63	56	121	21	57	1	79	1	6	2	9	57	11	36	104	313	
03/07/18 12:45-13:00	1	61	57	119	32	44	1	77	1	8	2	11	62	15	20	97	304	
03/07/18 13:00-13:15	2	60	56	118	28	44	2	74	2	11	0	13	66	8	23	97	302	
03/07/18 13:15-13:30	0	46	52	98	23	62	3	88	3	11	0	14	52	12	34	98	298	
03/07/18 13:30-13:45	1	54	44	99	26	62	4	92	3	15	0	18	73	9	31	113	322	
03/07/18 13:45-14:00	1	40	57	98	24	67	4	95	2	11	3	16	53	14	30	97	306	
03/07/18 14:00-14:15	0	45	50	95	24	79	1	104	4	6	1	11	60	7	31	98	308	
03/07/18 14:15-14:30	0	49	49	98	15	62	1	78	2	7	0	9	64	9	18	91	276	
03/07/18 14:30-14:45	0	54	49	103	24	79	1	104	0	12	0	12	66	15	40	121	340	
03/07/18 14:45-15:00	0	73	56	129	27	84	2	113	2	12	1	15	77	15	33	125	382	
03/07/18 15:00-15:15	0	89	70	159	23	84	3	110	5	11	0	16	57	12	38	107	392	
03/07/18 15:15-15:30	1	98	94	193	21	107	4	132	16	10	1	27	115	20	47	182	534	
03/07/18 15:30-15:45	5	116	85	206	48	168	36	252	11	12	0	23	97	16	45	158	639	
03/07/18 15:45-16:00	0	99	83	182	40	97	7	144	6	12	1	19	115	17	44	176	521	
03/07/18 16:00-16:15	1	93	63	157	35	123	3	161	1	12	0	13	112	24	38	174	505	
03/07/18 16:15-16:30	1	90	72	163	31	102	5	138	0	15	0	15	108	11	44	163	479	
03/07/18 16:30-16:45	0	104	92	196	30	117	4	151	1	18	2	21	122	26	58	206	574	
03/07/18 16:45-17:00	0	88	87	175	32	101	5	138	3	11	0	14	114	21	44	179	506	
03/07/18 17:00-17:15	1	80	91	172	28	109	3	140	4	12	2	18	139	18	46	203	533	
03/07/18 17:15-17:30	0	89	97	186	33	113	3	149	3	15	0	18	145	17	46	208	561	
03/07/18 17:30-17:45	2	112	94	208	29	138	3	170	3	9	2	14	201	24	43	268	660	
03/07/18 17:45-18:00	0	111	112	223	35	87	4	126	7	13	1	21	159	23	57	239	609	
03/07/18 18:00-18:15	0	69	87	156	34	81	2	117	3	7	1	11	142	19	43	204	488	
03/07/18 18:15-18:30	0	84	72	156	31	79	2	112	0	14	1	15	119	25	45	189	472	
03/07/18 18:30-18:45	1	87	86	174	25	79	1	105	2	13	0	15	104	19	54	177	471	
03/07/18 18:45-19:00	0	57	100	157	26	59	2	87	1	12	0	13	86	18	37	141	398	
03/07/18 19:00-19:15	1	55	68	124	13	37	2	52	1	7	2	10	68	22	30	120	306	
03/07/18 19:15-19:30	0	53	54	107	15	39	0	54	5	8	0	13	56	22	37	115	289	

03/07/18 19:30-19:45	0	28	36	64	13	26	5	44	0	4	0	4	61	17	27	105	217	
03/07/18 19:45-20:00	0	42	41	83	11	36	2	49	4	13	0	17	43	16	38	97	246	
03/07/18 20:00-20:15	0	45	36	81	9	40	1	50	1	5	0	6	51	16	23	90	227	
03/07/18 20:15-20:30	0	37	27	64	9	28	3	40	2	6	0	8	60	18	32	110	222	
03/07/18 20:30-20:45	0	26	23	49	5	26	2	33	0	8	0	8	51	8	12	71	161	
03/07/18 20:45-21:00	0	26	27	53	7	23	1	31	0	4	0	4	51	13	21	85	173	
03/07/18 21:00-21:15	0	31	21	52	6	21	2	29	0	3	0	3	48	16	20	84	168	
03/07/18 21:15-21:30	1	47	21	69	7	26	0	33	1	2	0	3	38	10	20	68	173	
03/07/18 21:30-21:45	0	25	23	48	6	25	2	33	1	1	1	3	43	14	17	74	158	
03/07/18 21:45-22:00	1	25	19	45	8	27	0	35	3	1	1	5	35	9	17	61	146	
03/07/18 22:00-22:15	1	21	20	42	2	28	1	31	0	5	1	6	25	9	20	54	133	
03/07/18 22:15-22:30	1	29	15	45	3	24	1	28	2	0	0	2	26	9	8	43	118	
03/07/18 22:30-22:45	0	15	15	30	7	21	0	28	0	5	0	5	16	2	5	23	86	
03/07/18 22:45-23:00	0	15	6	21	1	22	0	23	1	1	1	3	12	5	6	23	70	
03/07/18 23:00-23:15	2	15	12	29	1	15	0	16	0	3	0	3	12	1	6	19	67	
03/07/18 23:15-23:30	0	11	8	19	2	20	0	22	1	0	0	1	16	4	7	27	69	
03/07/18 23:30-23:45	0	10	9	19	0	11	0	11	0	1	0	1	16	1	7	24	55	
03/07/18 23:45-00:00	0	12	9	21	3	14	0	17	0	1	0	1	9	5	5	19	58	
03/08/18 00:00-00:15	0	14	8	22	0	15	0	15	0	1	0	1	6	0	3	9	47	
03/08/18 00:15-00:30	2	4	6	12	3	19	0	22	0	0	0	0	4	1	4	9	43	
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03/08/18 00:45-01:00	0	11	4	15	1	11	0	12	0	0	0	0	8	1	1	10	37	
03/08/18 01:00-01:15	0	6	4	10	3	14	0	17	0	1	0	1	8	1	2	11	39	
03/08/18 01:15-01:30	0	9	3	12	1	12	0	13	0	0	0	0	2	1	2	5	30	
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03/08/18 01:45-02:00	0	13	0	13	1	4	1	6	0	0	0	0	3	1	2	6	25	
03/08/18 02:00-02:15	0	4	0	4	0	6	0	6	0	0	0	0	1	0	0	1	11	
03/08/18 02:15-02:30	0	2	3	5	0	11	0	11	0	0	0	0	1	1	1	3	19	
03/08/18 02:30-02:45	0	4	0	4	0	12	0	12	0	0	0	0	3	1	0	4	20	
03/08/18 02:45-03:00	0	7	3	10	1	10	0	11	0	0	0	0	1	0	0	1	22	
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03/08/18 04:00-04:15	0	3	6	9	1	8	0	9	0	3	0	3	1	0	1	2	23	
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03/08/18 04:30-04:45	0	8	4	12	1	12	0	13	0	2	0	2	8	0	0	8	35	
03/08/18 04:45-05:00	0	7	17	24	3	10	0	13	0	4	0	4	6	1	0	7	48	
03/08/18 05:00-05:15	0	13	25	38	8	15	0	23	0	1	0	1	6	0	1	7	69	
03/08/18 05:15-05:30	0	12	8	20	6	16	0	22	1	0	0	1	11	1	0	12	55	
03/08/18 05:30-05:45	0	19	19	38	12	18	0	30	0	5	1	6	13	0	1	14	88	
03/08/18 05:45-06:00	0	33	35	68	15	29	1	45	0	5	0	5	17	3	5	25	143	
03/08/18 06:00-06:15	0	28	42	70	14	39	0	53	2	9	0	11	22	2	4	28	162	
03/08/18 06:15-06:30	0	43	31	74	13	41	0	54	0	6	0	6	29	3	9	41	175	
03/08/18 06:30-06:45	0	43	37	80	15	55	1	71	0	12	1	13	25	4	12	41	205	
03/08/18 06:45-07:00	2	65	56	123	21	88	1	110	2	4	1	7	50	5	18	73	313	
03/08/18 07:00-07:15	1	77	70	148	29	98	0	127	2	6	0	8	76	3	12	91	374	
03/08/18 07:15-07:30	0	95	92	187	39	97	1	137	0	14	1	15	61	1	22	84	423	
03/08/18 07:30-07:45	0	77	148	225	39	101	5	145	5	14	0	19	92	6	19	117	506	
03/08/18 07:45-08:00	1	100	124	225	42	88	2	132	7	36	0	43	87	6	27	120	520	
03/08/18 08:00-08:15	0	82	145	227	38	88	2	128	2	7	0	9	95	8	22	125	489	
03/08/18 08:15-08:30	0	87	80	167	26	88	1	115	4	12	1	17	67	7	22	96	395	
03/08/18 08:30-08:45	0	106	123	229	35	94	1	130	11	23	1	35	84	11	21	116	510	
03/08/18 08:45-09:00	1	91	109	201	64	117	17	198	21	12	0	33	79	8	23	110	542	
03/08/18 09:00-09:15	1	85	106	192	64	89	16	169	5	13	0	18	61	7	16	84	463	
03/08/18 09:15-09:30	0	64	79	143	34	32	3	69	4	18	0	22	49	6	20	75	309	
03/08/18 09:30-09:45	2	53	61	116	37	47	2	86	6	11	0	17	50	9	19	78	297	
03/08/18 09:45-10:00	0	52	62	114	28	47	0	75	6	6	2	14	56	8	30	94	297	
03/08/18 10:00-10:15	1	49	60	110	25	34	1	60	3	8	1	12	50	5	19	74	256	
03/08/18 10:15-10:30	1	51	69	121	27	38	3	68	3	9	1	13	41	10	14	65	267	

03/08/18 10:30-10:45	1	58	62	121	37	48	1	86	2	8	2	12	38	10	23	71	290
03/08/18 10:45-11:00	2	43	53	98	19	40	2	61	2	7	0	9	37	11	39	87	255
03/08/18 11:00-11:15	1	45	43	89	30	42	1	73	2	9	0	11	53	8	26	87	260
03/08/18 11:15-11:30	0	52	42	94	29	53	0	82	1	11	0	12	52	9	31	92	280
03/08/18 11:30-11:45	1	62	64	127	31	37	1	69	2	7	0	9	44	7	24	75	280
03/08/18 11:45-12:00	3	55	48	106	34	42	2	78	3	10	0	13	65	6	30	101	298
03/08/18 12:00-12:15	0	48	47	95	39	61	3	103	1	12	0	13	50	13	48	111	322
03/08/18 12:15-12:30	0	55	55	110	28	38	2	68	0	8	0	8	48	10	33	91	277
03/08/18 12:30-12:45	1	52	47	100	31	42	0	73	3	14	0	17	58	10	43	111	301
03/08/18 12:45-13:00	0	61	63	124	25	39	1	65	1	9	0	10	59	14	29	102	301
03/08/18 13:00-13:15	3	59	54	116	23	48	2	73	1	8	0	9	52	15	47	114	312
03/08/18 13:15-13:30	1	39	52	92	33	50	2	85	2	5	0	7	56	15	31	102	286
03/08/18 13:30-13:45	0	66	66	132	27	54	3	84	3	7	1	11	54	6	45	105	332
03/08/18 13:45-14:00	2	62	56	120	30	71	1	102	0	13	1	14	57	2	40	99	335
03/08/18 14:00-14:15	0	61	48	109	31	73	3	107	3	3	0	6	79	8	40	127	349
03/08/18 14:15-14:30	1	43	52	96	22	64	4	90	1	9	0	10	64	13	19	96	292
03/08/18 14:30-14:45	2	64	50	116	28	92	4	124	5	9	1	15	70	12	38	120	375
03/08/18 14:45-15:00	0	68	58	126	27	76	3	106	1	10	1	12	85	7	39	131	375
03/08/18 15:00-15:15	0	71	62	133	31	82	6	119	3	9	3	15	75	19	36	130	397
03/08/18 15:15-15:30	1	92	84	177	29	111	6	146	16	11	1	28	110	18	46	174	525
03/08/18 15:30-15:45	0	112	76	188	39	131	26	196	13	10	1	24	107	27	34	168	576
03/08/18 15:45-16:00	2	91	81	174	31	99	5	135	8	11	0	19	97	24	56	177	505
03/08/18 16:00-16:15	0	105	92	197	32	104	4	140	2	18	1	21	116	30	52	198	556
03/08/18 16:15-16:30	4	79	80	163	45	108	5	158	0	10	0	10	101	24	38	163	494
03/08/18 16:30-16:45	0	90	77	167	31	108	1	140	11	13	2	26	102	18	37	157	490
03/08/18 16:45-17:00	2	105	98	205	26	92	8	126	3	9	3	15	118	21	47	186	532
03/08/18 17:00-17:15	1	97	84	182	35	115	6	156	3	14	5	22	139	22	40	201	561
03/08/18 17:15-17:30	1	87	80	168	26	79	7	112	4	15	1	20	116	24	50	190	490
03/08/18 17:30-17:45	0	90	91	181	35	118	3	156	4	20	0	24	151	19	38	208	569
03/08/18 17:45-18:00	1	103	108	212	34	98	3	135	4	15	1	20	125	18	43	186	553
03/08/18 18:00-18:15	2	64	78	144	32	76	5	113	1	14	2	17	104	30	35	169	443
03/08/18 18:15-18:30	0	80	81	161	33	56	2	91	1	18	1	20	73	13	47	133	405
03/08/18 18:30-18:45	2	83	97	182	22	63	3	88	0	10	0	10	108	27	47	182	462
03/08/18 18:45-19:00	1	61	85	147	22	44	2	68	2	14	3	19	87	21	35	143	377
03/08/18 19:00-19:15	1	58	70	129	24	46	1	71	0	15	2	17	67	17	43	127	344
03/08/18 19:15-19:30	1	55	47	103	15	34	0	49	0	10	0	10	59	15	32	106	268
03/08/18 19:30-19:45	0	38	50	88	15	35	1	51	0	7	1	8	58	19	33	110	257
03/08/18 19:45-20:00	0	42	34	76	22	29	0	51	0	3	0	3	36	20	36	92	222
03/08/18 20:00-20:15	1	43	31	75	6	43	1	50	1	6	1	8	70	15	25	110	243
03/08/18 20:15-20:30	0	38	35	73	8	37	0	45	5	4	2	11	49	20	21	90	219
03/08/18 20:30-20:45	1	48	28	77	4	32	2	38	1	3	1	5	41	16	22	79	199
03/08/18 20:45-21:00	1	23	30	54	6	29	1	36	1	2	0	3	47	12	25	84	177
03/08/18 21:00-21:15	0	23	27	50	7	20	3	30	0	4	1	5	44	15	33	92	177
03/08/18 21:15-21:30	0	30	22	52	13	29	2	44	3	4	1	8	40	14	19	73	177
03/08/18 21:30-21:45	1	26	23	50	7	23	0	30	1	6	1	8	50	10	15	75	163
03/08/18 21:45-22:00	0	27	26	53	7	21	0	28	0	2	0	2	26	9	18	53	136
03/08/18 22:00-22:15	0	24	11	35	3	31	0	34	0	4	1	5	29	6	13	48	122
03/08/18 22:15-22:30	0	15	18	33	11	16	1	28	0	3	0	3	18	4	9	31	95
03/08/18 22:30-22:45	0	25	29	54	4	22	0	26	2	1	0	3	23	5	9	37	120
03/08/18 22:45-23:00	0	20	8	28	2	17	1	20	0	1	1	2	13	3	7	23	73
03/08/18 23:00-23:15	0	15	4	19	4	20	0	24	0	3	0	3	20	1	13	34	80
03/08/18 23:15-23:30	0	11	12	23	3	25	0	28	0	0	0	0	13	4	6	23	74
03/08/18 23:30-23:45	1	13	10	24	1	18	0	19	0	1	0	1	13	0	6	19	63
03/08/18 23:45-00:00	0	21	5	26	2	12	0	14	0	0	0	0	12	3	5	20	60
Summary	139	13404	13424	26967	5323	13922	576	19821	600	2035	115	2750	14104	2528	6131	22763	72301

National Data & Surveying Services Intersection Turning Movement Count

Location: Fiddyment Rd & Harvey Way
City: Roseville
Control: 1-Way Stop(WB)

Project ID: 18-07057-002
Date: 2/27/2018

Total

NS/EW Streets:	Fiddyment Rd				Fiddyment Rd				Harvey Way				Harvey Way				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	0	0	0	0	0.5	0.5	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	47	1	0	0	58	0	0	0	0	0	0	0	0	1	0	107
6:15 AM	0	62	0	0	1	66	0	0	0	0	0	0	2	0	0	0	131
6:30 AM	0	80	1	0	2	100	0	0	0	0	0	0	5	0	0	0	188
6:45 AM	0	131	3	0	2	103	0	0	0	0	0	0	0	0	1	0	240
7:00 AM	0	104	7	0	0	143	0	0	0	0	0	0	2	0	0	0	256
7:15 AM	0	99	1	0	0	136	0	1	0	0	0	0	2	0	2	0	241
7:30 AM	0	124	2	0	1	138	0	0	0	0	0	0	4	0	2	0	271
7:45 AM	0	109	2	0	1	110	0	0	0	0	0	0	1	0	4	0	227
8:00 AM	0	100	2	0	1	123	0	2	0	0	0	0	3	0	1	0	232
8:15 AM	0	122	1	0	1	105	0	0	0	0	0	0	2	0	5	0	236
8:30 AM	0	132	2	0	7	203	0	0	0	0	0	0	2	0	12	0	358
8:45 AM	0	90	2	0	3	120	0	0	0	0	0	0	2	0	2	0	219
9:00 AM																	0
9:15 AM																	0
9:30 AM																	0
9:45 AM																	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1200	24	0	19	1405	0	3	0	0	0	0	25	0	30	0	2706
APPROACH %'s :	0.00%	98.04%	1.96%	0.00%	1.33%	98.46%	0.00%	0.21%					45.45%	0.00%	54.55%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	463	7	0	10	541	0	2	0	0	0	0	8	0	22	0	1053
PEAK HR FACTOR :	0.000	0.877	0.875	0.000	0.357	0.666	0.000	0.250	0.000	0.000	0.000	0.000	0.667	0.000	0.458	0.000	0.735
		0.877				0.658								0.536			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	0	0	0	0	0.5	0.5	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	132	0	0	0	142	0	0	0	0	0	0	0	0	0	0	274
4:15 PM	0	128	0	0	1	131	0	0	0	0	0	0	2	0	5	0	267
4:30 PM	0	113	0	0	1	142	0	0	0	0	0	0	2	0	2	0	260
4:45 PM	0	126	0	0	7	124	0	0	0	0	0	0	0	0	1	0	258
5:00 PM	0	152	2	0	3	123	0	0	0	0	0	0	1	0	3	0	284
5:15 PM	0	169	7	0	0	147	0	0	0	0	0	0	3	0	3	0	329
5:30 PM	0	124	1	0	2	125	0	0	0	0	0	0	0	0	3	0	255
5:45 PM	0	132	7	1	2	120	0	0	0	0	0	0	1	0	0	0	263
6:00 PM	0	127	1	0	2	102	0	0	0	0	0	0	1	0	1	0	234
6:15 PM	0	109	4	0	0	85	0	1	0	0	0	0	0	0	1	0	200
6:30 PM	0	106	2	0	2	82	0	0	0	0	0	0	0	0	0	0	192
6:45 PM	0	76	1	0	1	69	0	0	0	0	0	0	0	0	0	0	147
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1494	25	1	21	1392	0	1	0	0	0	0	10	0	19	0	2963
APPROACH %'s :	0.00%	98.29%	1.64%	0.07%	1.49%	98.44%	0.00%	0.07%					34.48%	0.00%	65.52%	0.00%	
PEAK HR :	04:30 PM - 05:30 PM																TOTAL
PEAK HR VOL :	0	560	9	0	11	536	0	0	0	0	0	0	6	0	9	0	1131
PEAK HR FACTOR :	0.000	0.828	0.321	0.000	0.393	0.912	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.750	0.000	0.859
		0.808				0.930								0.625			

National Data & Surveying Services Intersection Turning Movement Count

Location: Oak Meadow Dr & Harvey Way
City: Roseville
Control: 1-Way Stop(NB)

Project ID: 18-07057-003
Date: 2/27/2018

Total

NS/EW Streets:	Oak Meadow Dr				Oak Meadow Dr				Harvey Way				Harvey Way				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
6:15 AM	0	0	0	1	0	0	0	0	0	1	0	0	0	3	0	0	5
6:30 AM	0	0	0	1	0	0	0	0	0	2	1	0	1	4	0	0	9
6:45 AM	0	0	1	0	0	0	0	0	0	5	0	0	1	1	0	0	8
7:00 AM	0	0	1	0	0	0	0	0	0	5	1	0	2	2	0	0	11
7:15 AM	0	0	3	0	0	0	0	0	0	2	0	0	2	4	0	0	11
7:30 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	6	0	0	9
7:45 AM	0	0	0	0	0	0	0	0	0	2	0	1	0	4	0	0	7
8:00 AM	0	0	1	0	0	0	0	0	0	3	0	0	0	4	0	0	8
8:15 AM	0	0	1	0	0	0	0	0	0	2	0	0	0	8	0	0	11
8:30 AM	0	0	3	0	0	0	0	0	0	9	0	0	1	14	0	0	27
8:45 AM	0	0	1	0	0	0	0	0	0	5	0	0	1	3	0	0	10
9:00 AM																	0
9:15 AM																	0
9:30 AM																	0
9:45 AM																	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	11	2	0	0	0	0	0	40	2	1	8	54	0	0	118
APPROACH %'s :	0.00%	0.00%	84.62%	15.38%					0.00%	93.02%	4.65%	2.33%	12.90%	87.10%	0.00%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	0	0	6	0	0	0	0	0	0	19	0	0	2	29	0	0	56
PEAK HR FACTOR :	0.000	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.528	0.000	0.000	0.500	0.518	0.000	0.000	0.519
	0.500								0.528				0.517				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	3
4:15 PM	0	0	1	0	0	0	0	0	0	3	0	0	0	7	0	0	11
4:30 PM	0	0	2	0	0	0	0	0	0	3	0	0	0	4	0	0	9
4:45 PM	0	0	0	0	0	0	0	0	0	8	0	0	0	1	0	0	9
5:00 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	4	0	1	10
5:15 PM	0	0	0	0	0	0	0	0	0	5	0	0	3	4	0	0	12
5:30 PM	1	0	2	0	0	0	0	0	0	5	0	0	0	3	0	0	11
5:45 PM	0	0	0	0	0	0	0	0	0	6	0	0	0	2	0	0	8
6:00 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	2	0	0	6
6:15 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	4
6:30 PM	0	0	0	0	0	0	0	0	0	5	0	0	1	0	0	0	6
6:45 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	0	6	0	0	0	0	0	0	50	0	0	5	28	0	1	91
APPROACH %'s :	14.29%	0.00%	85.71%	0.00%					0.00%	100.00%	0.00%	0.00%	14.71%	82.35%	0.00%	2.94%	
PEAK HR :	04:45 PM - 05:45 PM																TOTAL
PEAK HR VOL :	1	0	2	0	0	0	0	0	0	23	0	0	3	12	0	1	42
PEAK HR FACTOR :	0.250	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.719	0.000	0.000	0.250	0.750	0.000	0.250	0.875
	0.250								0.719				0.571				

National Data & Surveying Services Intersection Turning Movement Count

Location: Orchard View Rd & Harvey Way
City: Roseville
Control: 2-Way Stop(EB/WB)

Project ID: 18-07057-004
Date: 2/27/2018

Total

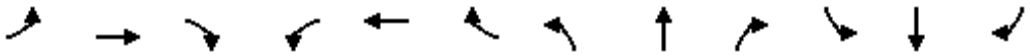
NS/EW Streets:	Orchard View Rd				Orchard View Rd				Harvey Way				Harvey Way				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	1	0	0	2	0	0	0	0	0	0	5	1	0	0	9
6:15 AM	1	0	2	0	0	1	0	0	0	0	1	0	5	2	0	0	12
6:30 AM	2	1	1	0	0	1	0	0	0	0	2	0	5	1	0	0	13
6:45 AM	6	0	3	0	0	3	0	0	0	0	2	0	8	0	0	0	22
7:00 AM	3	0	2	0	0	3	0	0	0	0	1	0	8	0	0	0	17
7:15 AM	3	1	1	0	0	7	1	0	0	0	7	0	14	2	0	0	36
7:30 AM	0	0	0	0	0	2	0	0	0	1	1	0	10	3	0	0	17
7:45 AM	2	0	5	0	0	6	0	0	0	0	2	0	9	2	0	0	26
8:00 AM	2	0	4	0	0	3	0	0	0	0	1	0	7	1	0	0	18
8:15 AM	2	2	3	0	0	5	3	1	0	1	2	0	6	4	0	0	29
8:30 AM	3	1	1	0	0	6	0	0	0	6	5	0	4	10	0	0	36
8:45 AM	3	0	2	0	0	5	0	0	1	5	1	0	9	1	0	0	27
9:00 AM																	0
9:15 AM																	0
9:30 AM																	0
9:45 AM																	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	27	5	25	0	0	44	4	1	1	13	25	0	90	27	0	0	262
APPROACH %'s :	47.37%	8.77%	43.86%	0.00%	0.00%	89.80%	8.16%	2.04%	2.56%	33.33%	64.10%	0.00%	76.92%	23.08%	0.00%	0.00%	
PEAK HR :	08:00 AM - 09:00 AM																TOTAL
PEAK HR VOL :	10	3	10	0	0	19	3	1	1	12	9	0	26	16	0	0	110
PEAK HR FACTOR :	0.833	0.375	0.625	0.000	0.000	0.792	0.250	0.250	0.250	0.500	0.450	0.000	0.722	0.400	0.000	0.000	0.764
	0.821				0.639				0.500				0.750				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	5	2	3	0	0	0	0	0	1	0	5	0	4	0	0	0	20
4:15 PM	6	1	7	0	0	3	0	0	0	0	1	0	2	3	0	0	23
4:30 PM	1	1	11	0	0	2	0	0	0	0	3	0	7	4	0	0	29
4:45 PM	5	2	10	0	0	0	0	0	0	9	0	0	6	0	0	0	32
5:00 PM	4	1	7	0	0	3	0	0	0	2	3	0	4	2	1	0	27
5:15 PM	8	0	5	0	0	4	1	0	1	3	4	0	4	0	0	0	30
5:30 PM	5	1	11	0	0	4	1	0	2	3	2	1	3	0	0	0	33
5:45 PM	7	2	11	0	0	0	0	0	2	2	2	0	9	0	0	0	35
6:00 PM	3	1	10	0	0	1	0	0	0	2	3	0	4	1	0	0	25
6:15 PM	6	3	11	0	1	1	0	0	1	1	2	0	3	0	0	0	29
6:30 PM	6	1	7	0	0	2	0	0	0	4	2	0	4	0	0	0	26
6:45 PM	1	1	5	0	0	2	0	0	0	1	2	0	11	1	0	0	24
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	57	16	98	0	1	22	2	0	7	27	29	1	61	11	1	0	333
APPROACH %'s :	33.33%	9.36%	57.31%	0.00%	4.00%	88.00%	8.00%	0.00%	10.94%	42.19%	45.31%	1.56%	83.56%	15.07%	1.37%	0.00%	
PEAK HR :	05:00 PM - 06:00 PM																TOTAL
PEAK HR VOL :	24	4	34	0	0	11	2	0	5	10	11	1	20	2	1	0	125
PEAK HR FACTOR :	0.750	0.500	0.773	0.000	0.000	0.688	0.500	0.000	0.625	0.833	0.688	0.250	0.556	0.250	0.250	0.000	0.893
	0.775				0.650				0.844				0.639				

Kimley»Horn

Attachment B

Signalized Intersection Queuing and
Operations Synchro Analysis Worksheets



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	55	83	5	365	42	117	3	405	508	238	534	32
v/c Ratio	0.10	0.14	0.01	0.58	0.07	0.27	0.01	0.39	0.62	0.44	0.32	0.04
Control Delay	27.5	33.5	0.0	32.1	32.5	1.5	30.3	22.0	6.0	32.8	15.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.5	33.5	0.0	32.1	32.5	1.5	30.3	22.0	6.0	32.8	15.7	0.1
Queue Length 50th (ft)	10	12	0	74	8	0	0	73	0	49	68	0
Queue Length 95th (ft)	24	26	0	142	27	1	4	132	69	78	137	0
Internal Link Dist (ft)		462			385			709			365	
Turn Bay Length (ft)	235		235	235			245		245	245		245
Base Capacity (vph)	1555	1567	627	1640	1199	672	1058	1799	1054	1058	1856	911
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.05	0.01	0.22	0.04	0.17	0.00	0.23	0.48	0.22	0.29	0.04

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	62	4	347	40	111	3	369	462	169	379	23
Future Volume (veh/h)	41	62	4	347	40	111	3	369	462	169	379	23
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	55	83	5	365	42	117	3	405	508	238	534	32
Adj No. of Lanes	2	3	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.75	0.75	0.75	0.95	0.95	0.95	0.91	0.91	0.91	0.71	0.71	0.71
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	313	400	125	490	365	163	852	1366	611	412	818	366
Arrive On Green	0.09	0.08	0.08	0.14	0.10	0.10	0.25	0.39	0.39	0.12	0.23	0.23
Sat Flow, veh/h	3442	5085	1583	3442	3539	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	55	83	5	365	42	117	3	405	508	238	534	32
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	1.1	1.1	0.1	7.6	0.8	3.8	0.0	5.9	21.7	4.9	10.2	1.2
Cycle Q Clear(g_c), s	1.1	1.1	0.1	7.6	0.8	3.8	0.0	5.9	21.7	4.9	10.2	1.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	313	400	125	490	365	163	852	1366	611	412	818	366
V/C Ratio(X)	0.18	0.21	0.04	0.74	0.11	0.72	0.00	0.30	0.83	0.58	0.65	0.09
Avail Cap(c_a), veh/h	922	1363	424	1429	1043	467	922	1565	700	922	1565	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.3	32.2	9.6	30.7	30.4	16.7	21.1	15.9	20.7	31.1	26.0	22.5
Incr Delay (d2), s/veh	0.1	0.3	0.2	0.9	0.2	8.3	0.0	0.2	8.9	0.5	1.7	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.5	0.1	3.7	0.4	2.5	0.0	2.9	10.9	2.3	5.2	0.5
LnGrp Delay(d),s/veh	31.4	32.5	9.8	31.6	30.6	25.0	21.1	16.1	29.6	31.5	27.7	22.7
LnGrp LOS	C	C	A	C	C	C	C	B	C	C	C	C
Approach Vol, veh/h		143			524			916			804	
Approach Delay, s/veh		31.3			30.0			23.6			28.6	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.9	34.8	14.6	12.3	24.5	23.3	13.2	13.7
Change Period (Y+Rc), s	4.0	6.0	4.0	6.4	6.0	* 6	6.4	* 6
Max Green Setting (Gmax), s	20.0	33.0	31.0	20.0	20.0	* 33	20.0	* 22
Max Q Clear Time (g_c+I1), s	6.9	23.7	9.6	3.1	2.0	12.2	3.1	5.8
Green Ext Time (p_c), s	0.5	5.2	1.0	0.5	8.0	5.1	0.5	0.8

Intersection Summary	
HCM 2010 Ctrl Delay	27.2
HCM 2010 LOS	C

Notes

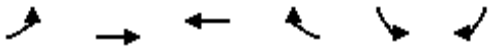
Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	691	496	4	0	2
Future Vol, veh/h	2	691	496	4	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	265	-	-	240	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	93	93	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	751	533	4	0	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	533	0	-	0	838	267
Stage 1	-	-	-	-	533	-
Stage 2	-	-	-	-	305	-
Critical Hdwy	5.34	-	-	-	5.74	7.14
Critical Hdwy Stg 1	-	-	-	-	6.64	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	3.12	-	-	-	3.82	3.92
Pot Cap-1 Maneuver	653	-	-	-	374	623
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	661	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	653	-	-	-	373	623
Mov Cap-2 Maneuver	-	-	-	-	373	-
Stage 1	-	-	-	-	462	-
Stage 2	-	-	-	-	659	-

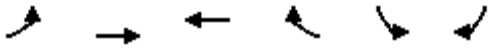
Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	653	-	-	-	623
HCM Lane V/C Ratio	0.003	-	-	-	0.005
HCM Control Delay (s)	10.5	-	-	-	10.8
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	4	774	470	25	71	13
v/c Ratio	0.01	0.20	0.13	0.02	0.15	0.03
Control Delay	14.2	2.8	4.6	3.7	13.9	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.2	2.8	4.6	3.7	13.9	7.8
Queue Length 50th (ft)	1	23	13	0	16	0
Queue Length 95th (ft)	7	34	44	10	33	8
Internal Link Dist (ft)		333	430		493	
Turn Bay Length (ft)	230			245		240
Base Capacity (vph)	993	5085	5085	1583	993	894
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.15	0.09	0.02	0.07	0.01

Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	704	437	23	57	10
Future Volume (veh/h)	4	704	437	23	57	10
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	4	774	470	25	71	12
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.91	0.91	0.93	0.93	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	64	3358	2745	855	302	269
Arrive On Green	0.04	0.66	0.54	0.54	0.17	0.17
Sat Flow, veh/h	1774	5253	5253	1583	1774	1583
Grp Volume(v), veh/h	4	774	470	25	71	12
Grp Sat Flow(s),veh/h/ln	1774	1695	1695	1583	1774	1583
Q Serve(g_s), s	0.1	2.2	1.7	0.3	1.2	0.2
Cycle Q Clear(g_c), s	0.1	2.2	1.7	0.3	1.2	0.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	64	3358	2745	855	302	269
V/C Ratio(X)	0.06	0.23	0.17	0.03	0.24	0.04
Avail Cap(c_a), veh/h	1053	6896	6896	2147	1053	939
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.5	2.4	4.1	3.8	12.7	12.3
Incr Delay (d2), s/veh	0.2	0.1	0.0	0.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.0	0.8	0.1	0.6	0.2
LnGrp Delay(d),s/veh	16.6	2.5	4.2	3.8	12.8	12.3
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		778	495		83	
Approach Delay, s/veh		2.5	4.2		12.8	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				26.4		9.0	4.3	22.1
Change Period (Y+Rc), s				6.0		4.0	4.0	6.0
Max Green Setting (Gmax), s				45.0		20.0	20.0	45.0
Max Q Clear Time (g_c+I1), s				4.2		3.2	2.1	3.7
Green Ext Time (p_c), s				12.4		0.1	0.0	12.4

Intersection Summary	
HCM 2010 Ctrl Delay	3.8
HCM 2010 LOS	A

Notes

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	9	0	22	0	513	8	12	562	0
Future Vol, veh/h	0	0	0	9	0	22	0	513	8	12	562	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	235	205	-	220	250	-	180
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	70	70	70	88	88	88	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	13	0	31	0	583	9	17	803	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1128	1420	401	1019	1420	291	803	0	0	583	0	0
Stage 1	837	837	-	583	583	-	-	-	-	-	-	-
Stage 2	291	583	-	436	837	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	159	135	599	191	135	706	817	-	-	987	-	-
Stage 1	327	380	-	465	497	-	-	-	-	-	-	-
Stage 2	693	497	-	569	380	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	150	133	599	188	133	706	817	-	-	987	-	-
Mov Cap-2 Maneuver	150	133	-	188	133	-	-	-	-	-	-	-
Stage 1	327	373	-	465	497	-	-	-	-	-	-	-
Stage 2	662	497	-	559	373	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	14.7	0	0.2
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	817	-	-	-	188	706	987	-	-
HCM Lane V/C Ratio	-	-	-	-	0.068	0.045	0.017	-	-
HCM Control Delay (s)	0	-	-	0	25.6	10.3	8.7	-	-
HCM Lane LOS	A	-	-	A	D	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.2	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	20	0	2	31	0	6
Future Vol, veh/h	20	0	2	31	0	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	70	70	70	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	0	3	44	0	9

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	29	0	79	29
Stage 1	-	-	-	-	29	-
Stage 2	-	-	-	-	50	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1584	-	924	1046
Stage 1	-	-	-	-	994	-
Stage 2	-	-	-	-	972	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1584	-	922	1046
Mov Cap-2 Maneuver	-	-	-	-	922	-
Stage 1	-	-	-	-	994	-
Stage 2	-	-	-	-	970	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	8.5
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1046	-	-	1584	-
HCM Lane V/C Ratio	0.008	-	-	0.002	-
HCM Control Delay (s)	8.5	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

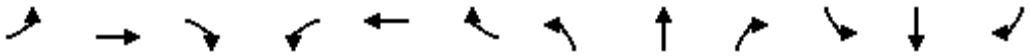
Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	12	9	26	16	0	10	3	10	1	19	3
Future Vol, veh/h	1	12	9	26	16	0	10	3	10	1	19	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	75	75	75	82	82	82	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	17	13	35	21	0	12	4	12	1	27	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	77	72	29	81	68	10	31	0	0	16	0	0
Stage 1	32	32	-	34	34	-	-	-	-	-	-	-
Stage 2	45	40	-	47	34	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	912	818	1046	907	823	1071	1582	-	-	1602	-	-
Stage 1	984	868	-	982	867	-	-	-	-	-	-	-
Stage 2	969	862	-	967	867	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	888	811	1046	875	816	1071	1582	-	-	1602	-	-
Mov Cap-2 Maneuver	888	811	-	875	816	-	-	-	-	-	-	-
Stage 1	976	867	-	974	860	-	-	-	-	-	-	-
Stage 2	937	855	-	935	866	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	9.5	3.2	0.3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1582	-	-	897	852	1602	-	-
HCM Lane V/C Ratio	0.008	-	-	0.035	0.066	0.001	-	-
HCM Control Delay (s)	7.3	0	-	9.2	9.5	7.2	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	17	59	9	607	96	204	5	426	442	135	449	18
v/c Ratio	0.04	0.11	0.03	0.72	0.09	0.33	0.01	0.43	0.58	0.30	0.29	0.02
Control Delay	31.6	36.5	0.1	32.1	23.1	6.5	33.5	24.6	6.0	36.4	18.4	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.6	36.5	0.1	32.1	23.1	6.5	33.5	24.6	6.0	36.4	18.4	0.1
Queue Length 50th (ft)	3	9	0	135	14	0	1	85	0	30	66	0
Queue Length 95th (ft)	12	26	0	226	51	61	6	147	61	70	173	0
Internal Link Dist (ft)		462			385			709			365	
Turn Bay Length (ft)	235		235	235			245		245	245		245
Base Capacity (vph)	1446	1457	597	1525	1331	723	983	1673	981	983	1716	855
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.04	0.02	0.40	0.07	0.28	0.01	0.25	0.45	0.14	0.26	0.02

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	54	8	558	88	188	4	375	389	126	418	17
Future Volume (veh/h)	16	54	8	558	88	188	4	375	389	126	418	17
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	17	59	9	607	96	204	5	426	442	135	449	18
Adj No. of Lanes	2	3	1	2	2	1	2	2	1	2	2	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.88	0.88	0.88	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	416	350	109	741	489	219	812	1233	552	373	691	309
Arrive On Green	0.12	0.07	0.07	0.22	0.14	0.14	0.24	0.35	0.35	0.11	0.20	0.20
Sat Flow, veh/h	3442	5085	1583	3442	3539	1583	3442	3539	1583	3442	3539	1583
Grp Volume(v), veh/h	17	59	9	607	96	204	5	426	442	135	449	18
Grp Sat Flow(s),veh/h/ln	1721	1695	1583	1721	1770	1583	1721	1770	1583	1721	1770	1583
Q Serve(g_s), s	0.3	0.9	0.2	13.2	1.9	7.3	0.1	7.0	19.9	2.9	9.2	0.7
Cycle Q Clear(g_c), s	0.3	0.9	0.2	13.2	1.9	7.3	0.1	7.0	19.9	2.9	9.2	0.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	416	350	109	741	489	219	812	1233	552	373	691	309
V/C Ratio(X)	0.04	0.17	0.08	0.82	0.20	0.93	0.01	0.35	0.80	0.36	0.65	0.06
Avail Cap(c_a), veh/h	874	1292	402	1355	989	442	874	1483	664	874	1483	664
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.6	34.5	11.4	29.4	30.1	17.7	23.0	19.0	23.2	32.6	29.2	25.8
Incr Delay (d2), s/veh	0.0	0.3	0.4	0.9	0.3	21.4	0.0	0.3	7.5	0.2	2.0	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.4	0.2	6.3	0.9	5.1	0.0	3.5	9.8	1.4	4.7	0.3
LnGrp Delay(d),s/veh	30.6	34.8	11.9	30.3	30.3	39.1	23.0	19.3	30.7	32.8	31.2	25.9
LnGrp LOS	C	C	B	C	C	D	C	B	C	C	C	C
Approach Vol, veh/h		85			907			873			602	
Approach Delay, s/veh		31.6			32.3			25.1			31.4	
Approach LOS		C			C			C			C	

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.5	33.4	21.0	11.8	24.6	21.4	15.9	16.9
Change Period (Y+Rc), s	4.0	6.0	4.0	6.4	6.0	* 6	6.4	* 6
Max Green Setting (Gmax), s	20.0	33.0	31.0	20.0	20.0	* 33	20.0	* 22
Max Q Clear Time (g_c+I1), s	4.9	21.9	15.2	2.9	2.1	11.2	2.3	9.3
Green Ext Time (p_c), s	0.3	5.6	1.7	0.3	7.5	4.2	0.3	1.6

Intersection Summary	
HCM 2010 Ctrl Delay	29.5
HCM 2010 LOS	C

Notes

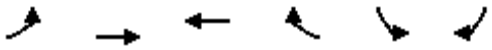
Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	568	827	2	0	7
Future Vol, veh/h	1	568	827	2	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	265	-	-	240	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	93	93	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	617	889	2	0	10

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	889	0	-	0	1138	445
Stage 1	-	-	-	-	889	-
Stage 2	-	-	-	-	249	-
Critical Hdwy	5.34	-	-	-	5.74	7.14
Critical Hdwy Stg 1	-	-	-	-	6.64	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	3.12	-	-	-	3.82	3.92
Pot Cap-1 Maneuver	443	-	-	-	264	479
Stage 1	-	-	-	-	282	-
Stage 2	-	-	-	-	706	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	443	-	-	-	263	479
Mov Cap-2 Maneuver	-	-	-	-	263	-
Stage 1	-	-	-	-	282	-
Stage 2	-	-	-	-	704	-

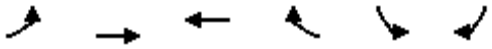
Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.7
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	443	-	-	-	479
HCM Lane V/C Ratio	0.002	-	-	-	0.021
HCM Control Delay (s)	13.1	-	-	-	12.7
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	6	649	852	68	37	11
v/c Ratio	0.02	0.15	0.20	0.05	0.08	0.03
Control Delay	18.0	1.6	3.3	2.2	16.2	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.0	1.6	3.3	2.2	16.2	10.4
Queue Length 50th (ft)	1	0	0	0	5	0
Queue Length 95th (ft)	9	26	77	15	29	10
Internal Link Dist (ft)		333	430		493	
Turn Bay Length (ft)	230			245		240
Base Capacity (vph)	976	5085	4951	1543	976	877
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.13	0.17	0.04	0.04	0.01

Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	558	818	65	34	10
Future Volume (veh/h)	5	558	818	65	34	10
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	6	649	852	68	37	11
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.86	0.86	0.96	0.96	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	65	3711	3139	977	210	188
Arrive On Green	0.04	0.73	0.62	0.62	0.12	0.12
Sat Flow, veh/h	1774	5253	5253	1583	1774	1583
Grp Volume(v), veh/h	6	649	852	68	37	11
Grp Sat Flow(s),veh/h/ln	1774	1695	1695	1583	1774	1583
Q Serve(g_s), s	0.1	1.6	3.0	0.7	0.7	0.2
Cycle Q Clear(g_c), s	0.1	1.6	3.0	0.7	0.7	0.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	65	3711	3139	977	210	188
V/C Ratio(X)	0.09	0.17	0.27	0.07	0.18	0.06
Avail Cap(c_a), veh/h	942	6173	6173	1922	942	841
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.4	1.7	3.5	3.0	15.7	15.5
Incr Delay (d2), s/veh	0.2	0.0	0.1	0.0	0.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.7	1.4	0.3	0.4	0.2
LnGrp Delay(d),s/veh	18.6	1.7	3.5	3.1	15.8	15.5
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		655	920		48	
Approach Delay, s/veh		1.8	3.5		15.8	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				31.9		7.7	4.4	27.4
Change Period (Y+Rc), s				6.0		4.0	4.0	6.0
Max Green Setting (Gmax), s				45.0		20.0	20.0	45.0
Max Q Clear Time (g_c+I1), s				3.6		2.7	2.1	5.0
Green Ext Time (p_c), s				16.6		0.1	0.0	16.4

Intersection Summary	
HCM 2010 Ctrl Delay	3.2
HCM 2010 LOS	A

Notes

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	6	0	9	0	569	10	13	555	0
Future Vol, veh/h	0	0	0	6	0	9	0	569	10	13	555	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	235	205	-	220	250	-	180
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	70	70	70	81	81	81	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	9	0	13	0	702	12	14	597	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	976	1327	298	1028	1327	351	597	0	0	702	0	0
Stage 1	625	625	-	702	702	-	-	-	-	-	-	-
Stage 2	351	702	-	326	625	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	206	154	698	188	154	645	976	-	-	891	-	-
Stage 1	439	475	-	395	439	-	-	-	-	-	-	-
Stage 2	639	439	-	661	475	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	199	152	698	186	152	645	976	-	-	891	-	-
Mov Cap-2 Maneuver	199	152	-	186	152	-	-	-	-	-	-	-
Stage 1	439	468	-	395	439	-	-	-	-	-	-	-
Stage 2	626	439	-	651	468	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	16.5	0	0.2
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	976	-	-	-	186	645	891	-	-
HCM Lane V/C Ratio	-	-	-	-	0.046	0.02	0.016	-	-
HCM Control Delay (s)	0	-	-	0	25.3	10.7	9.1	-	-
HCM Lane LOS	A	-	-	A	D	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	23	0	7	14	1	2
Future Vol, veh/h	23	0	7	14	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	72	72	70	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	0	10	20	1	3

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	32	0	72	32
Stage 1	-	-	-	-	32	-
Stage 2	-	-	-	-	40	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1580	-	932	1042
Stage 1	-	-	-	-	991	-
Stage 2	-	-	-	-	982	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1580	-	926	1042
Mov Cap-2 Maneuver	-	-	-	-	926	-
Stage 1	-	-	-	-	991	-
Stage 2	-	-	-	-	976	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.4	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1000	-	-	1580	-
HCM Lane V/C Ratio	0.004	-	-	0.006	-
HCM Control Delay (s)	8.6	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0	-	-	0	-

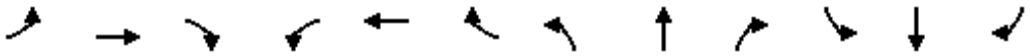
Intersection	
Int Delay, s/veh	5.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	10	11	20	2	1	24	4	34	0	11	2
Future Vol, veh/h	5	10	11	20	2	1	24	4	34	0	11	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	70	70	70	78	78	78	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	12	13	29	3	1	31	5	44	0	16	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	108	127	17	118	107	27	19	0	0	49	0	0
Stage 1	17	17	-	88	88	-	-	-	-	-	-	-
Stage 2	91	110	-	30	19	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	871	764	1062	858	783	1048	1597	-	-	1558	-	-
Stage 1	1002	881	-	920	822	-	-	-	-	-	-	-
Stage 2	916	804	-	987	880	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	854	749	1062	824	767	1048	1597	-	-	1558	-	-
Mov Cap-2 Maneuver	854	749	-	824	767	-	-	-	-	-	-	-
Stage 1	982	881	-	902	806	-	-	-	-	-	-	-
Stage 2	893	788	-	962	880	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	9.5	2.8	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1597	-	-	879	826	1558	-	-
HCM Lane V/C Ratio	0.019	-	-	0.035	0.04	-	-	-
HCM Control Delay (s)	7.3	0	-	9.2	9.5	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.1	0.1	0	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	67	83	5	445	49	117	3	452	538	269	534	32
v/c Ratio	0.10	0.15	0.01	0.65	0.12	0.32	0.01	0.42	0.63	0.50	0.32	0.04
Control Delay	28.5	37.1	0.0	34.7	37.2	2.3	32.7	23.5	6.0	36.1	17.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.5	37.1	0.0	34.7	37.2	2.3	32.7	23.5	6.0	36.1	17.0	0.1
Queue Length 50th (ft)	13	13	0	100	11	0	0	90	0	61	75	0
Queue Length 95th (ft)	29	28	0	182	33	0	4	158	74	93	152	0
Internal Link Dist (ft)		462			502			709			365	
Turn Bay Length (ft)	235		235	235			245		245	245		245
Base Capacity (vph)	1443	1454	597	1521	1113	638	983	1670	1030	981	1793	886
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.06	0.01	0.29	0.04	0.18	0.00	0.27	0.52	0.27	0.30	0.04

Intersection Summary

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (veh/h)	50	62	4	21	402	47	111	3	411	490	22	169
Future Volume (veh/h)	50	62	4	21	402	47	111	3	411	490	22	169
Number	7	4	14		3	8	18	5	2	12		1
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0		0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	1.00		1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863		1863	1863	1863	1863	1863	1863		1863
Adj Flow Rate, veh/h	67	83	5		423	49	117	3	452	538		238
Adj No. of Lanes	2	3	1		2	2	1	2	2	1		2
Peak Hour Factor	0.75	0.75	0.75		0.95	0.95	0.95	0.91	0.91	0.91		0.71
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2		2
Cap, veh/h	379	387	121		546	351	157	870	1384	619		393
Arrive On Green	0.11	0.08	0.08		0.16	0.10	0.10	0.25	0.39	0.39		0.11
Sat Flow, veh/h	3442	5085	1583		3442	3539	1583	3442	3539	1583		3442
Grp Volume(v), veh/h	67	83	5		423	49	117	3	452	538		238
Grp Sat Flow(s),veh/h/ln	1721	1695	1583		1721	1770	1583	1721	1770	1583		1721
Q Serve(g_s), s	1.4	1.2	0.1		9.2	1.0	4.1	0.1	7.0	24.6		5.2
Cycle Q Clear(g_c), s	1.4	1.2	0.1		9.2	1.0	4.1	0.1	7.0	24.6		5.2
Prop In Lane	1.00		1.00		1.00		1.00	1.00		1.00		1.00
Lane Grp Cap(c), veh/h	379	387	121		546	351	157	870	1384	619		393
V/C Ratio(X)	0.18	0.21	0.04		0.77	0.14	0.74	0.00	0.33	0.87		0.61
Avail Cap(c_a), veh/h	878	1297	404		1360	993	444	878	1489	666		878
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00
Upstream Filter(I)	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00
Uniform Delay (d), s/veh	31.7	34.0	10.4		31.6	32.3	18.4	21.9	16.7	22.0		33.1
Incr Delay (d2), s/veh	0.1	0.4	0.2		0.9	0.3	9.8	0.0	0.3	12.4		0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0
%ile BackOfQ(50%),veh/ln	0.7	0.6	0.1		4.5	0.5	2.7	0.0	3.4	12.9		2.5
LnGrp Delay(d),s/veh	31.8	34.4	10.5		32.5	32.5	28.2	21.9	16.9	34.4		33.6
LnGrp LOS	C	C	B		C	C	C	C	B	C		C
Approach Vol, veh/h		155				589			993			
Approach Delay, s/veh		32.5				31.7			26.4			
Approach LOS		C				C			C			

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.9	36.7	16.5	12.4	25.8	23.8	15.0	13.8
Change Period (Y+Rc), s	4.0	6.0	4.0	6.4	6.0	* 6	6.4	* 6
Max Green Setting (Gmax), s	20.0	33.0	31.0	20.0	20.0	* 33	20.0	* 22
Max Q Clear Time (g_c+I1), s	7.2	26.6	11.2	3.2	2.1	12.8	3.4	6.1
Green Ext Time (p_c), s	0.5	4.1	1.2	0.6	8.7	5.0	0.6	0.9

Intersection Summary	
HCM 2010 Ctrl Delay	29.3
HCM 2010 LOS	C

Notes

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	379	23
Future Volume (veh/h)	379	23
Number	6	16
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863
Adj Flow Rate, veh/h	534	32
Adj No. of Lanes	2	1
Peak Hour Factor	0.71	0.71
Percent Heavy Veh, %	2	2
Cap, veh/h	802	359
Arrive On Green	0.23	0.23
Sat Flow, veh/h	3539	1583
Grp Volume(v), veh/h	534	32
Grp Sat Flow(s),veh/h/ln	1770	1583
Q Serve(g_s), s	10.8	1.3
Cycle Q Clear(g_c), s	10.8	1.3
Prop In Lane		1.00
Lane Grp Cap(c), veh/h	802	359
V/C Ratio(X)	0.67	0.09
Avail Cap(c_a), veh/h	1489	666
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	1.00	1.00
Uniform Delay (d), s/veh	27.6	23.9
Incr Delay (d2), s/veh	1.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.6
LnGrp Delay(d),s/veh	29.5	24.1
LnGrp LOS	C	C
Approach Vol, veh/h	804	
Approach Delay, s/veh	30.5	
Approach LOS	C	
Timer		

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑	↱		↱
Traffic Vol, veh/h	0	714	476	81	0	105
Future Vol, veh/h	0	714	476	81	0	105
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	776	517	88	0	114

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	259
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	631
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	631
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12
HCM LOS			B

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	631
HCM Lane V/C Ratio	-	-	-	0.181
HCM Control Delay (s)	-	-	-	12
HCM Lane LOS	-	-	-	B
HCM 95th %tile Q(veh)	-	-	-	0.7

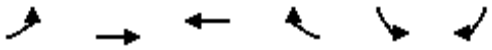
Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	30	712	514	39	0	43
Future Vol, veh/h	30	712	514	39	0	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	265	-	-	240	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	93	93	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	774	553	42	0	61

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	553	0	-	0	928	276
Stage 1	-	-	-	-	553	-
Stage 2	-	-	-	-	375	-
Critical Hdwy	5.34	-	-	-	5.74	7.14
Critical Hdwy Stg 1	-	-	-	-	6.64	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	3.12	-	-	-	3.82	3.92
Pot Cap-1 Maneuver	639	-	-	-	337	615
Stage 1	-	-	-	-	449	-
Stage 2	-	-	-	-	609	-
Platoon blocked, %			-	-	-	
Mov Cap-1 Maneuver	639	-	-	-	320	615
Mov Cap-2 Maneuver	-	-	-	-	320	-
Stage 1	-	-	-	-	449	-
Stage 2	-	-	-	-	578	-

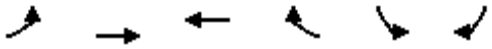
Approach	EB	WB	SB
HCM Control Delay, s	0.4	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	639	-	-	-	615
HCM Lane V/C Ratio	0.051	-	-	-	0.1
HCM Control Delay (s)	10.9	-	-	-	11.5
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.3



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	4	797	470	25	98	13
v/c Ratio	0.01	0.23	0.14	0.02	0.21	0.03
Control Delay	13.8	3.5	5.2	3.7	14.3	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.8	3.5	5.2	3.7	14.3	7.6
Queue Length 50th (ft)	1	24	13	0	19	0
Queue Length 95th (ft)	7	35	44	10	43	8
Internal Link Dist (ft)		333	430		493	
Turn Bay Length (ft)	230			245		240
Base Capacity (vph)	959	5085	5085	1583	959	863
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.16	0.09	0.02	0.10	0.02

Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	4	725	437	23	78	10
Future Volume (veh/h)	4	725	437	23	78	10
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	4	797	470	25	98	12
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.91	0.91	0.93	0.93	0.80	0.80
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	62	3281	2691	838	341	304
Arrive On Green	0.03	0.65	0.53	0.53	0.19	0.19
Sat Flow, veh/h	1774	5253	5253	1583	1774	1583
Grp Volume(v), veh/h	4	797	470	25	98	12
Grp Sat Flow(s),veh/h/ln	1774	1695	1695	1583	1774	1583
Q Serve(g_s), s	0.1	2.4	1.8	0.3	1.7	0.2
Cycle Q Clear(g_c), s	0.1	2.4	1.8	0.3	1.7	0.2
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	62	3281	2691	838	341	304
V/C Ratio(X)	0.06	0.24	0.17	0.03	0.29	0.04
Avail Cap(c_a), veh/h	1010	6618	6618	2060	1010	901
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.2	2.8	4.5	4.2	12.7	12.1
Incr Delay (d2), s/veh	0.2	0.1	0.0	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	1.1	0.8	0.1	0.9	0.2
LnGrp Delay(d),s/veh	17.4	2.8	4.5	4.2	12.9	12.2
LnGrp LOS	B	A	A	A	B	B
Approach Vol, veh/h		801	495		110	
Approach Delay, s/veh		2.9	4.5		12.8	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				26.8		10.1	4.3	22.5
Change Period (Y+Rc), s				6.0		4.0	4.0	6.0
Max Green Setting (Gmax), s				45.0		20.0	20.0	45.0
Max Q Clear Time (g_c+I1), s				4.4		3.7	2.1	3.8
Green Ext Time (p_c), s				12.7		0.2	0.0	12.8

Intersection Summary	
HCM 2010 Ctrl Delay	4.2
HCM 2010 LOS	A

Notes

Intersection	
Int Delay, s/veh	1.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	118	438	156	0	571
Future Vol, veh/h	0	118	438	156	0	571
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	128	476	170	0	621

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	323	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	673	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	673	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	673	-
HCM Lane V/C Ratio	-	-	0.191	-
HCM Control Delay (s)	-	-	11.6	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	0.7	-

Intersection	
Int Delay, s/veh	8.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	71	0	22	0	513	8	96	522	0
Future Vol, veh/h	0	0	0	71	0	22	0	513	8	96	522	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	235	205	-	220	250	-	180
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	70	70	70	88	88	88	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	101	0	31	0	583	9	137	746	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1311	1603	373	1230	1603	291	746	0	0	583	0	0
Stage 1	1020	1020	-	583	583	-	-	-	-	-	-	-
Stage 2	291	583	-	647	1020	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	116	105	624	134	105	706	858	-	-	987	-	-
Stage 1	253	312	-	465	497	-	-	-	-	-	-	-
Stage 2	693	497	-	426	312	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	99	90	624	120	90	706	858	-	-	987	-	-
Mov Cap-2 Maneuver	99	90	-	120	90	-	-	-	-	-	-	-
Stage 1	253	269	-	465	497	-	-	-	-	-	-	-
Stage 2	662	497	-	367	269	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	88.3	0	1.4
HCM LOS	A	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	858	-	-	-	120	706	987	-	-
HCM Lane V/C Ratio	-	-	-	-	0.845	0.045	0.139	-	-
HCM Control Delay (s)	0	-	-	0	112.5	10.3	9.2	-	-
HCM Lane LOS	A	-	-	A	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	5.1	0.1	0.5	-	-

Intersection	
Int Delay, s/veh	2.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	20	84	0	31	62	0
Future Vol, veh/h	20	84	0	31	62	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	22	91	0	34	67	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	113	0	101	67
Stage 1	-	-	-	-	67	-
Stage 2	-	-	-	-	34	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1476	-	898	997
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	988	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1476	-	898	997
Mov Cap-2 Maneuver	-	-	-	-	898	-
Stage 1	-	-	-	-	956	-
Stage 2	-	-	-	-	988	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	898	-	-	1476	-
HCM Lane V/C Ratio	0.075	-	-	-	-
HCM Control Delay (s)	9.3	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	20	0	2	31	0	27
Future Vol, veh/h	20	0	2	31	0	27
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	70	70	70	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	0	3	44	0	39

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	29	0	79	29
Stage 1	-	-	-	-	29	-
Stage 2	-	-	-	-	50	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1584	-	924	1046
Stage 1	-	-	-	-	994	-
Stage 2	-	-	-	-	972	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1584	-	922	1046
Mov Cap-2 Maneuver	-	-	-	-	922	-
Stage 1	-	-	-	-	994	-
Stage 2	-	-	-	-	970	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	8.6
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1046	-	-	1584	-
HCM Lane V/C Ratio	0.037	-	-	0.002	-
HCM Control Delay (s)	8.6	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	1	12	30	26	16	0	10	3	10	1	19	3
Future Vol, veh/h	1	12	30	26	16	0	10	3	10	1	19	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	70	70	70	75	75	75	82	82	82	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	1	17	43	35	21	0	12	4	12	1	27	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	77	72	29	96	68	10	31	0	0	16	0	0
Stage 1	32	32	-	34	34	-	-	-	-	-	-	-
Stage 2	45	40	-	62	34	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	912	818	1046	887	823	1071	1582	-	-	1602	-	-
Stage 1	984	868	-	982	867	-	-	-	-	-	-	-
Stage 2	969	862	-	949	867	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	888	811	1046	831	816	1071	1582	-	-	1602	-	-
Mov Cap-2 Maneuver	888	811	-	831	816	-	-	-	-	-	-	-
Stage 1	976	867	-	974	860	-	-	-	-	-	-	-
Stage 2	937	855	-	891	866	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	9.7	3.2	0.3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1582	-	-	964	825	1602	-	-
HCM Lane V/C Ratio	0.008	-	-	0.064	0.068	0.001	-	-
HCM Control Delay (s)	7.3	0	-	9	9.7	7.2	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.2	0	-	-

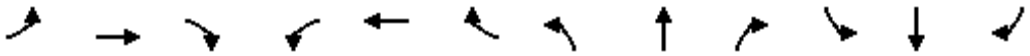
Intersection	
Int Delay, s/veh	6.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	10	36	51	18	8	0
Future Vol, veh/h	10	36	51	18	8	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	39	55	20	9	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	139	9	9	0	-	0
Stage 1	9	-	-	-	-	-
Stage 2	130	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	854	1073	1611	-	-	-
Stage 1	1014	-	-	-	-	-
Stage 2	896	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	824	1073	1611	-	-	-
Mov Cap-2 Maneuver	824	-	-	-	-	-
Stage 1	1014	-	-	-	-	-
Stage 2	865	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	8.8	5.4	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1611	-	1007	-	-
HCM Lane V/C Ratio	0.034	-	0.05	-	-
HCM Control Delay (s)	7.3	0	8.8	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	0.2	-	-



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	30	59	9	747	109	204	5	490	484	166	449	18
v/c Ratio	0.05	0.12	0.03	0.77	0.12	0.36	0.01	0.48	0.60	0.39	0.30	0.02
Control Delay	30.4	41.6	0.1	34.4	31.5	8.2	36.8	27.4	6.1	41.5	21.0	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.4	41.6	0.1	34.4	31.5	8.2	36.8	27.4	6.1	41.5	21.0	0.1
Queue Length 50th (ft)	7	10	0	188	17	0	1	113	0	43	78	0
Queue Length 95th (ft)	20	28	0	300	61	64	6	180	64	87	188	0
Internal Link Dist (ft)		462			502			709			365	
Turn Bay Length (ft)	235		235	235			245		245	245		245
Base Capacity (vph)	1284	1294	553	1354	1195	670	874	1486	945	874	1600	808
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.05	0.02	0.55	0.09	0.30	0.01	0.33	0.51	0.19	0.28	0.02

Intersection Summary

Movement	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL
Lane Configurations												
Traffic Volume (veh/h)	28	54	8	35	652	100	188	4	431	426	29	126
Future Volume (veh/h)	28	54	8	35	652	100	188	4	431	426	29	126
Number	7	4	14		3	8	18	5	2	12		1
Initial Q (Qb), veh	0	0	0		0	0	0	0	0	0		0
Ped-Bike Adj(A_pbT)	1.00		1.00		1.00		1.00	1.00		1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863		1863	1863	1863	1863	1863	1863		1863
Adj Flow Rate, veh/h	30	59	9		709	109	204	5	490	484		135
Adj No. of Lanes	2	3	1		2	2	1	2	2	1		2
Peak Hour Factor	0.92	0.92	0.92		0.92	0.92	0.92	0.88	0.88	0.88		0.93
Percent Heavy Veh, %	2	2	2		2	2	2	2	2	2		2
Cap, veh/h	506	332	103		833	486	217	837	1255	562		346
Arrive On Green	0.15	0.07	0.07		0.24	0.14	0.14	0.24	0.35	0.35		0.10
Sat Flow, veh/h	3442	5085	1583		3442	3539	1583	3442	3539	1583		3442
Grp Volume(v), veh/h	30	59	9		709	109	204	5	490	484		135
Grp Sat Flow(s),veh/h/ln	1721	1695	1583		1721	1770	1583	1721	1770	1583		1721
Q Serve(g_s), s	0.6	0.9	0.3		16.9	2.4	8.2	0.1	8.9	24.4		3.2
Cycle Q Clear(g_c), s	0.6	0.9	0.3		16.9	2.4	8.2	0.1	8.9	24.4		3.2
Prop In Lane	1.00		1.00		1.00		1.00	1.00		1.00		1.00
Lane Grp Cap(c), veh/h	506	332	103		833	486	217	837	1255	562		346
V/C Ratio(X)	0.06	0.18	0.09		0.85	0.22	0.94	0.01	0.39	0.86		0.39
Avail Cap(c_a), veh/h	801	1183	368		1241	906	405	837	1358	608		801
HCM Platoon Ratio	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00
Upstream Filter(I)	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00		1.00
Uniform Delay (d), s/veh	31.6	38.0	12.9		31.1	33.0	20.6	24.7	20.8	25.8		36.2
Incr Delay (d2), s/veh	0.0	0.3	0.5		2.5	0.3	22.5	0.0	0.4	12.7		0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0
%ile BackOfQ(50%),veh/ln	0.3	0.5	0.1		8.3	1.2	5.0	0.0	4.4	12.5		1.5
LnGrp Delay(d),s/veh	31.6	38.3	13.4		33.6	33.4	43.1	24.7	21.2	38.5		36.5
LnGrp LOS	C	D	B		C	C	D	C	C	D		D
Approach Vol, veh/h		98				1022			979			
Approach Delay, s/veh		34.0				35.5			29.7			
Approach LOS		C				D			C			

Timer	1	2	3	4	5	6	7	8
Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	12.6	36.5	24.8	12.0	26.9	22.2	19.0	17.8
Change Period (Y+Rc), s	4.0	6.0	4.0	6.4	6.0	* 6	6.4	* 6
Max Green Setting (Gmax), s	20.0	33.0	31.0	20.0	20.0	* 33	20.0	* 22
Max Q Clear Time (g_c+I1), s	5.2	26.4	18.9	2.9	2.1	12.1	2.6	10.2
Green Ext Time (p_c), s	0.3	4.1	1.9	0.3	8.4	4.1	0.3	1.6

Intersection Summary	
HCM 2010 Ctrl Delay	33.2
HCM 2010 LOS	C

Notes

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (veh/h)	418	17
Future Volume (veh/h)	418	17
Number	6	16
Initial Q (Qb), veh	0	0
Ped-Bike Adj(A_pbT)		1.00
Parking Bus, Adj	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863
Adj Flow Rate, veh/h	449	18
Adj No. of Lanes	2	1
Peak Hour Factor	0.93	0.93
Percent Heavy Veh, %	2	2
Cap, veh/h	668	299
Arrive On Green	0.19	0.19
Sat Flow, veh/h	3539	1583
Grp Volume(v), veh/h	449	18
Grp Sat Flow(s),veh/h/ln	1770	1583
Q Serve(g_s), s	10.1	0.8
Cycle Q Clear(g_c), s	10.1	0.8
Prop In Lane		1.00
Lane Grp Cap(c), veh/h	668	299
V/C Ratio(X)	0.67	0.06
Avail Cap(c_a), veh/h	1358	608
HCM Platoon Ratio	1.00	1.00
Upstream Filter(I)	1.00	1.00
Uniform Delay (d), s/veh	32.4	28.6
Incr Delay (d2), s/veh	2.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	0.4
LnGrp Delay(d),s/veh	34.7	28.8
LnGrp LOS	C	C
Approach Vol, veh/h	602	
Approach Delay, s/veh	34.9	
Approach LOS	C	
Timer		

Intersection	
Int Delay, s/veh	1.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑	↱		↱
Traffic Vol, veh/h	0	604	799	121	0	175
Future Vol, veh/h	0	604	799	121	0	175
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	150	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	657	868	132	0	190

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	434
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	487
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	487
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	17.1
HCM LOS			C

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	487
HCM Lane V/C Ratio	-	-	-	0.391
HCM Control Delay (s)	-	-	-	17.1
HCM Lane LOS	-	-	-	C
HCM 95th %tile Q(veh)	-	-	-	1.8

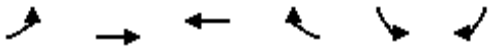
Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	38	603	845	54	0	75
Future Vol, veh/h	38	603	845	54	0	75
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	265	-	-	240	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	93	93	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	41	655	909	58	0	107

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	909	0	-	0	1254	454
Stage 1	-	-	-	-	909	-
Stage 2	-	-	-	-	345	-
Critical Hdwy	5.34	-	-	-	5.74	7.14
Critical Hdwy Stg 1	-	-	-	-	6.64	-
Critical Hdwy Stg 2	-	-	-	-	6.04	-
Follow-up Hdwy	3.12	-	-	-	3.82	3.92
Pot Cap-1 Maneuver	433	-	-	-	231	473
Stage 1	-	-	-	-	275	-
Stage 2	-	-	-	-	631	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	433	-	-	-	209	473
Mov Cap-2 Maneuver	-	-	-	-	209	-
Stage 1	-	-	-	-	275	-
Stage 2	-	-	-	-	571	-

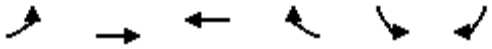
Approach	EB	WB	SB
HCM Control Delay, s	0.8	0	14.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	433	-	-	-	473
HCM Lane V/C Ratio	0.095	-	-	-	0.227
HCM Control Delay (s)	14.2	-	-	-	14.8
HCM Lane LOS	B	-	-	-	B
HCM 95th %tile Q(veh)	0.3	-	-	-	0.9



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Group Flow (vph)	6	690	852	68	75	11
v/c Ratio	0.02	0.17	0.22	0.06	0.17	0.03
Control Delay	17.4	2.4	4.1	2.2	16.7	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	2.4	4.1	2.2	16.7	9.9
Queue Length 50th (ft)	1	20	26	0	18	0
Queue Length 95th (ft)	9	27	76	15	49	10
Internal Link Dist (ft)		333	430		493	
Turn Bay Length (ft)	230			245		240
Base Capacity (vph)	935	5085	4970	1549	935	841
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.14	0.17	0.04	0.08	0.01

Intersection Summary



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	593	818	65	69	10
Future Volume (veh/h)	5	593	818	65	69	10
Number	7	4	8	18	1	16
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			1.00	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	6	690	852	68	75	11
Adj No. of Lanes	1	3	3	1	1	1
Peak Hour Factor	0.86	0.86	0.96	0.96	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	62	3563	3027	943	281	251
Arrive On Green	0.03	0.70	0.60	0.60	0.16	0.16
Sat Flow, veh/h	1774	5253	5253	1583	1774	1583
Grp Volume(v), veh/h	6	690	852	68	75	11
Grp Sat Flow(s),veh/h/ln	1774	1695	1695	1583	1774	1583
Q Serve(g_s), s	0.1	2.0	3.5	0.8	1.6	0.3
Cycle Q Clear(g_c), s	0.1	2.0	3.5	0.8	1.6	0.3
Prop In Lane	1.00			1.00	1.00	1.00
Lane Grp Cap(c), veh/h	62	3563	3027	943	281	251
V/C Ratio(X)	0.10	0.19	0.28	0.07	0.27	0.04
Avail Cap(c_a), veh/h	875	5735	5735	1786	875	781
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.9	2.2	4.2	3.6	15.7	15.2
Incr Delay (d2), s/veh	0.3	0.0	0.1	0.0	0.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.9	1.6	0.4	0.8	0.2
LnGrp Delay(d),s/veh	20.1	2.2	4.3	3.7	15.9	15.2
LnGrp LOS	C	A	A	A	B	B
Approach Vol, veh/h		696	920		86	
Approach Delay, s/veh		2.4	4.2		15.8	
Approach LOS		A	A		B	

Timer	1	2	3	4	5	6	7	8
Assigned Phs				4		6	7	8
Phs Duration (G+Y+Rc), s				32.8		9.7	4.5	28.3
Change Period (Y+Rc), s				6.0		4.0	4.0	6.0
Max Green Setting (Gmax), s				45.0		20.0	20.0	45.0
Max Q Clear Time (g_c+I1), s				4.0		3.6	2.1	5.5
Green Ext Time (p_c), s				17.1		0.1	0.0	16.9

Intersection Summary	
HCM 2010 Ctrl Delay	4.1
HCM 2010 LOS	A

Notes

Intersection	
Int Delay, s/veh	1.9

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	195	443	233	0	561
Future Vol, veh/h	0	195	443	233	0	561
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	212	482	253	0	610

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	-	367	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-	-
Pot Cap-1 Maneuver	0	630	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	630	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	13.6	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBT
Capacity (veh/h)	-	-	630	-
HCM Lane V/C Ratio	-	-	0.336	-
HCM Control Delay (s)	-	-	13.6	-
HCM Lane LOS	-	-	B	-
HCM 95th %tile Q(veh)	-	-	1.5	-

Intersection	
Int Delay, s/veh	31.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	108	0	9	0	569	10	144	482	0
Future Vol, veh/h	0	0	0	108	0	9	0	569	10	144	482	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	235	205	-	220	250	-	180
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	70	70	70	81	81	81	93	93	93
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	154	0	13	0	702	12	155	518	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1179	1530	259	1271	1530	351	518	0	0	702	0	0
Stage 1	828	828	-	702	702	-	-	-	-	-	-	-
Stage 2	351	702	-	569	828	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	146	116	740	~ 125	116	645	1044	-	-	891	-	-
Stage 1	332	384	-	395	439	-	-	-	-	-	-	-
Stage 2	639	439	-	474	384	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	124	96	740	~ 108	96	645	1044	-	-	891	-	-
Mov Cap-2 Maneuver	124	96	-	~ 108	96	-	-	-	-	-	-	-
Stage 1	332	317	-	395	439	-	-	-	-	-	-	-
Stage 2	626	439	-	392	317	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	287.1	0	2.3
HCM LOS	A	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1044	-	-	-	108	645	891	-	-
HCM Lane V/C Ratio	-	-	-	-	1.429	0.02	0.174	-	-
HCM Control Delay (s)	0	-	-	0	$ 310.1	10.7	9.9	-	-
HCM Lane LOS	A	-	-	A	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	11	0.1	0.6	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	3.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	23	131	0	15	102	0
Future Vol, veh/h	23	131	0	15	102	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	142	0	16	111	0

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	167	0	112	96
Stage 1	-	-	-	-	96	-
Stage 2	-	-	-	-	16	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1411	-	885	960
Stage 1	-	-	-	-	928	-
Stage 2	-	-	-	-	1007	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1411	-	885	960
Mov Cap-2 Maneuver	-	-	-	-	885	-
Stage 1	-	-	-	-	928	-
Stage 2	-	-	-	-	1007	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	885	-	-	1411	-
HCM Lane V/C Ratio	0.125	-	-	-	-
HCM Control Delay (s)	9.7	-	-	0	-
HCM Lane LOS	A	-	-	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0	-

Intersection	
Int Delay, s/veh	4.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	23	0	7	14	1	37
Future Vol, veh/h	23	0	7	14	1	37
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	72	72	70	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	0	10	20	1	53

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	32	0	72	32
Stage 1	-	-	-	-	32	-
Stage 2	-	-	-	-	40	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1580	-	932	1042
Stage 1	-	-	-	-	991	-
Stage 2	-	-	-	-	982	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1580	-	926	1042
Mov Cap-2 Maneuver	-	-	-	-	926	-
Stage 1	-	-	-	-	991	-
Stage 2	-	-	-	-	976	-

Approach	EB	WB	NB
HCM Control Delay, s	0	2.4	8.7
HCM LOS			A

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	1039	-	-	1580	-
HCM Lane V/C Ratio	0.052	-	-	0.006	-
HCM Control Delay (s)	8.7	-	-	7.3	0
HCM Lane LOS	A	-	-	A	A
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	5	10	46	20	2	1	24	4	34	0	11	2
Future Vol, veh/h	5	10	46	20	2	1	24	4	34	0	11	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	84	84	84	70	70	70	78	78	78	70	70	70
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	6	12	55	29	3	1	31	5	44	0	16	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	108	127	17	138	107	27	19	0	0	49	0	0
Stage 1	17	17	-	88	88	-	-	-	-	-	-	-
Stage 2	91	110	-	50	19	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	871	764	1062	833	783	1048	1597	-	-	1558	-	-
Stage 1	1002	881	-	920	822	-	-	-	-	-	-	-
Stage 2	916	804	-	963	880	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	854	749	1062	769	767	1048	1597	-	-	1558	-	-
Mov Cap-2 Maneuver	854	749	-	769	767	-	-	-	-	-	-	-
Stage 1	982	881	-	902	806	-	-	-	-	-	-	-
Stage 2	893	788	-	901	880	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9	9.8	2.8	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1597	-	-	976	778	1558	-	-
HCM Lane V/C Ratio	0.019	-	-	0.074	0.042	-	-	-
HCM Control Delay (s)	7.3	0	-	9	9.8	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	-	-

Intersection	
Int Delay, s/veh	6.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	18	59	73	19	16	0
Future Vol, veh/h	18	59	73	19	16	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	64	79	21	17	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	196	17	17	0	-	0
Stage 1	17	-	-	-	-	-
Stage 2	179	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	793	1062	1600	-	-	-
Stage 1	1006	-	-	-	-	-
Stage 2	852	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	753	1062	1600	-	-	-
Mov Cap-2 Maneuver	753	-	-	-	-	-
Stage 1	1006	-	-	-	-	-
Stage 2	809	-	-	-	-	-

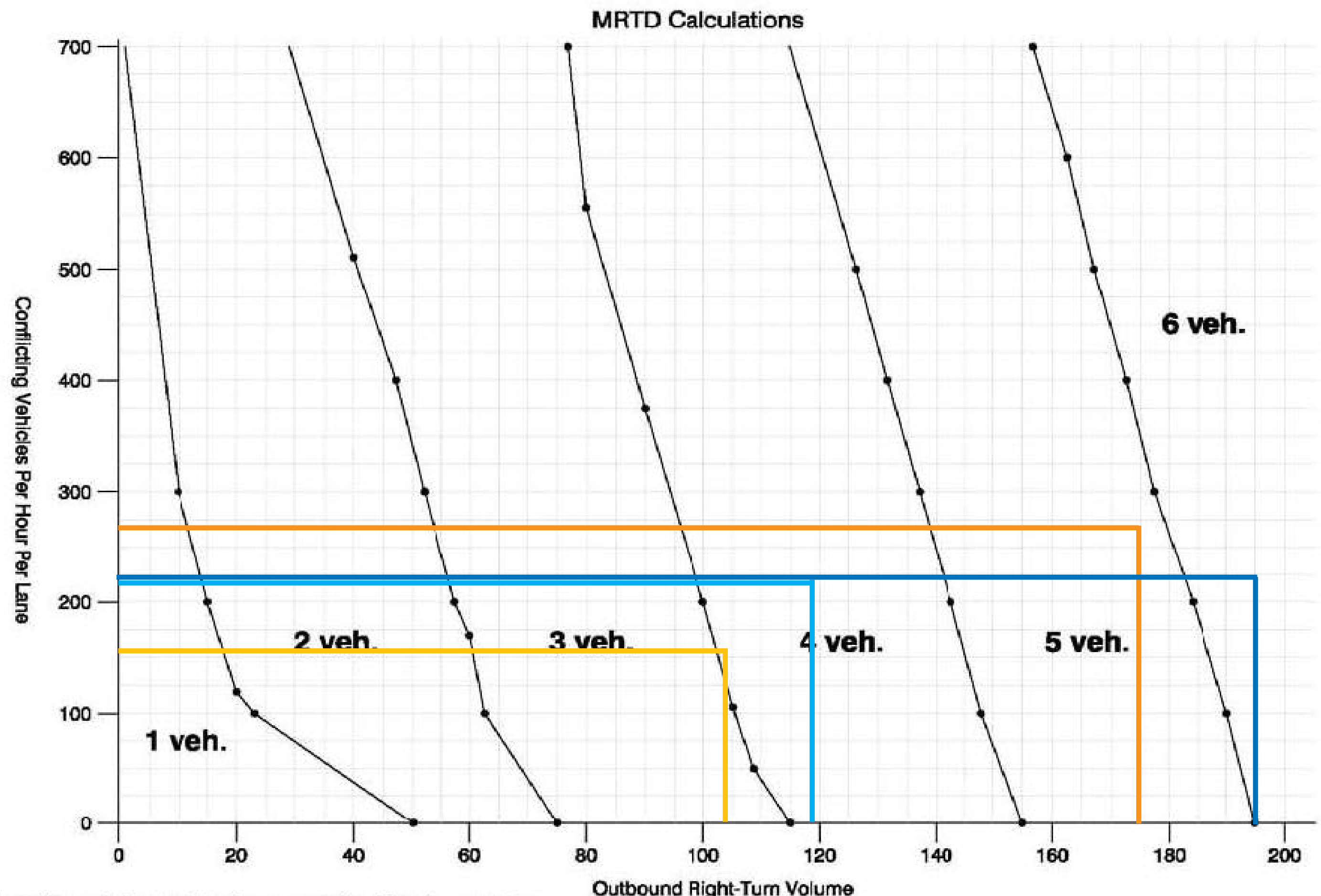
Approach	EB	NB	SB
HCM Control Delay, s	9.1	5.8	0
HCM LOS	A		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1600	-	969	-	-
HCM Lane V/C Ratio	0.05	-	0.086	-	-
HCM Control Delay (s)	7.4	0	9.1	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.2	-	0.3	-	-

Attachment C

Minimum Required Throat Depth (MRTD) Analysis Worksheet

Exhibit 4-2
Minimum Required Throat Depth For Right-Turn Only Movements



NOTE: When data point is outside of range, use the following equation:
Queue = 0.877 + 0.02365 • Approach Volume + 0.001307 • Conflicting Vehicles Per Lane

FEHR & PEERS
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Jan 29, 2007 MJF
O:\Graphics_Library\CONTINUAL_USE_FILES\fig01_MRTD_calcs.dwg

LEGEND

Project Driveway #2	Project Driveway #5
AM Volumes	AM Volumes
PM Volumes	PM Volumes