City of
SACRAMENTO
Community Development

REVISED ADDENDUM TO AN ADOPTED ENVIRONMENTAL IMPACT REPORT

SCH #2004082020

The City of Sacramento, California, a municipal corporation, does hereby prepare, make declare, and publish this Revised Addendum to a certified Environmental Impact Report (EIR) for the following described project:

Project Name and Number: Curtis Park Village Fuel Center Project (P14-036)

Original project: Curtis Park Village (P04-109)

The City of Sacramento, Community Development Department, has reviewed the proposed project and on the basis of the whole record before it, has determined that there is no substantial evidence that the project, as identified in the attached Revised Addendum, would have a significant effect on the environment beyond that which was evaluated in the attached EIR. A Subsequent EIR is not required pursuant to the California Environmental Quality Act of 1970 (Sections 21000, et. Seq., Public Resources Code of the State of California) (CEQA).

This Revised Addendum to a certified EIR has been prepared pursuant to Title 14, Section 15164 of the California Code of Regulations; the Sacramento Local Environmental Regulations (Resolution 91-892) adopted by the City of Sacramento.

A copy of this document and all supportive documentation may be reviewed or obtained at the City of Sacramento, Community Development Department, Planning Division, 300 Richards Boulevard, Sacramento, California 95811.

Environmental Services Manager, City of Sacramento, California, a municipal corporation

Date: November 10, 2015

By: _____

Tom Buford, Senior Planner

Curtis Park Village Fuel Center Project (P14-036)
Revised Addendum to Environmental Impact Report (SCH 2004082020)

File Number Project Name: Curtis Park Village Fuel Center Project (P14-036)

Project Location: The applicant has proposed two sites. Sutterville Road and Crocker Road in Sacramento, California (see Attachment A)**, and Buchannan Street (see Attachment C).**

Existing Plan Designations and Zoning: The 2035 General Plan land use designation for the project site is Traditional Center, Traditional Neighborhood Medium and Traditional Neighborhood High. The current zoning designations established within the Curtis Park Village project site include residential (R1-A (PUD), R-2B (PUD), R-4 (PUD), R-4A (PUD), R-5 (PUD)), shopping center (SC (PUD)) and open space (A-OS (PUD).)

Project Discussion: The City Council approved the Curtis Park Village project on September 28, 2010. As part of the project approval, the City Council certified the Curtis Park Village EIR (Resolution No. 2010-174) on April 1, 2010, and adopted CEQA Findings of Fact, Mitigation Monitoring Program (MMP) and a Statement of Overriding Considerations on September 28, 2010 (Resolution No. 2010-572). The project approval established a planned unit development (PUD) covering the entire project site. The EIR and City Council Resolutions are available online at http://portal.cityofsacramento.org/Community-Development/Planning/Environmental/Impact-Reports.aspx.

The EIR was prepared in compliance with CEQA, and evaluated the relevant technical issues in terms of whether the project as proposed would cause significant effects on the environment. The MMP, included in Resolution No. 2010-572 (pages 34 and following) identified the mitigation measures in the project EIR that had been identified as reducing significant effects. Significant and unavoidable impacts identified in the EIR included impacts to freeway ramps under baseline plus project conditions, cumulative impacts to study roadway segments, cumulative impacts to freeway ramps, impacts related to long-term increase of criteria air pollutants, and cumulative contribution to regional air quality conditions.

The applicant has proposed the inclusion of a fuel center (gas station) with an associated retail kiosk. The fuel center would include 16 vehicle fueling positions, with a retail kiosk of approximately 740 square feet. Two locations for the fuel center have been proposed:

- The original proposal identified a site located in the southern portion of the Curtis Park Village site, on an 11.8-acre area parcel identified as the South Commercial Area at the southwest corner of Crocker Drive and a private access to the commercial center. See Attachment B.

- A second location has been proposed within the commercial center and north of Buchannan Street. See Attachment C.

For purposes of the transportation analysis, the review conducted for the project assumed that the fuel center would be operated by Safeway, and would be associated with a Safeway grocery

store to be located within the retail portion of the project. Each of the proposed locations is within the shopping center zone.

The Planning and Development Code provides that a gas station is allowed in the shopping center zone with approval of a conditional use permit (CUP). (City Code section 17.216.510B). Staff has determined that the project also requires site plan and design review.

The EIR for the Curtis Park Village project evaluated the impacts of a mixed-use and residential project that included a 53,500 square foot grocery store, 25,000 square foot bookstore and 76,300 square feet of other retail commercial space. A fuel center was not specifically identified as a future use in the commercial area. Staff has concluded that the fuel center is considered a "gas station" and is consistent with the PUD Guidelines adopted as part of the Curtis Park Village project.

The proposed fuel center operation requires a conditional use permit. The project is part of the buildout of the Curtis Park Village project, and constitutes part of the same project as originally approved by the City Council. See CEQA Guidelines section 15378. Environmental review for the proposed fuel center thus proceeds pursuant to CEQA Guidelines section 15162. See also Public Resources Code section 21166.

In the case of a project proposal requiring discretionary approval by the City on a project for which the City has certified an EIR for the overall project, as here, the City must determine whether a supplemental or subsequent EIR is required. The CEQA Guidelines provide guidance in this process by requiring an examination of whether, since the certification of the EIR and approval of the project, there have been changes in the project or conditions to such an extent that the proposal may result in substantial changes in physical conditions that are considered significant under the California Environmental Quality Act. If so, the City would be required to prepare a supplemental or subsequent EIR. This was the first step taken by the City in reviewing the CEQA treatment of the proposed fuel center project.

This review proceeds with the requirements of CEQA Guidelines section 15162 in mind. Section 15162 is discussed in detail below. It was concluded that the conditions set forth in section 15162 were not present, and that an addendum would be prepared for the project pursuant to CEQA Guidelines section 15164.

The discussion in this Revised Addendum confirms that the proposed fuel center project has been evaluated for significant impacts pursuant to the California Environmental Quality Act. This is meaningfully different than a determination that the project is "exempt" from CEQA review, which is not the case. Rather, the determination here is that the project's impacts have been considered in an EIR (the Curtis Park Village project EIR) that was reviewed and certified by the City Council, and that the EIR provides a sufficient and adequate analysis of the environmental impacts of the proposed fuel center project. An addendum is the appropriate environmental document.

Discussion

An addendum to a certified environmental impact report may be prepared if only minor technical changes or additions to the EIR are required, and none of the conditions identified in CEQA Guidelines Section 15162 are present. The following identifies the standards set forth in section 15162 as they relate to the project.

1. **No substantial changes are proposed in the project which would require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects.**

2. **No substantial changes have occurred with respect to circumstances under which the project is undertaken that would require major revisions of the previous EIR due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects.**

3. **No new information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified, shows any of the following:**

    a) **The project will have one or more significant effects not discussed in the previous EIR;**

    b) **Significant effects previously examined will be substantially more severe than shown in the previous EIR;**

    c) **Mitigation measures or alternatives previously found not to be feasible would in fact be feasible, and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative, or;**

    d) **Mitigation measures or alternatives which are considerably different from those analyzed in the previous would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.**

Section 15162 provides that the lead agency□s role in project approval is completed upon certification of the EIR and approval of the project, unless further discretionary action is required. The approvals requested as part of the fuels island project (i.e., conditional use permit, site plan and design review) are considered discretionary actions, and CEQA review is therefore required.

Substantial Changes in the Project Standard

The Curtis Park Village EIR identified a grocery store and book store as future commercial uses, and indicated that the project would include 73,600 square feet of other retail commercial space. The applicant has indicated that the fuel center facility would be operated in conjunction with a Safeway grocery store as part of Safeway's Reward Points Program, whereby customers receive points for purchases of groceries, gift cards and pharmacy items. (See http://www.safeway.com/ShopStores/RewardPoints-FuelPartner-FAQ.page)

At the time of the preparation of the EIR the City did not identify all of the commercial retail uses that might occupy the commercial center. The City did, however, restrict the future uses by imposing a zone designation on the project site, which restricts the uses that could be approved for the site. The proposed project qualifies as such a use, and is included within the range of future uses that might reasonably have been contemplated for the commercial area.

The Draft EIR, based on the project description that included a general description of future commercial uses that could be implemented, indicated that the land uses would not involve the routine use or transport of hazardous materials. (Draft EIR, page 5.8-15). The operation of a fuel facility as proposed would involve such activities within the commercial area. The Master EIR for the 2035 General Plan, certified by the City Council on March 3, 2015 (see City Council resolution No. 2015-0060) discussed the potential exposure of people to hazards and hazardous materials during the life of the 2035 General Plan. See Impact 4.6-2, page 4.6-7.

The impact discussion included the following:

> The Land Use and Design Element of the 2035 General Plan includes several policies to guide the location of industrial uses that may require use of potentially hazardous materials. Further, proposed General Plan Policy PHS 3.1.5 encourages clean industries within the city, while discouraging businesses that require onsite treatment of solid waste. With implementation of Policy PHS 3.1.6, future development of hazardous material treatment, storage, and disposal facilities would be consistent with the County's Hazardous Waste Management Plan and compatible with nearby land uses. The City would also maintain a Multi-Hazard Emergency Response Plan to address hazardous materials spills as required by Policy PHS 4.1.1.
>
> The Policy Area also contains transportation corridors used to transport hazardous materials, including U.S. Highway 50; Interstates 5 and 80, and Capital City Freeway; and State Routes 99, 16, and 160; and the Union Pacific Railroad. In addition to highways, there are also major arterial roads throughout the city and nearby airports that may be used to transport hazardous materials either into or out of the city. The transportation of hazardous materials is subject to applicable local, state, and federal regulations, that are intended to minimize the risk of upset during routine operations. In addition, proposed General Plan Policy PHS 3.1.4 restricts transportation of hazardous materials to designated routes within the city to protect public safety. However, it is possible that small quantities of hazardous materials could be transported along roads throughout the city on a daily basis.

One of the primary purposes of the Master EIR is to identify and evaluate cumulative impacts of development and actions that could occur during the general plan period. The CEQA analysis that follows focuses on whether the proposed project in question would cause any additional significant effect on the environment that was not examined in the Master EIR. In this case the potential for exposure to hazardous substances, including any that would be present as part of the fuel center project, was considered in the Master EIR. The regulation and conditions that apply to the fuel center project, including those enforced by the air district, would ensure that no new significant effect would occur due to exposure to hazardous substances.

The proposal, therefore, does not constitute a substantial change in the project.

Substantial Changes in the Circumstances Standard

The project site once housed the railyard and operations center for the Western Pacific Railroad (WPR). When the Union Pacific was purchased by Southern Pacific Railroad in the early 1980s, the yard was declared surplus and closed. Union Pacific Railroad (UPRR) owned the property until 2003, when the applicant (Curtis Park Village, LLC) purchased the land. Railroad operations, including freight and passenger (light rail) service, will continue for the foreseeable future on land still owned by UPRR to the immediate west of the project property.

The remaining railroad operations that occur on the railroad-owned property consist of north/south rail mainlines and a switch area operated by the UPRR, as well as a dual track light rail transit facility and two stations operated by Sacramento Regional Transit. All of these facilities run along the entire west property line of the project site and separate the Curtis Park Village area from the Land Park neighborhood.

The Curtis Park Village project site was contaminated with hazardous wastes from the railyard era. Remediation of the site occurred pursuant to a Remedial Action Plan (RAP) approved by the California Department of Toxic Substances Control in 1995. The RAP included removal of contaminated soils resulting from the previous uses of the site as a railyard. Due to these remediation activities, much of the site has been graded or excavated.

The remediation of the site has been completed. Ongoing groundwater monitoring will occur on the project site, post-remediation, pursuant to the current RAP.

Remediation activities have thus been occurring on the project site for a number of years, and prior to project approval constituted the only activity on the site. With the exception of the rail and remediation activities the site has been vacant. Since project approval the applicant has proceeded with project-related activities, including construction of roads, utility infrastructure, senior housing and single-family housing development. These actions were contemplated as part of the project, and do not constitute a change in circumstances.

Construction of a pedestrian overpass on the west side of the project that will carry pedestrians from the project site to the Sacramento City College campus and the Regional Transit light rail station has been initiated and is proceeding. The construction of the pedestrian overpass was contemplated at the time the City Council approved the Curtis Park Village Project, and the

applicant was required, as part of project approval, to provide an easement for the overpass. See Large Lot Tentative Map Condition 31; Small Lot Tentative Map Condition 32.

There have been no substantial physical changes in the area surrounding the project site since project approval that would affect any issue of environmental significance. The physical changes that have occurred involve construction on the project site, including construction of development infrastructure and roadways.

One of the requirements of CEQA is the examination of whether a proposed project is in conflict with existing plans and regulations, including the general plan, zoning regulations and other planning documents. Inconsistency may suggest that a project would have environmental effects that have not been identified in advance, and for which no planning, or analysis, has occurred. In this case, City staff has determined that the proposed project is consistent with the general plan, zoning district and the Curtis Park Village Planned Unit Development.

The EIR for the Curtis Park Village project discussed its consistency with the City s general plan then in effect. The City has since adopted the 2035 General Plan. The current general plan was intended as an update to the previous general plan, and has not made a substantial change in policy direction either for the City as a whole, or the project site. The policy direction that was undertaken in the 2030 General Plan, discussed in the Curtis Park Village EIR, called for infill development within the City limits, focus on multi-modal transportation options and intensification of uses in the urban core. The 2035 General Plan maintains this focus, and its adoption and implementation do not require additional environmental review.

The circumstances under which the project would be undertaken have not changed significantly since 2010.

New Information of Substantial Importance Standard

The applicant s proposal to construct and operate a fuel station as part of the Curtis Park Village project has received attention and comment. The applicant has confirmed that the proposal would include operation as part of a customer rewards program, and has asserted that this feature of the operation is essential to attracting and retaining the type of grocery store the applicant, and according to the applicant, the community, desires.

Community criticisms of the proposal have asserted that the rewards feature would affect the operation by attracting customers from a wide-spread area, thereby detracting from the commercial center s character as a neighborhood amenity. Critics have also stated that fuel stations with such connections to other retail operations, grocery and otherwise, pump far more fuel than the typical gas station, and thus generate far more traffic. Other criticisms have focused on the traffic circulation and queuing, asserting that stacking of cars that would result would interfere with the pedestrian circulation and safety and on site.

The requirements of a conditional use permit, and site plan and design review, prior to construction and operation are requirements that apply to activities generally on the project site, and do not reflect inconsistency with the City s regulations that have been approved on the Curtis Park Village site. The analysis in the EIR, to the extent it relied on review and approval of a

project that would follow the standards and requirements as set forth in planning documents is unchanged, and valid. The concerns as to whether the proposed project would be beneficial for the neighborhood, or whether the City should consider various aspects of the operation as adversely affecting the character of the commercial center, Curtis Park Village project or the neighborhood to such an extent that it should be denied, are legitimate issues and are addressed during the public hearing process regarding the planning entitlements. They do not, however, necessarily raise issues of environmental significance under CEQA.

Two issues have been especially prominent in public discussion of the proposed fuel center project: transportation impacts and the health risk associated with the operation of a fuel center in proximity to residential development.

Transportation and Circulation

A Transportation Analysis Report has been prepared for the Crocker Drive location proposed by the applicant. (See Attachment D) The traffic analysis considered the rewards program connection and potential effect on vehicle trips:

> The analysis of the trip generation of the proposed fuel center is based upon information from the Institute of Transportation Engineers *Trip Generation, Ninth Edition,* 2012, data provided by the applicant from existing Safeway fuel centers, and data from other studies of the trip generation of Safeway fuel centers. For conservatism, it was assumed that all transactions included in the data supplied by the applicant involved a fuel sale, rather than a kiosk-only transaction.
>
> The proposed Safeway fuel center will be open to the general public. It functions similar to a typical retail gasoline station. Safeway fuel centers offer fuel discounts as a result of shopping at a Safeway grocery store. Discounts of up to 1 per gallon can be redeemed at a Safeway fuel center. Safeway discounts can also be redeemed at many Chevron stations, although the discount is currently limited to 20 cents per fill-up. There are 17 participating Chevron stations within five miles of zip code 95818, and 20 stations within 6.4 miles. Figure 2 illustrates the station locations.
>
> As typical of many retail establishments, vehicular trip generation varies substantially based upon the attractiveness of particular establishment. In the case of fuel centers, attractiveness includes the price of fuel, particularly in relationship to the prices offered by nearby competitors. Attractiveness also includes accessibility. The majority of trips for fuel are not stand-alone trips; they are linked trips, where the gas station is an intermediate destination between home, employment site, shopping site, etc. The majority of trips are pass-by trips (trips on the adjacent roadway) or diverted trips (trips typically diverted by a few blocks). (Transportation Analysis, page 3)

The traffic analysis concluded that the total peak hour and daily traffic volumes for the proposed fuel center project are lower than those utilized for traffic analysis in the Curtis Park Village project EIR (See Traffic Analysis, Table 2). The sensitivity analysis of PUD trip generation, which

includes higher fuel center volumes, also results in lower vehicular trip generation than the volumes utilized in the Draft EIR and FEIR analysis. (See Traffic Analysis, Table 8). The report did not rely solely on data provided by the Institute of Traffic Engineers, though that source is a standard and accepted reference source in the industry. The report also discussed observations of other reasonably similar Safeway operations and concluded:

> These recorded and estimated volumes are substantially higher than both the Safeway data for the Sacramento area, as well as the ITE estimates of trip generation. Such variation in trip generation is not unusual for retail facilities, due to the great variation in local conditions (competitiveness, access, customer base). (Traffic Analysis, page 8).

The Traffic Analysis also examined onsite circulation and queuing, which are recognized elements of a traffic analysis for such an operation, and within the expertise of the traffic engineers that prepared the report. While the report identified several elements of the proposed site plan that presented challenges, the report concluded:

> With proper onsite traffic management (including signing, pavement marking, and peak period manual traffic direction), anticipated queues can be adequately accommodated onsite, without impacts to City streets and sidewalks. In the event of higher than anticipated volumes (sensitivity analysis), a queuing strategy has been identified that can manage queues onsite without impacts to City streets and sidewalks. (Traffic Analysis, page 8)

An evaluation of the Buchannan location was prepared by Public Works staff (see attachment D) concluded that the Buchannan Street location south of the grocery store is not expected to impact City streets and the traffic study prepared by DKS for the Crocker Drive location is considered appropriate to evaluate the overall impact of the Buchannan Street location for the following reasons:

- The number of fuel pumps is the same at both locations.
- Trip generation estimate is similar on both sites.
- Trip distribution at the Buchannan Street may be slightly different from the Crocker Drive site. It is expected that traffic exiting the fuel station would go northbound and southbound on Buchannan Street which is designed to accommodate this traffic.
- All traffic accessing the Buchannan Street location will enter the fuel station from the parking lot area. No inbound access to this site is provided from Buchannan Street yet would be at various locations along Crocker Drive or the private easement. The Crocker Drive location access points are in close proximity to Crocker Drive and the private easement in addition to access from the parking lot.
- Buchannan Street location allows for vehicular queuing on the project site without spill back onto public streets.
- The outbound traffic for the Buchannan Street location is directed to exit the site at the Buchannan Street driveway. It is expected that minimal traffic from the shopping center will use this driveway. The outbound traffic for the Crocker Drive location will likely be using the same driveways for inbound and outbound.

- The driveway on Buchannan Street will serve the outbound traffic only (right turn and left turn movements allowed). No inbound traffic is allowed at this driveway. This will minimize the several points of conflicts between inbound and outbound traffic.

A sight distance evaluation of Buchannan Street driveway (Sight Distance Analysis for Curtis Park Village Refueling Center, October 28, 2015, Richard McGrath) is included in Attachment D documenting the available sight distance for outbound traffic at the Buchannan Street driveway. The evaluation concluded that there is sufficient stopping sight distance and corner sight distance to safely accommodate a 25 MPH traveling vehicle on Buchannan Street. Therefore, the location of the driveway at Buchannan Street meets the standard requirements.

To improve traffic operation within the fuel station site, the traffic evaluation for the Buchannan Street location recommended the project to install on-site signage directing vehicles to fuel center; provide standard signing and striping (One-Way and Do Not Enter signage, as well as stop bar) at the exit of the fuel area/driveway on Buchannan Street and utilization of personnel (fuel ambassadors) to help direct traffic at the fuel station area during busy periods.

Air Quality (Toxic Air Contaminants)

The Draft EIR for the Curtis Park Village project included discussion of health hazards that could result from toxic air contaminants (TAC). The project site had been contaminated as a result of use as a railroad yard, and the applicant engaged in a years-long undertaking to remediate the site. This remediation process was the subject of agency oversight, including the California Department of Toxic Substances Control (DTSC). The Remediation Action Plan (RAP) set forth the processes and results that served as the foundation for the RAP. The RAP was subject to separate CEQA review. The RAP was discussed the EIR in Chapter 5.8, Public Health and Hazards. See, for example, Impact 5.8-1 (RAP updates and activities less than significant); Impact 5.8-2 (exposure to contaminated soil--less than significant). The proposed project would not affect the analysis of the potential impacts related to the Remediation Action Plan.

The Air Quality chapter of the Draft EIR (Chapter 5.3) addressed various issues related to air quality. The EIR included a threshold relating to toxic air contaminants of cancer risk of 10 in one million. (See Draft EIR page 5.3-8). Impact 5.3-1 related to impacts from update of the RAP, and concluded, as in the Public Health and Hazards chapter, that the risks would be less than significant. (See Impact 5.3-1, page 5.3-10, 11). Impact 5.3-6 identified a potential impact due to the proximity to rail operations, an impact analysis that would not be affected by the proposed project.

The proposed fuel center project involves a stationary use of a type that is regulated by the Sacramento Metropolitan Air Quality Management District (SMAQMD or air district). SMAQMD has advised the City that the operation of the fuel facility requires approval of a discretionary permit from the air district in the form of a Permit to Operate. The permit, if approved, includes conditions regarding operation, including limits on the amount of gasoline that can be pumped on a quarterly and annual basis (throughput). The SMAQMD has enforcement authority regarding

these conditions and throughput limits. As such the air district is a Responsible Agency under CEQA Guidelines section 15096. The primary goals of the CEQA provisions regarding responsible agencies are to avoid duplication of effort in the review process, and to focus an agency's attentions on the environmental issues within its area of expertise. Assessment of health risks from uses such as a fuel center are clearly within the expertise and area of responsibility for the SMAQMD, and the agency's review requirements are recognized and respected by the City.

The thresholds of significance utilized by the air district are set forth on page 2 of the HRA, included as Attachment E. The air district measures cancer risk for projects in terms of cancer health risk per million. If the cancer risk is less than 10 per million the impact is considered less than significant, with the facility required by air district conditions to apply Toxic Best Available Technology (TBACT).If the cancer risk exceeds 10 per million the air district regulations provide that the permit request is denied unless a finding is made that the project may result in greater negative impact to the public than approving the project. This is similar to CEQA's requirement that in the event of a significant and unavoidable impact the agency may approve the project only with a statement of overriding considerations, as was the case with the original Curtis Park Village project approval.

The modeling used for the HRA was United States Environmental Protection Agency's (USEPA) AERMOD model version 14134, a Gaussian air dispersion model recommended by Sacramento Metropolitan Air Quality Management District (SMAQMD) for use in preparing environmental documentation. This model requires inputs from meteorological and topographical data, as well as emission rates and receptors used at the site of the proposed GDF. Cancer risk was calculated using the modeled ambient annual benzene concentration, California Office of Environmental Health Hazard Assessment (OEHHA) default exposure parameters for a resident and an off-site worker, cancer potency factors for benzene, and age sensitivity factors following the OEHHA Guidance Manual. The Chronic Health Impact (HI) was also calculated from modeled ambient annual benzene concentrations using the methodology from the 2015 OEHHA Hot Spots Guidance Manual. The Acute HI was calculated from modeled ambient hourly benzene concentrations using the methodology from the 2015 OEHHA Hot Spots Guidance Manual.

The HRA submitted for the original location, dated May 16, 2015, concluded that with a throughput of 7.45 million gallons per year all health impacts, including maximum cancer risk, non-cancer chronic HI (hazard index) and non-cancer acute HI are within an acceptable range and below SMAQMD thresholds of significance. The cancer risk was determined to be less than 10 per million, and was, therefore, below the threshold of significance for both the City and the air district. Based on this analysis, the operation of the proposed fuel facility would not result in any additional significant impacts beyond those identified in the Curtis Park Village EIR.

The applicant has proposed an alternative location for the fuel center, located within the commercial center north of Sutterville Road. Ramboll Environ, the consultant that prepared the original health risk assessment, has reviewed the alternative location, and has concluded as follows (see Attachment F):

> This revised location will very likely result in lower estimated health impacts. It is about 400 feet further from residents in the predominant wind direction, compared

to the initial site location. (The wind rose (Figure 2) indicates that the predominant wind direction is from the south west.) This will result in lower cancer risk, chronic HI, and acute HI. Based on Bay Area Air Quality Management District (BAAQMD) scaling methodologies for gas stations, this additional distance could reduce impacts by as much as 90□. SMAQMD does not have similar guidance, but we believe the BAAQMD guidance can be used to provide a reasonable estimate of the reduction in impacts. The new proposed location is closer to the community college to the east, but the community college location is still 400 feet away, which is further than the original maximally impacted receptors, and is not a residential location, further lowering health impacts. In addition, the community college is not in the predominant wind direction and therefore we believe that risks would be lower in this location than at the original MEI.

Neither of the proposed locations would result in new significant effects not evaluated in the original EIR.

Other EIR Discussions

In addition to the impacts analyzed in the previous discussions, the Curtis Park Village EIR included analysis of Land Use; Aesthetics; Biological Resources; Cultural Resources; Geology and Soils; Hydrology, Water Quality and Drainage; Population and Housing; and Parks and Recreation. The EIR concluded that the Curtis Park Village project would have less than significant impact in all technical study areas, with the exception of Air Quality and Transportation and Circulation, for which mitigation was unable to reduce the impacts to a less than significant level.

The project approval included adoption of a Mitigation Monitoring Program for the Curtis Park Village project. (See City Council Resolution No. 2010-572). The program remains in place and would apply to the fuel center project as further assurance that the proposed facility would not result in new significant effects.

Conclusion

Substantial changes are not proposed to the project nor have any substantial changes occurred that would require major revisions to the Curtis Park Village EIR for the purpose of providing adequate environmental review for the fuel center project. The proposed project modifications would not result in any new information of substantial importance that would have new, more severe impacts, new or revised mitigation measure, or new or revised alternatives from what was identified for the original project in the Curtis Park Village EIR.

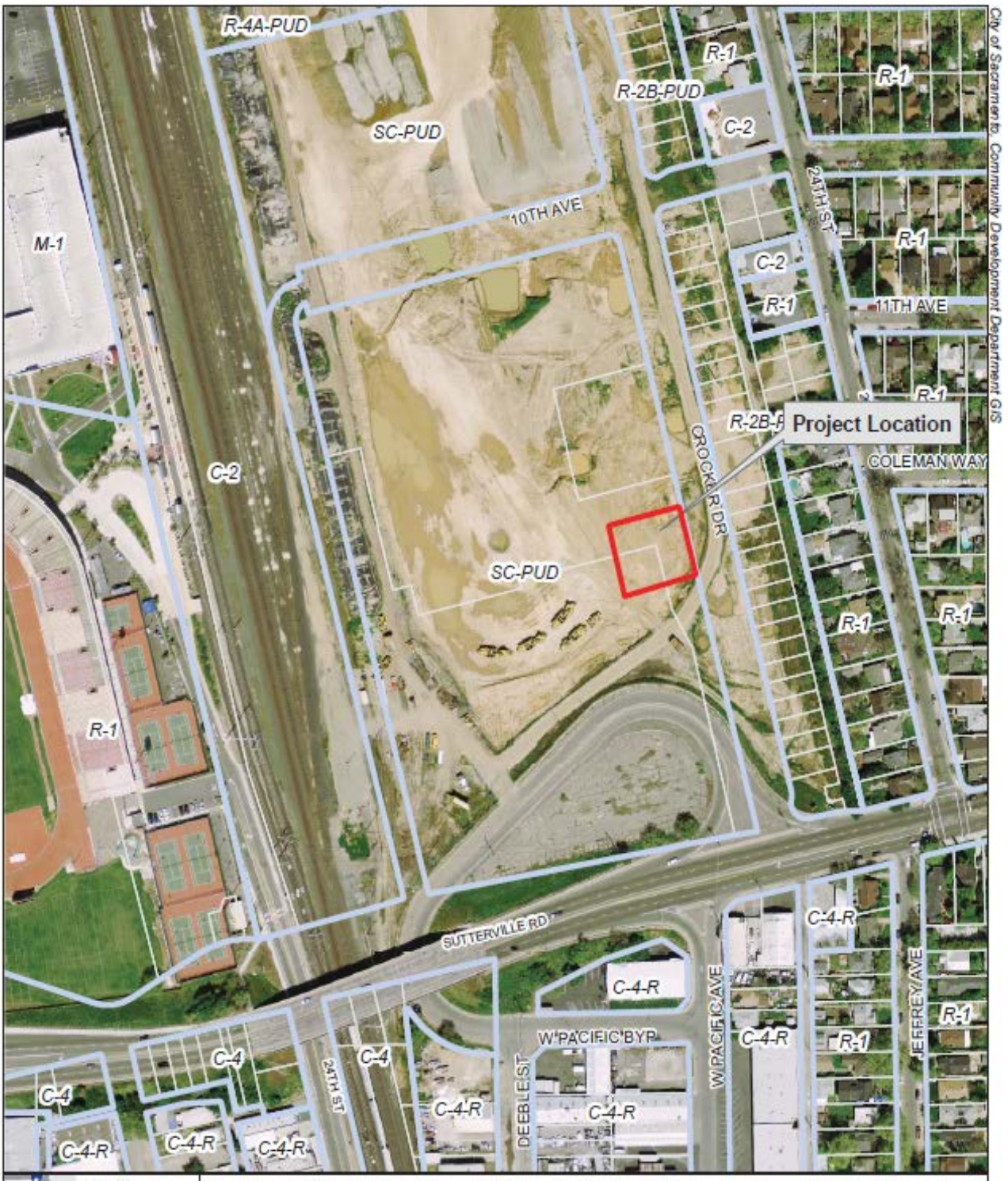
None of the conditions requiring additional environmental review in CEQA Guidelines section 15162 is present.

Based on the above analysis, this Revised Addendum to the previously-certified Environmental Impact Report for the project has been prepared.

Attachments:

A) Vicinity Map
B) Site Plan for Crocker Road Location
C) Site Plan for Buchannan Road Location
D) Transportation Analysis Report
E) Health Risk Assessment for Crocker Road Location, May 6, 2015 (HRA Report Attachment A (AERMOD Input Files) and Attachment B (Health Risk Calculation Databases) are voluminous and consist of input data only. These are available on request.)
F) Health Risk Assessment Letter Report for Buchannan Road Location, September 30, 2015
G) Resolution No. 2010-174 (Certification of Curtis Park Village EIR)
H) Resolution No. 2010-572 (Adoption of CEQA Findings, Statement of Overriding Considerations, Mitigation Monitoring Program)

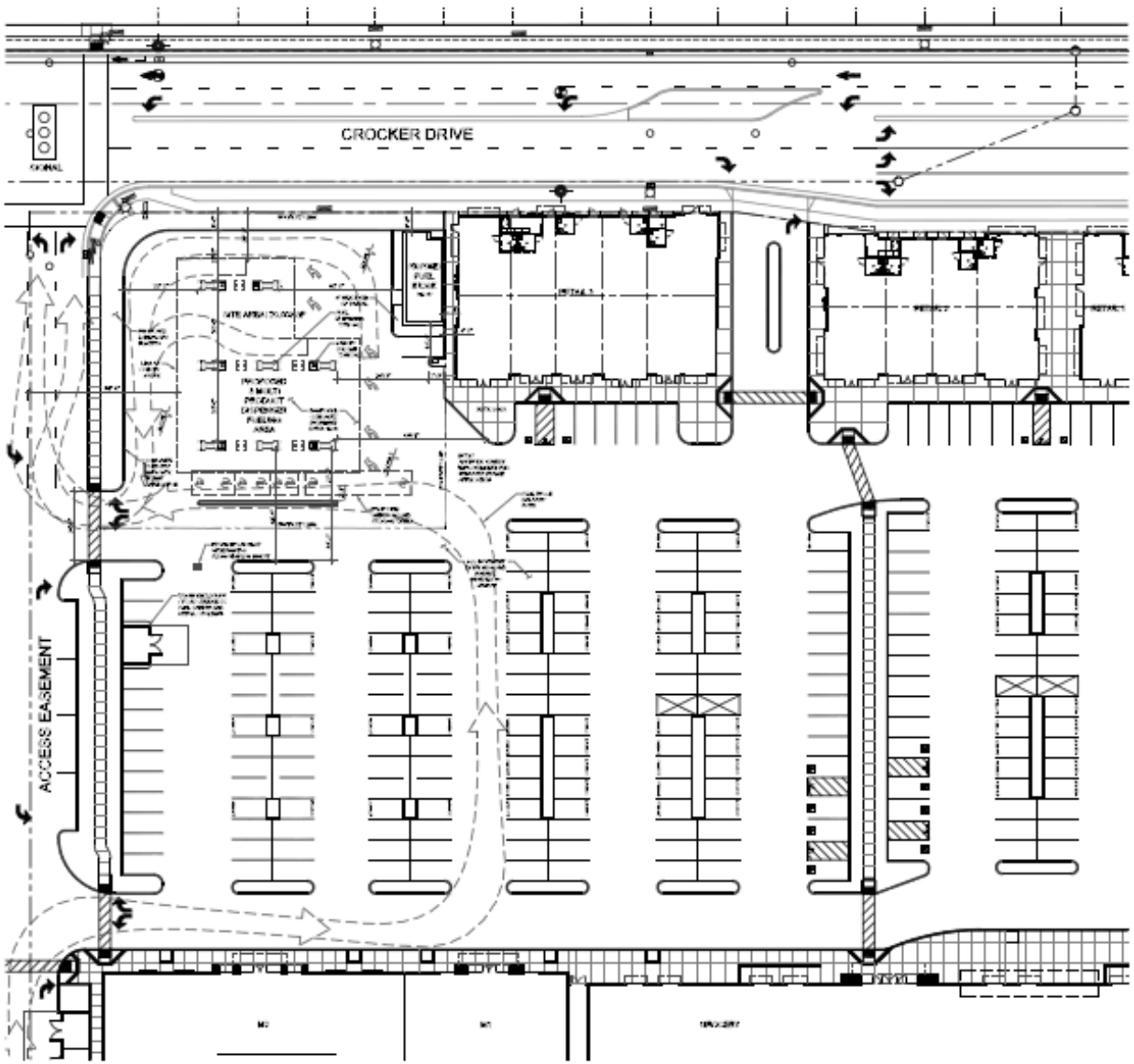
Attachment A
Vicinity Map



P14-036
Vicinity Map
Curtis Park Village Fuel Center

A. Ablog | 8.28.14

Attachment B
Site Plan for Crocker Road Location



1 SITE PLAN

INDEX OF DRAWINGS

VICINITY MAP

PROJECT DIRECTORY

PROJECT SUMMARY

STAMP

REVISIONS

CURTIS PARK VILLAGE
FUEL CENTER

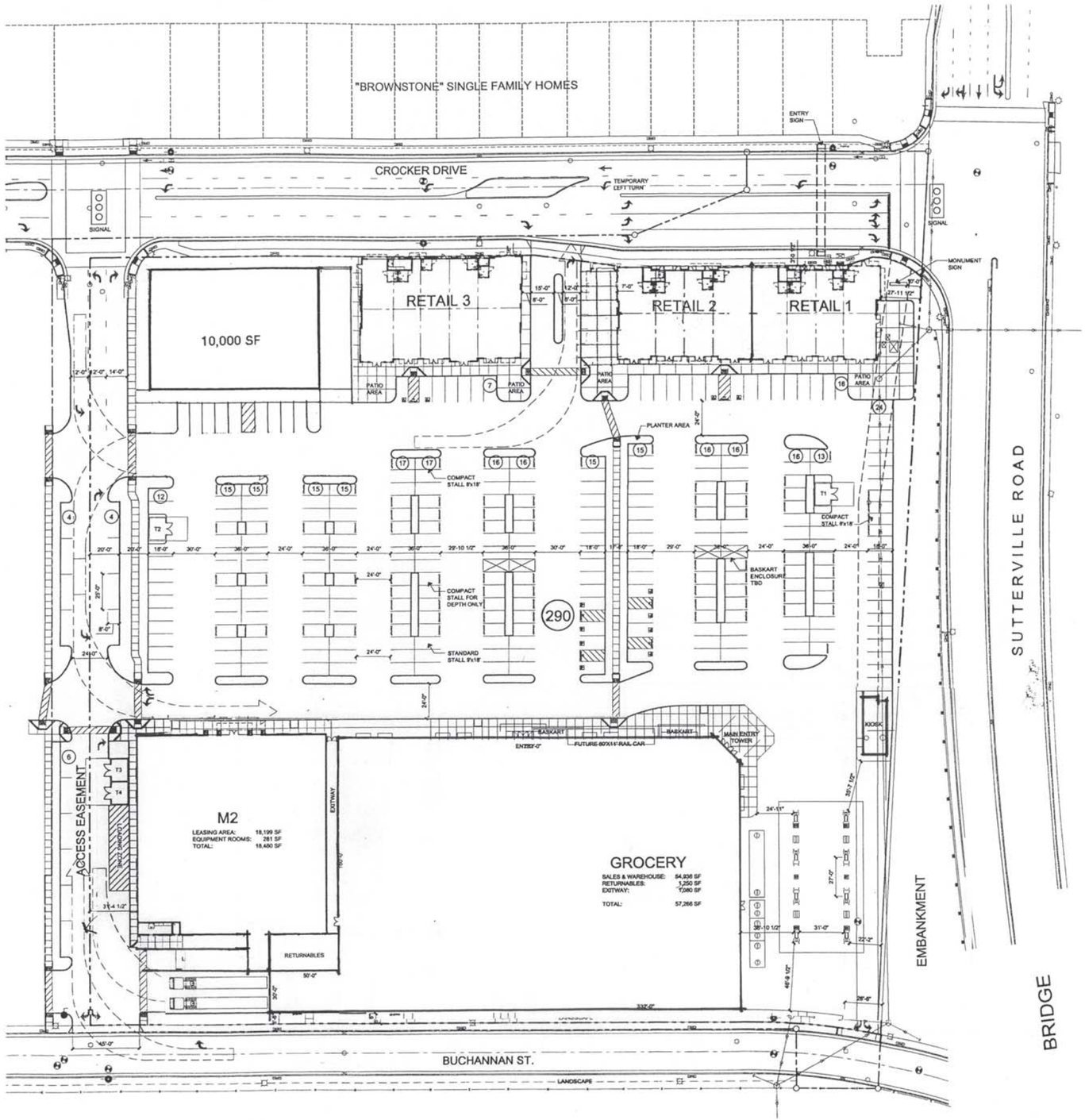
CURTIS PARK VILLAGE DRIVE
SACRAMENTO, CA

SHEET TITLE
SITE PLAN

SHEET NO.
A1.1

Attachment C

Site Plan for Buchannan Street Location



SCALE 1" = 30'-0"

REVISED JUNE 4, 2014
APRIL 2, 2014

PETROVICH DEVELOPMENT COMPANY

Curtis Park Village Neighborhood Shopping Center

Sacramento, California

SITE PLAN

kuchman ARCHITECTS PC

A1.1

Attachment D
Transportation Analysis Report

Curtis Park Village
Fuel Center
Transportation Analysis

Technical Report

Prepared for

City of Sacramento

By

***DKS** Associates*

8950 Cal Center Drive, Suite 340

Sacramento, California

(916) 368-2000

April 10, 2015

TABLE OF CONTENTS

INTRODUCTION

This report summarizes technical analyses of the Curtis Park Village Development conducted for the City of Sacramento. The project applicant has proposed a Fuel Center as part of the retail development associated with the project. The technical analysis focuses on the following tasks:

- Estimation of the vehicular trip generation of the fuel center
- Estimation of the total project vehicular trip generation, based upon the current project characteristics
- Review of the circulation of the proposed fuel center

PROJECT DESCRIPTION

Curtis Park Village is a mixed-use development located on the site of the former Western Pacific Railroad railyard in the City of Sacramento. The project was the subject of earlier transportation analyses as part of the CEQA environmental review process. Portions of the project are currently under construction. The applicant has proposed the inclusion of a Fuel Center (gas station) with an associated retail kiosk. The fuel center would contain 16 vehicle fueling positions, with a retail kiosk of approximately 850 square feet. The project would be located in the retail portion of Curtis Park Village, adjacent to the recently constructed Crocker Drive (see Figure 1). This analysis assumes that the Fuel Center would be operated by Safeway, and would be associated with a Safeway grocery store to be located within the retail portion of the project.

Table 1 summarizes the proposed elements of the overall Curtis Park Village development, including the proposed fuel center.

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Figure 1
Site Location

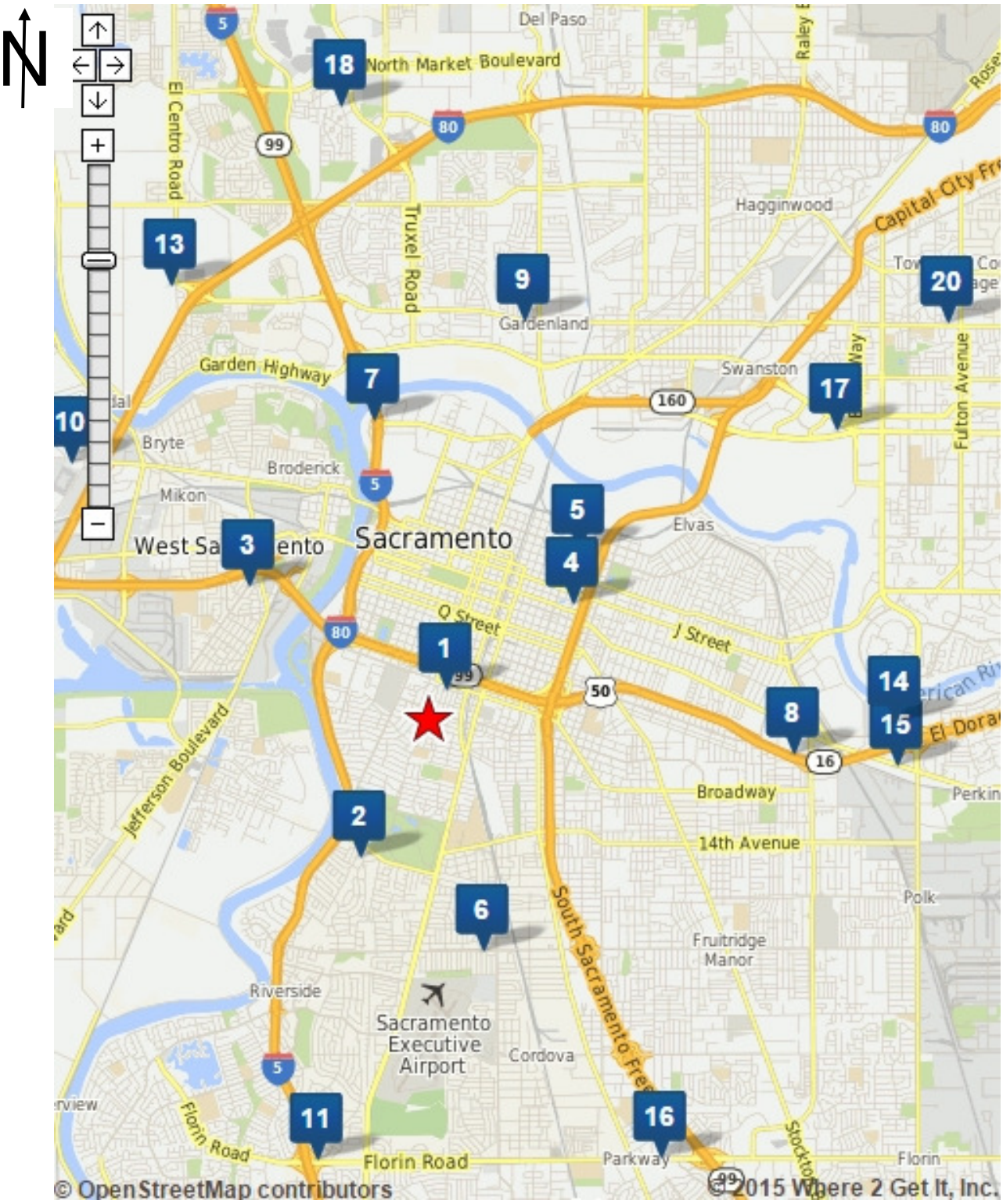
TABLE 1 CURTIS PARK VILLAGE LAND USES	
Project Land Use	**Amount**
Retail	161,734 square feet
Grocery Store	57,266 square feet
Fuel Center	16 vehicle fueling positions 850 square feet kiosk
Health Spa	40,000 square feet
Park / Open Space	7 acres
Single-Family Residential	193 units
Multi-Family Residential	244 units
Senior Housing	91 units
Source: Petrovich Development, March 25, 2015.	

FUEL CENTER TRIP GENERATION

The analysis of the trip generation of the proposed fuel center is based upon information from the Institute of Transportation Engineers' *Trip Generation, Ninth Edition,* 2012, data provided by the applicant from existing Safeway fuel centers, and data from other studies of the trip generation of Safeway fuel centers. For conservatism, it was assumed that all transactions included in the data supplied by the applicant involved a fuel sale, rather than a kiosk-only transaction.

The proposed Safeway fuel center will be open to the general public. It functions similar to a typical retail gasoline station. Safeway fuel centers offer fuel discounts as a result of shopping at a Safeway grocery store. Discounts of up to $1 per gallon can be redeemed at a Safeway fuel center. Safeway discounts can also be redeemed at many Chevron stations, although the discount is currently limited to 20 cents per fill-up. There are 17 participating Chevron stations within five miles of zip code 95818, and 20 stations within 6.4 miles. Figure 2 illustrates the station locations.

As typical of many retail establishments, vehicular trip generation varies substantially based upon the attractiveness of particular establishment. In the case of fuel centers, attractiveness includes the price of fuel, particularly in relationship to the prices offered by nearby competitors. Attractiveness also includes accessibility. The majority of trips for fuel are not stand-alone trips; they are linked trips, where the gas station is an intermediate destination between home, employment site, shopping site, etc. The majority of trips are pass-by trips (trips on the adjacent roadway) or diverted trips (trips typically diverted by a few blocks).



Source: Safeway.com, accessed 9 April 2015.

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Figure 2
Chevron Stations Participating in Safeway Rewards

For a Gasoline / Service Station with Convenience Market (Land Use Code 945), ITE reports over 50 percent pass-by trips in the am and pm peak periods, with primary trips typically under 20 percent.[1] As a result, the trip generation of a gas station is correlated with traffic volumes on the adjacent roadway. This relationship is further demonstrated by the historical locations of gasoline stations (and many retail establishments); prime locations have always been at the intersections of major high volume roadways, where the greatest exposure (and visibility) occurs.

The estimation of trip generation of the fuel center begins with estimation based upon the ITE Trip Generation data, and then comparison to the available Safeway fuel center information.

Table 2 estimates vehicular trip generation of the fuel center based upon ITE land use code 945 (Gasoline / Service Station with Convenience Market). The fuel center would generate 2,604 daily vehicle trips, 163 trips in the a.m. peak hour, and 216 trips in the p.m. peak hour and Saturday peak hour. As ITE does not report data for this land use during the Saturday peak hour, the p.m. peak weekday hour data was utilized for the Saturday peak hour.

The trip generation values (trips) are technically trip-ends, and each vehicle utilizing a fuel center generates two trips (one trip entering and one trip exiting). Thus, assuming that all the vehicles purchase fuel, the number of vehicles served at the fueling positions are about 82 during the a.m. peak hour and about 108 during the p.m. and Saturday peak hours. The a.m. peak hour data is based upon 36 studies, while the p.m. peak hour data is based upon 39 studies.

This information was compared with data from Safeway fuel centers. The applicant provided data for four fuel centers in the Sacramento region that the applicant deemed comparable to the proposed Curtis Park location. These locations were deemed comparable as they are in the Sacramento region, and are located on the arterial roadway system without freeway visibility. Table 3 compares the four sites to the Curtis Park Village site, including the number of vehicles fueled based upon data for Friday, January 23, 2015.

As summarized in the table, the ITE estimates are about 5 percent higher than the average of the four Sacramento area sites in the a.m. peak hour, and about 14 percent higher in the p.m. peak hour.

1 Institute of Transportation Engineers, *Trip Generation Handbook, Third Edition*, 2014.

TABLE 2
ITE FUEL CENTER VEHICULAR TRIP GENERATION

Land Use	Amount	Source	Trips Generated (trip-ends)									
			Week-day	AM Peak Hour			PM Peak Hour			Saturday Peak Hour[1]		
				Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Gasoline / Service Station with Convenience Market	16 Vehicle Fueling Positions	ITE Land Use 945	2,604	82	81	163	108	108	216	108	108	216

1. Saturday peak hour rate based upon weekday p.m. peak hour rate.

***Source**: DKS Associates, 2015, based upon ITE Trip Generation, Ninth Edition, 2012.*

TABLE 3
SACRAMENTO AREA SAFEWAY FUEL CENTER DATA

Name	Intersection	Vehicle Fueling Positions	Store Size (square feet)	Vehicles Fueled[6]		Adjacent Roadway Lanes		Average Daily Traffic Volume		
				AM Peak Hour	PM Peak Hour	North-South Street	East-West Street	North-South Street	East-West Street	Total
Granite Bay[1]	Southwest corner Sierra College Boulevard and Douglas Boulevard	10	60,227	83	103	6	6	29,378	44,328	73,706
Fair Oaks[2]	Northeast corner Madison Avenue and Dewey Drive	12	55,130	76	88	4	6	21,597	48,728	70,325
El Dorado Hills[3]	Northeast corner Francisco Drive and Green Valley Road	16	55,348	77	96	4	4	14,744	14,809	29,553
Roseville[4]	Northeast corner Sunrise Avenue and Cirby Way	12	55,145	75	92	4	4	36,555	23,427	59,982
Curtis Park Village[5]	Northwest corner Crocker Drive and Sutterville Road	16	57,266	-	-	4	4	8,429	31,692	40,121
ITE Estimates		16	-	82	108	-	-	-	-	-

1. Traffic volumes from City of Roseville, May 2011.
2. Traffic volumes from Sacramento County, 2014.
3. Traffic volumes from El Dorado County, February 7, 2013.
4. Traffic volumes from City of Roseville, December 2009 (north-south) and May 2011 (east-west).
5. Traffic volume estimates (Existing plus Project scenario) from Curtis Park Village FEIR.
6. For conservatism, it was assumed that all transactions involved a fuel sale.

***Source**: DKS Associates, 2015, based upon ITE Trip Generation, Ninth Edition, 2012, and data from Safeway, 2015.*

Trip generation data was also obtained for two Safeway fuel centers in the San Francisco Bay Area.

- Data was collected by Fehr & Peers Associates for the Safeway fuel center on Contra Costa Boulevard in Pleasant Hill, adjacent to I-680[2]. Two months of transaction data was reviewed, and data was collected on Saturday, May 25, 2013, and Thursday, May 30, 2013. At the time of the data collection, this fuel center had twelve vehicle fueling positions, and demonstrated an average hourly demand of approximately 130 to 140 vehicles. Weekday and Saturday demand was reported as about 2,300 vehicles. The number of vehicles served was limited by the service rate of the available fueling positions. Unserved demand (vehicles that arrive in the hour that are not served within the hour) was estimated to be 20 vehicles. When the queue length reaches 8 to 10 vehicles, vehicles were observed leaving the site without fueling. The maximum queue was estimated to be about 25 vehicles.

- TJKM collected data at the Safeway fuel center in Campbell, located on West Hamilton Avenue near the San Tomas Expressway[3]. The documentation indicates that the Pleasant Hill and Campbell fuel centers are the highest traffic-generating facilities for Safeway. The Campbell fuel center, with 16 vehicle fueling positions, averaged 82 vehicles during the a.m. peak hour, 127 vehicles during the p.m. peak hour, and 168 vehicles during the Saturday peak hour.

These recorded and estimated volumes are substantially higher than both the Safeway data for the Sacramento area, as well as the ITE estimates of trip generation. Such variation in trip generation is not unusual for retail facilities, due to the great variation in local conditions (competitiveness, access, customer base).

Further analysis in this report is based primarily upon the ITE data. These estimates, based on over 30 studies, are greater than the Sacramento area locations, but less than the two Bay Area locations. These values provide a reasonable estimate of anticipated fuel center trip generation. However, an additional sensitivity analysis is also included in this report. The sensitivity analysis provides a "what if" look of what would occur if the highest recorded volumes from the Pleasant Hill and Campbell fuel centers were to occur in Curtis Park Village. While these levels are not anticipated, the analysis provides useful information for the planning and review of the Curtis Park facility. Table 4 summarizes the trip generation estimates.

2 Memorandum from Kathrin Tellez and Matthew Ridgway, Fehr & Peers, to Todd Paradis, Safeway, October 2, 2013.

3 Revised Report, Traffic Study for Safeway Fuel Center at Washington Square Shopping Center in the City of Petaluma, TJKM Transportation Consultants, August 13, 2014.

TABLE 4 VEHICLES FUELED – ESTIMATED AVERAGE AND SENSITIVITY ANALYSIS				
Condition	**Weekday**	**AM Peak Hour**	**PM Peak Hour**	**Saturday Peak Hour**
Estimated Average	1,302	82	108	108
Sensitivity Analysis	2,300	130	140	168
Percent Difference	+77%	+59%	+30%	+56%
***Source**: DKS Associates, 2015.*				

CURTIS PARK VILLAGE (PUD) TRIP GENERATION

The earlier transportation analysis of Curtis Park Village estimated the total trip generation of the project. The initial estimates were presented in the DEIR. As the project evolved over time, these estimates were updated for the FEIR. These results are summarized in Tables 5 and 6.

Based upon the revised project description (see Table 1), the total project trip generation has been updated. The prior estimates were based on the following data:

- The DEIR analysis was based upon ITE *Trip Generation, Seventh Edition*, and ITE *Trip Generation Handbook, Second Edition.*

- The FEIR analysis was based upon ITE *Trip Generation, Eighth Edition,* and ITE *Trip Generation Handbook, Second Edition.*

ITE *Trip Generation* has now been updated to the *Ninth Edition*, and the *Third Edition* of the *Trip Generation Handbook* is available. Where applicable, data from these updated sources was utilized in this analysis.

For consistency and a valid comparison to the earlier estimates, the basic methodology was maintained, with only changes, where applicable, to reflect the changed project description or new ITE data. The following trip generation steps were utilized:

1. Estimate vehicle trips for each project component utilizing the latest ITE data.

2. Reduce vehicle trips to reflect transit service at the project site. The identical transit factors were utilized (by land use type). No transit reduction was taken for the fuel center.

3. Estimate internal trips. The two-step methodology from the CEQA analysis was followed, and updated, where applicable, to reflect new information in the *Trip Generation Handbook, Third Edition*. To be conservative, the fuel center was considered to be a retail use; the same internal trip unconstrained percentages were applied to all

retail uses. Between different retail uses, unconstrained internal trip percentages vary from 20 to 30 percent, depending upon time period and direction of travel. Between retail and residential uses, unconstrained internal trip percentages vary from 1 to 46 percent, depending upon time period and direction of travel. Please refer to the appendix for additional information.

4. Estimate pass-by trips, utilizing the latest ITE data. For the fuel center, the pass-by trip rate was 56 percent for daily, p.m. peak hour, and Saturday peak hour. The pass-by trip rate was 62 percent for the a.m. peak hour.

5. The result is new external trips.

Table 7 summarizes the updated total project trip generation. The total project trip generation is less than the estimated number of trips in the earlier analyses.

SENSITIVITY ANALYSIS

The trip generation analysis was revised to investigate the effects of utilizing the higher volume of fuel center vehicles summarized in Table 4. The results are summarized in Table 8. Assuming the highest levels of fuel center trip generation (comparable to the volumes recorded at Pleasant Hill and Campbell), the total Curtis Park Village (PUD) trip generation is less than the estimated number of trips in the earlier DEIR and FEIR analyses.

TABLE 5
CURTIS PARK VILLAGE DEIR TRIP GENERATION

Land Use	Amount	Source	Trips Generated (trip-ends)								
			Week-day	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Retail (Shopping Center)	92,100 square feet	ITE 820	6,439	91	58	149	285	308	593	427	394	821
Retail / Grocery Store	53,500 square feet	ITE 850	4,973	128	82	210	290	279	569	312	299	611
Retail / Bookstore	25,000 square feet	ITE 868	5,299	75	48	123	254	234	488	282	251	533
Restaurant	13,000 square feet	ITE 932	1,653	78	72	150	887	55	142	164	96	260
Dinner Theater	560 seats	ITE 931	1,602	9	8	17	98	48	146	124	87	211
Hotel	150 rooms	ITE 310	969	41	27	68	47	42	86	35	41	75
Health Spa	85,000 square feet	ITE 492	2,799	43	60	103	175	169	344	111	111	221
Single-Family Residential	216 units	ITE 210	2,112	40	121	161	135	79	214	110	93	203
Park / Open Space	7.2 acres	ITE 411	11	0	0	0	0	0	0	1	1	2
Total Project Trips			25,857	505	476	981	1,371	1,214	2,585	1,566	1,373	2,937
Transit Adjustments			-475	-9	-10	-20	-27	-23	-50	-2-	-26	-55
Internal Trips			-5,807	-78	-78	-156	-259	-259	-518	-315	-315	-630
Pass-by Trips			-3,545	-53	-53	-106	-184	-184	-368	-217	-217	-434
New External Trips			16,030	365	335	699	901	748	1,649	1,005	815	1,818

***Source**: Memorandum from Debbie Yueh and Mark Bowman, Dowling Associates, to Samar Hajeer, City of Sacramento, September 15, 2009.*

TABLE 6
CURTIS PARK VILLAGE FEIR TRIP GENERATION

Land Use	Amount	Source	Trips Generated (trip-ends)									
			Week-day	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Retail (Shopping Center)	129,500 square feet	ITE 820	8,034	109	70	179	370	386	756	527	487	1,014
Retail / Grocery Store	53,500 square feet	ITE 850	4,973	117	75	192	300	289	589	296	284	580
Retail / Bookstore	25,000 square feet	ITE 868	5,186	71	45	116	254	234	488	282	251	533
Restaurant	13,000 square feet	ITE 932	1,653	78	72	150	86	59	145	97	86	183
Athletic Club	38,000 square feet	ITE 493	1,634	69	44	113	144	89	233	124	129	253
Multi-Family Residential	248 units	ITE 220	1,626	25	100	125	100	54	154	75	64	139
Senior Adult Housing - Attached	90 units	ITE 252	313	4	8	12	8	6	14	13	14	27
Single-Family Residential	190 units	ITE 210	1,877	36	107	143	118	69	187	94	83	177
Park / Open Space	6.9 acres	ITE 411	11	0	0	0	0	0	0	1	1	2
Total Project Trips			25,301	509	521	1,030	1,380	1,186	2,566	1,509	1,399	2,908
Transit Adjustments			-505	-10	-13	-23	-30	-24	-54	-29	-28	-57
Internal Trips			-5,840	-82	-82	-165	-255	-255	-509	-300	-320	-640
Pass-by Trips			-3,796	-50	-50	-99	-204	-204	-407	-229	-229	-457
New External Trips			15,166	367	376	743	891	703	1,596	822	822	1,754

***Source**: Memorandum from Debbie Yueh and Mark Bowman, Dowling Associates, to Samar Hajeer, City of Sacramento, September 15, 2009.*

TABLE 7
CURTIS PARK VILLAGE UPDATED TRIP GENERATION

Land Use	Amount	Source	Trips Generated (trip-ends)									
			Week-day	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Retail (Shopping Center)	161,734 square feet	ITE 820	9,282	130	79	209	397	430	827	621	574	1,195
Retail / Grocery Store	57,266 square feet	ITE 850	5,226	121	74	195	263	253	516	335	322	657
Health Spa	40,000 square feet	ITE 492	1,317	28	28	56	79	60	139	50	61	111
Grocery Fuel Center	16 vehicle fueling positions	ITE 945	2,604	82	81	163	108	108	216	108	108	216
Single-Family Residential	193 units	ITE 210	1,923	36	109	145	120	70	190	98	83	181
Multi-Family Residential	244 units	ITE 220	1,602	25	98	123	99	53	152	64	55	119
Senior Adult Housing - Attached	91 units	ITE 252	292	6	12	18	12	11	23	17	12	29
Park / Open Space	7 acres	ITE 411	13	0	0	0	0	0	0	1	1	2
Total Project Trips			22,259	428	481	909	1,078	985	2,063	1,294	1,216	2,510
Transit Adjustments			-404	-7	-13	-20	-22	-18	-40	-24	-23	-47
Internal Trips			-6,301	-52	-52	-104	-216	-216	-431	-362	-362	-724
Pass-by Trips			-4,357	-96	-96	-192	-240	-240	-480	-210	-210	-420
New External Trips			11,198	273	320	593	300	511	1,112	698	621	1,319

***Source**: DKS Associates, 2015.*

TABLE 8
CURTIS PARK VILLAGE UPDATED TRIP GENERATION – SENSITIVITY ANALYSIS

Land Use	Amount	Source	Trips Generated (trip-ends)								
			Week-day	AM Peak Hour			PM Peak Hour			Saturday Peak Hour		
				Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Retail (Shopping Center)	161,734 square feet	ITE 820	9,282	130	79	209	397	430	827	621	574	1,195
Retail / Grocery Store	57,266 square feet	ITE 850	5,226	121	74	195	263	253	516	335	322	657
Health Spa	40,000 square feet	ITE 492	1,317	28	28	56	79	60	139	50	61	111
Grocery Fuel Center	16 vehicle fueling positions	See Table 4[1]	4,600	130	130	260	140	140	280	168	168	336
Single-Family Residential	193 units	ITE 210	1,923	36	109	145	120	70	190	98	83	181
Multi-Family Residential	244 units	ITE 220	1,602	25	98	123	99	53	152	64	55	119
Senior Adult Housing - Attached	91 units	ITE 252	292	6	12	18	12	11	23	17	12	29
Park / Open Space	7 acres	ITE 411	13	0	0	0	0	0	0	1	1	2
Total Project Trips			24,255	476	530	1,006	1,110	1,017	2,127	1,354	1,276	2,630
Transit Adjustments			-404	-7	-13	-20	-22	-18	-40	-24	-23	-47
Internal Trips			-6,860	-61	-61	-122	-221	-221	-443	-379	-379	-758
Pass-by Trips			-5,163	-120	-120	-240	-254	-254	-508	-234	-234	-468
New External Trips			11,829	288	336	624	613	524	1,136	717	640	1,357

1. Each fueled vehicle represents one entering and one exiting trip.

***Source**: DKS Associates, 2015.*

ONSITE CIRCULATION

Figure 3 illustrates the proposed onsite circulation plan. One-way flow is proposed through the fuel area. Traffic would flow from the south to the north. There are 16 vehicle fueling positions; four positions are located in the east row, and six positions in each of the other two rows. In addition to the 16 fueling positions, there is space for the queuing of approximately eight vehicles between the entrance to the fueling area and the east-west access aisle. Fuel truck delivery would occur at the western edge of the fuel area, as shown by the swept path of a typical fuel delivery vehicle on the plan.

CIRCULATION REVIEW

The following issues have been identified, as shown on Figure 4:

- There is a discrepancy on the plan, regarding the width of the north-west circulation aisle. Two dimensions, different in physical length, are shown as 24 feet.

- The fuel truck position is shown encroaching into the circulation aisle. Based upon the earlier referenced TJKM report, up to three fuel truck deliveries may occur per day.

- Access to the east row could be blocked by vehicles queued at the center and west rows.

- Vehicles in the north-south circulation aisle traverse an offset alignment.

The following plan modifications and operational strategies are recommended:

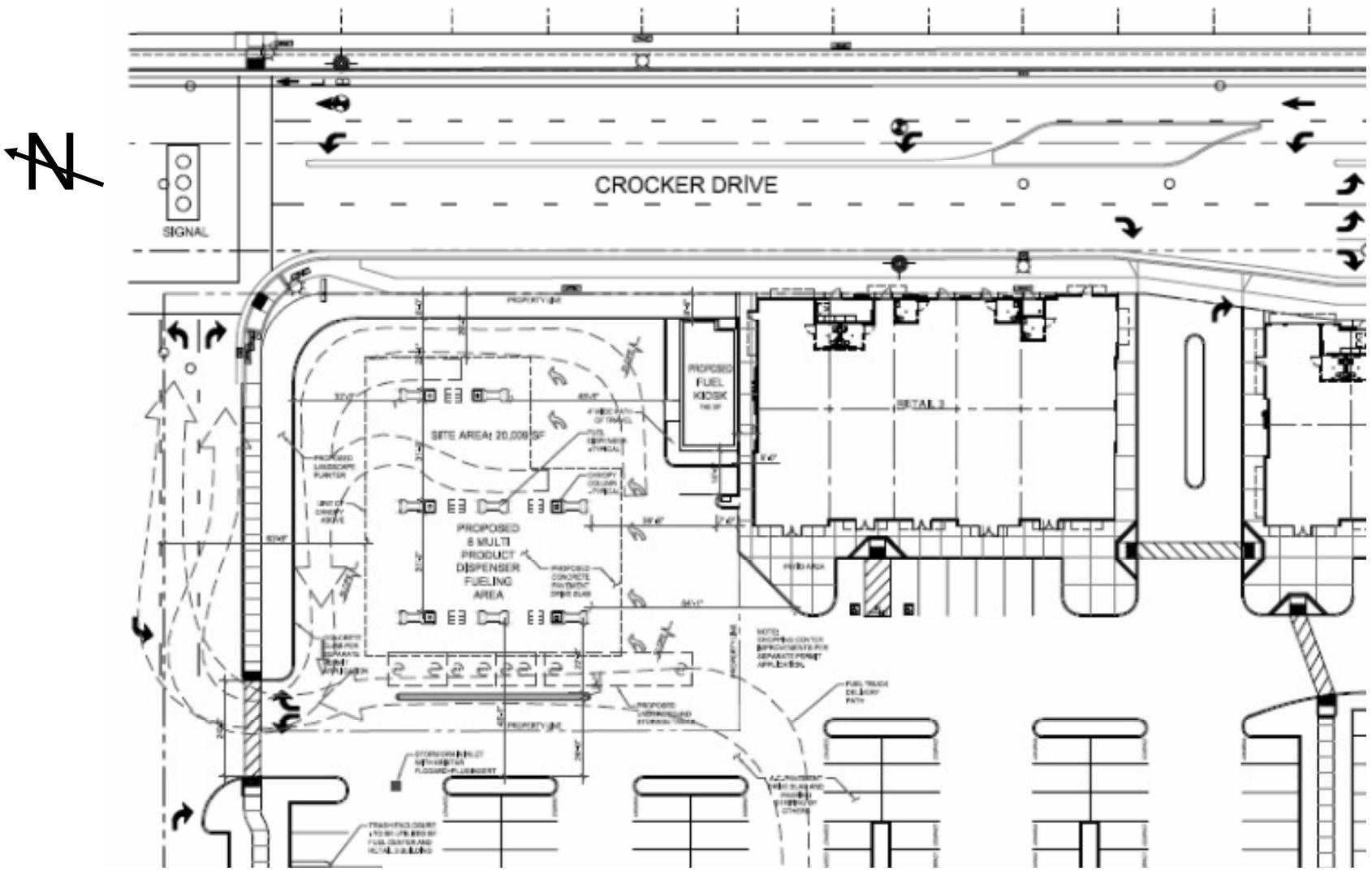
1. Address the circulation aisle width discrepancy. It is desirable that a continuous aisle is provided throughout the area without offsets (curves) in the vehicle travel path.

2. Revise the fuel truck location such that the fuel truck does not encroach into the circulation aisle.

3. Provide signing and striping to California MUTCD 2014 Edition Standards. This should include one-way and do not enter signage, as well as stop bars at the exit of the fuel area (at the circulation aisle).

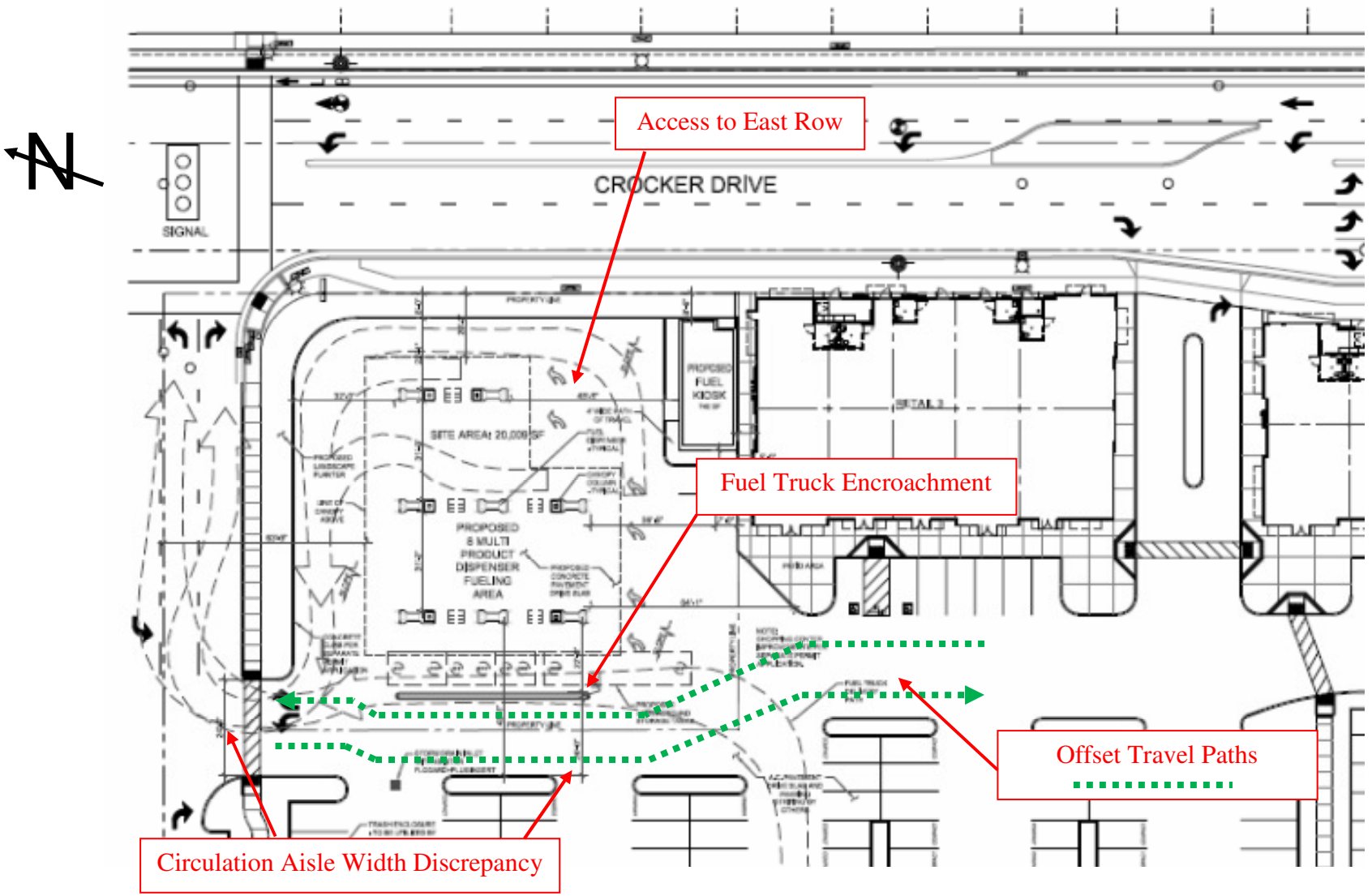
4. Safeway typically utilizes personnel (fuel ambassadors) to help direct traffic during busy periods. This practice is encouraged, as it will help to increase utilization of the fuel area. In particular, it may be necessary to direct vehicles to the east row (and maintain clear access to the row).

5. In the event that queuing exceeds the area between the fuel area and the circulation aisle, it may be necessary to dedicate an area (lane[s]) for queuing. This may result in the disruption of parking access during such periods. Figure 5 identifies a potential area for overflow queuing, which shall be monitored by the applicant. Fuel ambassadors shall be used for manual traffic direction and control.



Source: Curtis Park Village Fuel Center Site Plan, received March 16, 2015.

Figure 3
Proposed Site Plan



Source: Curtis Park Village Fuel Center Site Plan, received March 16, 2015.

Figure 4
Circulation Issues

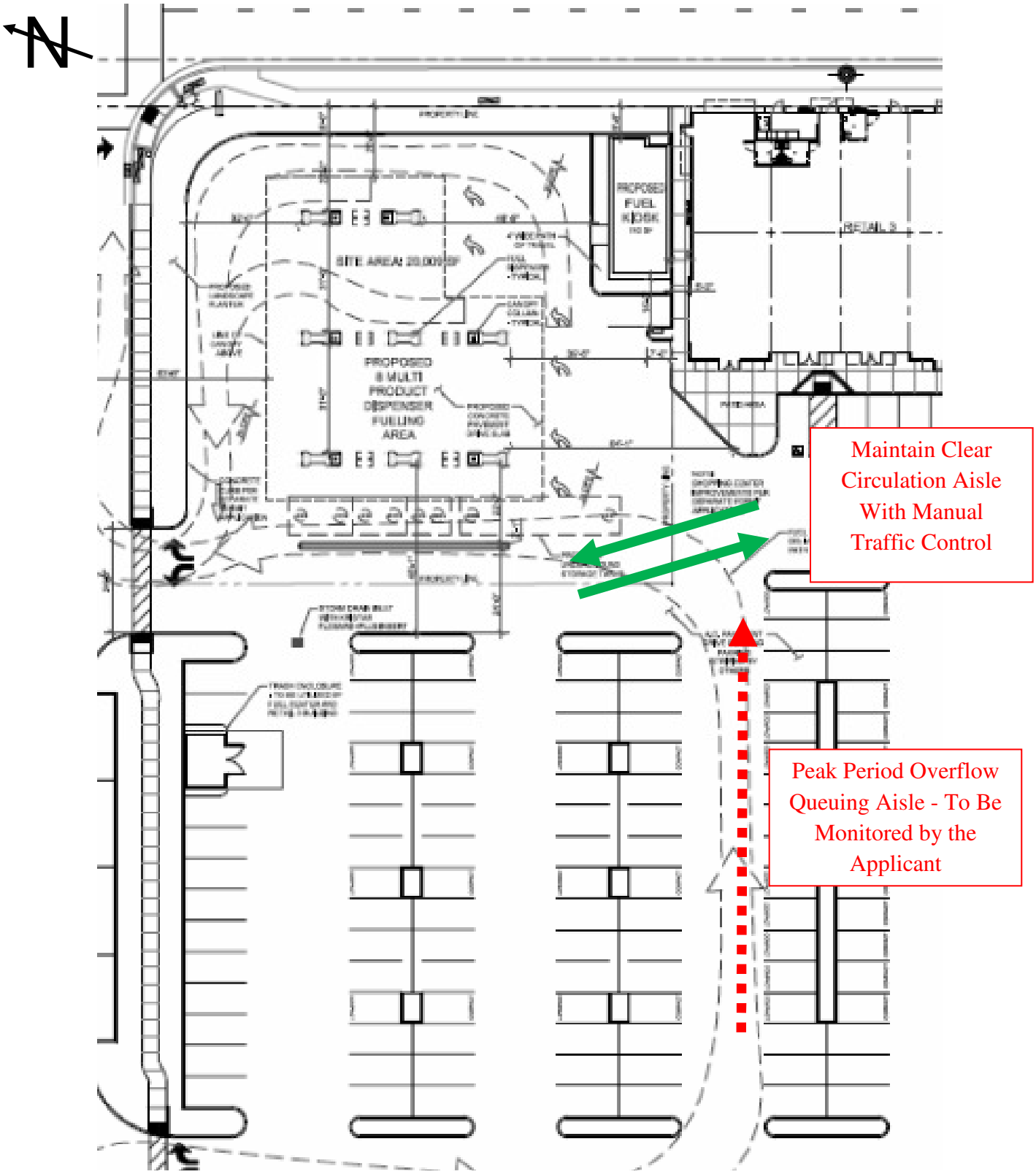


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Figure 5
Conceptual Overflow Queuing Management Strategy

QUEUING ANALYSIS

Based upon data collected by Fehr and Peers at the Pleasant Hill Safeway fuel center, the average service time at a fueling position is five minutes. Based upon this value, a fuel center with 16 vehicle fueling positions has an hourly capacity of 192 vehicles. This exceeds the peak hour trip generation estimate of 108 vehicles during the p.m. peak and Saturday peak hours.

Table 9 presents the results of queuing analysis. The queuing analysis assumes onsite circulation control (ambassadors) to ensure adequate access to all fueling positions. The anticipated 95th percentile queue does not exceed the available space at the proposed fuel center. Thus, no queuing impacts to City streets or sidewalks are anticipated.

TABLE 9
QUEUING ANALYSIS

Condition	AM Peak Hour	PM Peak Hour	Saturday Peak Hour
Fueling Positions	16	16	16
Service Rate (Customers per hour per position)	12	12	12
Estimated Demand	82	108	108
Average Number of Customers Waiting in Line	<1	<1	<1
Average Number of Customers in the System	6.8	9.0	9.0
95th Percentile Queue (beyond fueling positions)	<1	<1	<1

***Source**: DKS Associates, 2015.*

Table 10 presents the results of queuing analysis assuming the higher demand associated with the sensitivity analysis. For the a.m. and p.m. peak hour values (130 and 140 vehicles per hour, respectively), the anticipated 95th percentile queue does not exceed the available space at the proposed fuel center. For the Saturday peak hour value, which equals the highest demand value recorded at the Campbell site, the 95th percentile queue is 17 vehicles. This exceeds the available queuing space adjacent to the fuel center. However, the additional queue (9 vehicles) could be accommodated onsite with proper queue management. For example, see Figure 5. No impacts to offsite City streets or sidewalks are anticipated.

TABLE 10 QUEUING – SENSITIVITY ANALYSIS			
Condition	**AM Peak Hour**	**PM Peak Hour**	**Saturday Peak Hour**
Fueling Positions	16	16	16
Service Rate (Customers per hour per position)	12	12	12
Estimated Demand	130	140	168
Average Number of Customers Waiting in Line	<1	<1	3.6
Average Number of Customers in the System	11.0	12.1	17.6
95th Percentile Queue (beyond fueling positions)	1	3	17
***Source**: DKS Associates, 2015.*			

CONCLUSIONS

1. The review of trip generation information for the proposed fuel center concludes that the ITE data for a gasoline / service station with convenience market provides a reasonable estimate of anticipated site traffic. The ITE values are higher than the local Sacramento area Safeway fuel center data, but lower than the reportedly highest volume Safeway fuel centers located in the San Francisco Bay Area. For planning and review purposes, the higher volumes have been included in a sensitivity analysis.

2. Curtis Park Village (PUD) trip generation has been updated to reflect the latest project description, including the fuel center. The total peak hour and daily traffic volumes are lower than those utilized for traffic analysis in the project DEIR and FEIR. The sensitivity analysis of PUD trip generation, which includes the higher fuel center volumes, also results in lower vehicular trip generation than the volumes utilized in the DEIR and FEIR analyses.

3. A review of the onsite circulation identifies several items for improvement. With proper onsite traffic management (including signing, pavement marking, and peak period manual traffic direction), anticipated queues can be adequately accommodated onsite, without impacts to City streets and sidewalks. In the event of higher than anticipated volumes (sensitivity analysis), a queuing strategy has been identified that can manage queues onsite without impacts to City streets and sidewalks.

APPENDICES

DEIR TRIP GENERATION

Curtis Park Village
Trip Generation - As Analyzed in DEIR using ITE Trip Generation 7th edition

Trip Generation Land Use Category	Amount	Source	Trips Generated										Distribution					
			Weekday	AM Peak Hour			PM Peak Hour			Saturday			AM Peak		PM Peak		Saturday	
				In	Out	Total	In	Out	Total	In	Out	Total	In	Out	In	Out	In	Out
Retail (Shopping Center)	92.1 KSF	ITE (820)	6,439	91	58	149	285	308	593	427	394	821	61%	39%	48%	52%	52%	48%
Retail / Grocery Store	53.5 KSF	ITE (850)	4,973	128	82	210	290	279	569	312	299	611	61%	39%	51%	49%	51%	49%
Retail / Bookstore	25.0 KSF	ITE (868)[1]	5,299	75	48	123	254	234	488	282	251	533	61%	39%	52%	48%	53%	47%
Restaurant	13.0 KSF	ITE (932)	1,653	78	72	150	87	55	142	164	96	260	52%	48%	61%	39%	63%	37%
Dinner Theater	560.0 Seats	ITE (931)	1,602	9	8	17	98	48	146	124	87	211	52%	48%	67%	33%	59%	41%
Hotel	150.0 Rooms	ITE (310)	969	41	27	68	47	42	89	35	41	75	61%	39%	53%	47%	46%	54%
Health Spa	85.0 KSF	ITE (492)	2,799	43	60	103	175	169	344	111	111	221	42%	58%	51%	49%	50%	50%
Single-Family Residential	216 Units	ITE (210)	2,112	40	121	161	135	79	214	110	93	203	25%	75%	63%	37%	54%	46%
Park/Open Space	7.2 Acres	ITE (411)	11	0	0	0	0	0	0	1	1	2	50%	50%	50%	50%	50%	50%
Total Project Trips			25,857	505	476	981	1,371	1,214	2,585	1,566	1,373	2,937						
Transit Adjustments[2]																		
Retail (-1.8%)			-116	-2	-1	-3	-5	-6	-11	-8	-7	-15						
Grocery Store (-1.8%)			-90	-2	-2	-4	-5	-5	-10	-6	-5	-11						
Bookstore (-1.8%)			-95	-1	-1	-2	-5	-4	-9	-5	-5	-10						
Restaurant (-1.8%)			-30	-2	-1	-3	-2	-1	-3	-3	-2	-5						
Dinner Theater (-1.8%)			-29	0	0	0	-2	-1	-3	-2	-2	-4						
Hotel			0	0	0	0	0	0	0	0	0	0						
Health Spa (-1.8%)			-50	-1	-1	-2	-3	-3	-6	-2	-2	-4						
Residential (Daily -3.1% , a.m. -3.7% , p.m. -3.6% , Sat. -3.1			-65	-1	-4	-6	-5	-3	-8	-3	-3	-6						
Total Transit Adjustments			-475	-9	-10	-20	-27	-23	-50	-29	-26	-55						
Internal Trips			-5,807	-78	-78	-156	-259	-259	-518	-315	-315	-630						
Pass-by Trips (33% of net retail trips)			-3,545	-53	-53	-106	-184	-184	-368	-217	-217	-434						
New External Trips			16,030	365	335	699	901	748	1,649	1,005	815	1,818						
Transit Trips																		
Retail (2.2%)			501	10	7	17	24	26	50	30	28	58						
Residential (Daily 3.8% , a.m. 4.5% , p.m. 4.5% , Sat. 3.8%)			80	2	5	7	6	4	10	4	4	8						
Total Transit Trips			581	12	12	24	30	30	60	34	32	66						

Note:

[1] Trip generation for weekday and AM peak hour for bookstore were based on trip generation ratio of retail/shopping center land use.

[2] Transit adjustments and transit trips for restaurant, theater and health spa were assumed to be the same percentage as for retail use.

[3] Pass-by adjustments were made for shopping center, grocery store and bookstore only

Analyst: Dowling

Date: 9 15 2009

MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
As Analyzed in DEIR (ITE 7th ed)

Name of Development: Curtis Park

AM Peak Hour

Land Use A: Residential

ITE LU Code		210 220		
Exit to External	Size	366.0 units		
125		Total	Internal	External
	Enter	80	18	62
	Exit	144	19	125
62	Total	224	37	187
Enter from External		100	17	83

Demand		Balanced	Demand	
37	30	18	7	18
34	49	19	5	19

Land Use B: Retail

ITE LU Code		Various		
	Size	226.0 ksf		Enter from External
	Total	Internal	External	355
Enter	374	19	355	
Exit	263	18	245	
Total	637	37	600	245
	100	6	94	Exit to External

Note: Midday peak hour internal capture rates were used for the AM peak hour.

Residential land use includes single family homes and hotel

Net External Trips for Multi-use Development				
	LAND USE A	*LAND USE B*	*TOTAL*	
Enter	62	355	417	
Exit	125	245	370	
Total	187	600	787	*INTERNAL CAPTURE*
Single-Use Trip	224	637	861	9

Retail land use includes shopping center, grocery, bookstore, restaurants and dinner theater

PM Peak Hour

Land Use A: Residential

ITE LU Code		210 220		
Exit to External	Size	366.0 units		
55		Total	Internal	External
	Enter	177	55	122
	Exit	118	63	55
122	Total	295	117	178
Enter from External		100	40	60

Demand		Balanced	Demand	
31	55	55	12	109
53	63	63	9	90

Land Use B: Retail

ITE LU Code		Various		
	Size	226.0 ksf		Enter from External
	Total	Internal	External	932
Enter	995	63	932	
Exit	907	55	852	
Total	1,902	117	1785	852
	100	6	94	Exit to External

Net External Trips for Multi-use Development				
	LAND USE A	*LAND USE B*	*TOTAL*	
Enter	122	932	1055	
Exit	55	852	908	
Total	178	1785	1962	*INTERNAL CAPTURE*
Single-Use Trip	295	1902	2197	11

Saturday Peak Hour

Land Use A: Residential

ITE LU Code		210 220		
Exit to External	Size	366.0 units		
81		Total	Internal	External
	Enter	142	47	95
	Exit	131	50	81
95	Total	273	97	176
Enter from External		100	35	65

Demand		Balanced	Demand	
33	47	47	11	122
38	50	50	9	116

Land Use B: Retail

ITE LU Code		Various		
	Size	226.0 ksf		Enter from External
	Total	Internal	External	1235
Enter	1,285	50	1235	
Exit	1,106	47	1059	
Total	2,391	97	2294	1059
	100	4	96	Exit to External

Note: Daily peak hour internal capture rates were used for the Saturday peak hour.

Net External Trips for Multi-use Development				
	LAND USE A	*LAND USE B*	*TOTAL*	
Enter	95	1235	1330	
Exit	81	1059	1140	
Total	176	2294	2471	*INTERNAL CAPTURE*
Single-Use Trip	273	2391	2664	7

Daily

Land Use A: Residential

ITE LU Code		210 220		
Exit to External	Size	366.0 units		
935		Total	Internal	External
	Enter	1,508	498	1010
	Exit	1,508	573	935
1010	Total	3,016	1071	1945
Enter from External		100	36	65

Demand		Balanced	Demand	
33	498	498	11	1078
38	573	573	9	882

Land Use B: Retail

ITE LU Code		Various		
	Size	226.0 ksf		Enter from External
	Total	Internal	External	9230
Enter	9,803	573	9230	
Exit	9,803	498	9305	
Total	19,606	1071	18535	9305
	100	5	95	Exit to External

Net External Trips for Multi-use Development				
	LAND USE A	*LAND USE B*	*TOTAL*	
Enter	1010	9230	10240	
Exit	935	9305	10240	
Total	1945	18535	20481	*INTERNAL CAPTURE*
Single-Use Trip	3016	19606	22622	9

Source: *Trip Generation Handbook, 2nd Edition* (ITE 2004).

Analyst: Dowling

Date: 9 15 2009

MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
As Analyzed in DEIR (ITE 7th ed)

Name of Development: Curtis Park

The **total** of the internal trip capture rates at each retail site was constrained to equal the unconstrained rate in the ITE Trip Generation Handbook.

20% Unsoncstrained internal capture rate for trip origins

20% Unsoncstrained internal capture rate for trip destinations

Note: PM peak hour internal capture rates were used for the AM peak hour.

Time Period: AM Peak Hour

Land Use B: Retail Grocery Store

ITE LU Code	850		
Size	53.5 KSF		
	Total	Internal	External
Enter	126	12	114
Exit	80	11	69
Total	206	23	183
	100	11	89

Exit to External: 69 | Enter from External: 114

Demand 9 / 7 | Balanced 7 | Demand 6 / 10

Demand 8 / 10 | Balanced 7 | Demand 7 / 7

Demand 6 / 8 | Balanced 5 | Demand 5 / 4

Demand 7 / 5 | Balanced 4 | Demand 6 / 5

Land Use A: Retail (Shopping Ctr Bkstore)

ITE LU Code	820	868		
Size	117.1 KSF			
		Total	Internal	External
Enter		163	14	149
Exit		104	12	92
Total		267	26	241
		100	10	90

Exit to External: 92 | Enter from External: 149

Demand 6 / 10 | Balanced 7 | Demand 9 / 7

Demand 5 / 5 | Balanced 5 | Demand 8 / 7

Land Use C: Theater Restaurants

ITE LU Code	931	932		
Size	55.4 KSF			
		Total	Internal	External
Enter		85	8	77
Exit		79	12	67
Total		164	21	143
		100	13	87

Enter from External: 77 | Exit to External: 67

Net External Trips for Multi-use Development

	LAND USE A	*LAND USE B*	*LAND USE C*	*TOTAL*	
Enter	149	114	77	339	
Exit	92	69	67	228	
Total	241	183	143	568	*INTERNAL CAPTURE*
Single-Use Trip	267	206	164	637	11

The **total** of the internal trip capture rates at each retail site was constrained to equal the unconstrained rate in the ITE Trip Generation Handbook.

20% Unsoncstrained internal capture rate for trip origins

20% Unsoncstrained internal capture rate for trip destinations

Time Period: PM Peak Hour

Land Use B: Retail Grocery Store

ITE LU Code	850		
Size	53.5 KSF		
	Total	Internal	External
Enter	285	36	249
Exit	274	39	235
Total	559	75	484
	100	13	87

Exit to External: 235 | Enter from External: 249

Demand 11 / 29 | Balanced 29 | Demand 6 / 32

Demand 12 / 33 | Balanced 30 | Demand 6 / 30

Demand 2 / 6 | Balanced 6 | Demand 6 / 6

Demand 4 / 10 | Balanced 10 | Demand 6 / 11

Land Use A: Retail (Shopping Ctr Bkstore)

ITE LU Code	820	868		
Size	117.1 KSF			
		Total	Internal	External
Enter		529	40	489
Exit		532	50	482
Total		1061	90	971
		100	8	92

Exit to External: 482 | Enter from External: 489

Demand 2 / 12 | Balanced 11 | Demand 11 / 11

Demand 4 / 19 | Balanced 19 | Demand 12 / 21

Land Use C: Theater Restaurants

ITE LU Code	931	932		
Size	55.4 KSF			
		Total	Internal	External
Enter		181	29	152
Exit		101	17	84
Total		282	46	236
		100	16	84

Enter from External: 152 | Exit to External: 84

Net External Trips for Multi-use Development

	LAND USE A	*LAND USE B*	*LAND USE C*	*TOTAL*	
Enter	489	249	152	890	
Exit	482	235	84	802	
Total	971	484	236	1691	*INTERNAL CAPTURE*
Single-Use Trip	1061	559	282	1902	11

Analyst: Dowling

Date: 9 15 2009

MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
As Analyzed in DEIR (ITE 7th ed)

Name of Development: Curtis Park

The **total** of the internal trip capture rates at each retail site was constrained to equal the unconstrained rate in the ITE Trip Generation Handbook.

30% Unsoncstrained internal capture rate for trip origins

28% Unsoncstrained internal capture rate for trip destinations

Note: Daily peak hour internal capture rates were used for the Saturday peak hour.

Time Period: Saturday Peak Hour

Land Use B: Retail Grocery Store

ITE LU Code	850		
Size	53.5 KSF		
	Total	Internal	External
Enter	306	58	248
Exit	294	67	227
Total	600	125	475
Enter from External	100	21	79

Exit to External: 227 | Enter from External: 248

Demand 16 / 48 | Balanced 48 | Demand 7 / 52

Demand 16 / 49 | Balanced 45 | Demand 7 / 21

Demand 5 / 14 | Balanced 13 | Demand 7 / 13

Demand 7 / 19 | Balanced 19

Land Use A: Retail (Shopping Ctr Bkstore)

ITE LU Code	820	868	
Size	117.1 KSF		
	Total	Internal	External
Enter	696	77	619
Exit	633	87	546
Total	1329	164	1165
	100	12	88

Exit to External: 546 | Enter from External: 619

Demand 7 / 45

Demand 5 / 32 | Balanced 29 | Demand 16 / 29

Demand 7 / 42 | Balanced 42 | Demand 16 / 45

Land Use C: Theater Restaurants

ITE LU Code	931	932	
Size	55.4 KSF		
	Total	Internal	External
Enter	283	61	222
Exit	179	42	137
Total	462	103	359
	100	22	78

Enter from External: 222 | Exit to External: 137

Net External Trips for Multi-use Development

	LAND USE A	*LAND USE B*	*LAND USE C*	*TOTAL*	
Enter	619	248	222	1089	
Exit	546	227	137	910	
Total	1165	475	359	1999	*INTERNAL CAPTURE*
Single-Use Trip	1329	600	462	2391	16

The **total** of the internal trip capture rates at each retail site was constrained to equal the unconstrained rate in the ITE Trip Generation Handbook.

30% Unsoncstrained internal capture rate for trip origins

28% Unsoncstrained internal capture rate for trip destinations

Time Period: Daily

Land Use B: Retail Grocery Store

ITE LU Code	850		
Size	53.5 KSF		
	Total	Internal	External
Enter	2442	513	1929
Exit	2442	513	1929
Total	4884	1027	3857
Enter from External	100	21	79

Exit to External: 1929 | Enter from External: 1929

Demand 18 / 431 | Balanced 402 | Demand 7 / 402

Demand 16 / 402 | Balanced 402 | Demand 7 / 431

Demand 5 / 111 | Balanced 111 | Demand 7 / 119

Demand 5 / 119 | Balanced 111 | Demand 7 / 111

Land Use A: Retail (Shopping Ctr Bkstore)

ITE LU Code	820	868	
Size	117.1 KSF		
	Total	Internal	External
Enter	5764	665	5099
Exit	5764	665	5099
Total	11528	1330	10198
	100	12	88

Exit to External: 5099 | Enter from External: 5099

Demand 7 / 431

Demand 5 / 263 | Balanced 263 | Demand 18 / 282

Demand 5 / 282 | Balanced 263 | Demand 16 / 263

Land Use C: Theater Restaurants

ITE LU Code	931	932	
Size	55.4 KSF		
	Total	Internal	External
Enter	1598	375	1223
Exit	1598	375	1223
Total	3196	749	2447
	100	23	77

Enter from External: 1223 | Exit to External: 1223

Net External Trips for Multi-use Development

	LAND USE A	*LAND USE B*	*LAND USE C*	*TOTAL*	
Enter	5099	1929	1223	8251	
Exit	5099	1929	1223	8251	
Total	10198	3857	2447	16502	*INTERNAL CAPTURE*
Single-Use Trip	11528	4884	3196	19608	16

Analyst: Dowling

Date: 9 15 2009

MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
As Analyzed in DEIR (ITE 7th ed)

Name of Development: Curtis Park

AM Peak Hour

Land Use A: Residential

ITE LU Code		210 220		
Exit to External	Size	366.0 units		
142		Total	Internal	External
	Enter	80	4	76
	Exit	144	2	142
76	Total	224	6	218
Enter from External		100	3	97

Demand		Balanced	Demand	
37	30	4	7	4
34	49	2	5	2

Land Use B: Health Spa

ITE LU Code		492		
	Size	85.0 ksf		Enter from External
	Total	Internal	External	41
Enter	43	2	41	
Exit	60	4	56	
Total	103	6	97	56
	100	6	94	Exit to External

Note: Midday peak hour internal capture rates were used for the AM peak hour.

Residential land use includes single family homes and hotel

Net External Trips for Multi-use Development				
	LAND USE A	*LAND USE B*	*TOTAL*	
Enter	76	41	117	
Exit	142	56	198	
Total	218	97	314	*INTERNAL CAPTURE*
Single-Use Trip	224	103	327	4

Retail land use includes shopping center, grocery, bookstore, restaurants and dinner theater

PM Peak Hour

Land Use A: Residential

ITE LU Code		210 220		
Exit to External	Size	366.0 units		
102		Total	Internal	External
	Enter	177	20	157
	Exit	118	16	102
157	Total	295	36	259
Enter from External		100	12	88

Demand		Balanced	Demand	
31	55	20	12	20
53	63	16	9	16

Land Use B: Health Spa

ITE LU Code		492		
	Size	85.0 ksf		Enter from External
	Total	Internal	External	159
Enter	175	16	159	
Exit	169	20	149	
Total	344	36	308	149
	100	10	90	Exit to External

Net External Trips for Multi-use Development				
	LAND USE A	*LAND USE B*	*TOTAL*	
Enter	157	159	316	
Exit	102	149	251	
Total	259	308	567	*INTERNAL CAPTURE*
Single-Use Trip	295	344	639	11

Saturday Peak Hour

Land Use A: Residential

ITE LU Code		210 220		
Exit to External	Size	366.0 units		
121		Total	Internal	External
	Enter	142	12	130
	Exit	131	10	121
130	Total	273	22	251
Enter from External		100	8	92

Demand		Balanced	Demand	
33	47	12	11	12
38	50	10	9	10

Land Use B: Health Spa

ITE LU Code		492		
	Size	85.0 ksf		Enter from External
	Total	Internal	External	101
Enter	111	10	101	
Exit	111	12	99	
Total	222	22	200	99
	100	10	90	Exit to External

Note: Daily peak hour internal capture rates were used for the Saturday peak hour.

Net External Trips for Multi-use Development				
	LAND USE A	*LAND USE B*	*TOTAL*	
Enter	130	101	231	
Exit	121	99	220	
Total	251	200	451	*INTERNAL CAPTURE*
Single-Use Trip	273	222	495	9

Daily

Land Use A: Residential

ITE LU Code		210 220		
Exit to External	Size	366.0 units		
1382		Total	Internal	External
	Enter	1,508	154	1354
	Exit	1,508	126	1382
1354	Total	3,016	280	2736
Enter from External		100	9	91

Demand		Balanced	Demand	
33	498	154	11	154
38	573	126	9	126

Land Use B: Health Spa

ITE LU Code		492		
	Size	85.0 ksf		Enter from External
	Total	Internal	External	1274
Enter	1,400	126	1274	
Exit	1,400	154	1246	
Total	2,800	280	2520	1246
	100	10	90	Exit to External

Net External Trips for Multi-use Development				
	LAND USE A	*LAND USE B*	*TOTAL*	
Enter	1354	1274	2628	
Exit	1382	1246	2628	
Total	2736	2520	5256	*INTERNAL CAPTURE*
Single-Use Trip	3016	2800	5816	10

Source: *Trip Generation Handbook, 2nd Edition* (ITE 2004).

FEIR TRIP GENERATION

Curtis Park Village
Trip Generation -Current Proposed Project September 2009 (using ITE Trip Generation 8th edition)

Trip Generation Land Use Category	Amount	Source	Trips Generated									Distribution					
			Weekday	AM Peak Hour			PM Peak Hour			Saturday			AM Peak		PM Peak		Saturday	
				In	Out	Total	In	Out	Total	In	Out	Total	In	Out	In	Out	In	Out
Retail (Shopping Center)	129.5 KSF	ITE (820)	8,034	109	70	179	370	386	756	527	487	1,014	61%	39%	49%	51%	52%	48%
Retail / Grocery Store	53.5 KSF	ITE (850)	4,973	117	75	192	300	289	589	296	284	580	61%	39%	51%	49%	51%	49%
Retail / Bookstore	25.0 KSF	ITE (868)[1]	5,186	71	45	116	254	234	488	282	251	533	61%	39%	52%	48%	53%	47%
Restaurant	13.0 KSF	ITE (932)	1,653	78	72	150	86	59	145	97	86	183	52%	48%	59%	41%	53%	47%
Athletic Club	38.0 KSF	ITE (493)	1,634	69	44	113	144	89	233	124	129	253	61%	39%	62%	38%	49%	51%
Multi-Family Residential	248 Units	ITE (220)[2]	1,626	25	100	125	100	54	154	75	64	139	20%	80%	65%	35%	54%	46%
Sr Adult Housing - Attached	90 Units	ITE (252)[5]	313	4	8	12	8	6	14	13	14	27	36%	64%	60%	40%	48%	52%
Single-Family Residential	190 Units	ITE (210)	1,877	36	107	143	118	69	187	94	83	177	25%	75%	63%	37%	53%	47%
Park/Open Space	6.9 Acres	ITE (411)	11	0	0	0	0	0	0	1	1	2	50%	50%	50%	50%	50%	50%
Total Project Trips			25,307	509	521	1,030	1,380	1,186	2,566	1,509	1,399	2,908						
Transit Adjustments[3]																		
Retail (-1.8%)			-145	-2	-1	-3	-7	-7	-14	-9	-9	-18						
Grocery Store (-1.8%)			-90	-2	-1	-3	-6	-5	-11	-5	-5	-10						
Bookstore (-1.8%)			-93	-1	-1	-2	-5	-4	-9	-5	-5	-10						
Restaurant (-1.8%)			-30	-2	-1	-3	-2	-1	-3	-2	-1	-3						
Athletic Club (-1.8%)			-29	-1	-1	-2	-2	-2	-4	-2	-3	-5						
Residential (Daily -3.1%, a.m. -3.7%, p.m. -3.6%, Sat. -3.1%)			-118	-2	-8	-10	-8	-5	-13	-6	-5	-11						
Total Transit Adjustments			-505	-10	-13	-23	-30	-24	-54	-29	-28	-57						
Internal Trips			-5,840	-82	-82	-165	-255	-255	-509	-320	-320	-640						
Pass-by Trips (32% of net retail trips)			-3,796	-50	-50	-99	-204	-204	-407	-229	-229	-457						
New External Trips			15,166	367	376	743	891	703	1,596	931	822	1,754						
Transit Trips																		
Retail (2.2%)			473	10	7	17	24	25	49	29	27	56						
Residential (Daily 3.8%, a.m. 4.5%, p.m. 4.5%, Sat. 3.8%)			145	3	10	13	10	6	16	7	6	13						
Total Transit Trips			618	13	17	30	34	31	65	36	33	69						

Note:

[1] Trip generation for weekday and AM peak hour for bookstore were based on trip generation ratio of retail/shopping center land use.

[2] Trip generation for Saturday peak hour for multi-family residential was based on data from Low Rise Apartment (ITE 221)

[3] Transit adjustments and transit trips for grocery store, bookstore, restaurant and athletic club were assumed to be the same percentage as for retail use.

[4] Pass-by adjustments were made for shopping center, grocery store and bookstore only

MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
Current Proposed Project (ITE 8th ed)

Analyst: Dowling

Date: 9 17 2009

Name of Development: Curtis Park

AM Peak Hour

Land Use A: Residential

	ITE LU Code	210 220		
Exit to External	Size	528.0 units		
185		Total	Internal	External
	Enter	63	21	42
	Exit	207	22	185
42	Total	270	43	227
Enter from External		100	16	84

Demand		Balanced	Demand	
37	23	21	7	21
Demand		Balanced	Demand	
34	70	22	5	22

Land Use B: Retail

ITE LU Code	Various			
	Size	259.0 ksf		Enter from External
	Total	Internal	External	414
Enter	436	22	414	
Exit	301	21	280	
Total	737	43	694	280
	100	6	94	Exit to External

Note: Midday peak hour internal capture rates were used for the AM peak hour.

Residential land use includes single family homes and hotel

Net External Trips for Multi-use Development				
	LAND USE A	*LAND USE B*	*TOTAL*	
Enter	42	414	456	
Exit	185	280	465	
Total	227	694	921	*INTERNAL CAPTURE*
Single-Use Trip	270	737	1007	9

Retail land use includes shopping center, grocery, bookstore, restaurants and dinner theater

PM Peak Hour

Land Use A: Residential

	ITE LU Code	210 220		
Exit to External	Size	528.0 units		
58		Total	Internal	External
	Enter	218	68	150
	Exit	124	66	58
150	Total	342	133	209
Enter from External		100	39	61

Demand		Balanced	Demand	
31	68	68	12	125
Demand		Balanced	Demand	
53	66	66	9	102

Land Use B: Retail

ITE LU Code	Various			
	Size	259.0 ksf		Enter from External
	Total	Internal	External	1066
Enter	1,132	66	1066	
Exit	1,038	68	970	
Total	2,170	133	2037	970
	100	6	94	Exit to External

Net External Trips for Multi-use Development				
	LAND USE A	*LAND USE B*	*TOTAL*	
Enter	150	1066	1217	
Exit	58	970	1029	
Total	209	2037	2245	*INTERNAL CAPTURE*
Single-Use Trip	342	2170	2512	11

Saturday Peak Hour

Land Use A: Residential

	ITE LU Code	210 220		
Exit to External	Size	528.0 units		
97		Total	Internal	External
	Enter	176	58	118
	Exit	156	59	97
118	Total	332	117	215
Enter from External		100	35	65

Demand		Balanced	Demand	
33	58	58	11	134
Demand		Balanced	Demand	
38	59	59	9	117

Land Use B: Retail

ITE LU Code	Various			
	Size	259.0 ksf		Enter from External
	Total	Internal	External	1244
Enter	1,303	59	1244	
Exit	1,214	58	1156	
Total	2,517	117	2400	1156
	100	5	95	Exit to External

Note: Daily peak hour internal capture rates were used for the Saturday peak hour.

Net External Trips for Multi-use Development				
	LAND USE A	*LAND USE B*	*TOTAL*	
Enter	118	1244	1362	
Exit	97	1156	1253	
Total	215	2400	2614	*INTERNAL CAPTURE*
Single-Use Trip	332	2517	2849	8

Daily

Land Use A: Residential

	ITE LU Code	210 220		
Exit to External	Size	528.0 units		
1146		Total	Internal	External
	Enter	1,849	610	1239
	Exit	1,849	703	1146
1239	Total	3,698	1313	2385
Enter from External		100	36	65

Demand		Balanced	Demand	
33	610	610	11	1160
Demand		Balanced	Demand	
38	703	703	9	949

Land Use B: Retail

ITE LU Code	Various			
	Size	259.0 ksf		Enter from External
	Total	Internal	External	9844
Enter	10,547	703	9844	
Exit	10,547	610	9937	
Total	21,094	1313	19781	9937
	100	6	94	Exit to External

Net External Trips for Multi-use Development				
	LAND USE A	*LAND USE B*	*TOTAL*	
Enter	1239	9844	11083	
Exit	1146	9937	11083	
Total	2385	19781	22166	*INTERNAL CAPTURE*
Single-Use Trip	3698	21094	24792	11

Source: *Trip Generation Handbook, 2nd Edition* (ITE 2004).

Analyst: Dowling

Date: 9 17 2009

MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
Current Proposed Project (ITE 8th ed)

Name of Development: Curtis Park

The **total** of the internal trip capture rates at each retail site was constrained to equal the unconstrained rate in the ITE Trip Generation Handbook.

20% Unsoncstrained internal capture rate for trip origins

20% Unsoncstrained internal capture rate for trip destinations

Note: PM peak hour internal capture rates were used for the AM peak hour.

Time Period: AM Peak Hour

Land Use B: Retail Grocery Store

ITE LU Code	850		
Size	53.5 KSF		
	Total	Internal	External
Enter	115	12	103
Exit	74	11	63
Total	189	23	166
Enter from External	100	12	88

Exit to External: 63 | Enter from External: 103

Demand 8 6 | Balanced 6 | Demand 5 9

Demand 8 9 | Balanced 6 | Demand 5 7

Demand 8 9 | Balanced 6 | Demand 7 5

Demand 8 9 | Balanced 5 | Demand 5 6

Land Use A: Retail (Shopping Ctr Bkstore)

ITE LU Code	820 868		
Size	154.5 KSF		
	Total	Internal	External
Enter	177	15	162
Exit	113	13	100
Total	290	29	261
	100	10	90

Exit to External: 100 | Enter from External: 162

Demand 5 6 | Balanced 9 | Demand 8 9

Demand 8 13 | Balanced 7 | Demand 8 11

Land Use C: Athletic Club Restaurants

ITE LU Code	493 932		
Size	51.0 KSF		
	Total	Internal	External
Enter	144	12	132
Exit	114	15	99
Total	258	28	230
	100	11	89

Enter from External: 132 | Exit to External: 99

Net External Trips for Multi-use Development

	LAND USE A	*LAND USE B*	*LAND USE C*	*TOTAL*	
Enter	162	103	132	396	
Exit	100	63	99	261	
Total	261	166	230	658	*INTERNAL CAPTURE*
Single-Use Trip	290	189	258	737	11

The **total** of the internal trip capture rates at each retail site was constrained to equal the unconstrained rate in the ITE Trip Generation Handbook.

20% Unsoncstrained internal capture rate for trip origins

20% Unsoncstrained internal capture rate for trip destinations

Time Period: PM Peak Hour

Land Use B: Retail Grocery Store

ITE LU Code	850		
Size	53.5 KSF		
	Total	Internal	External
Enter	294	39	255
Exit	284	42	242
Total	578	81	497
Enter from External	100	14	86

Exit to External: 242 | Enter from External: 255

Demand 11 31 | Balanced 31 | Demand 12 34

Demand 3 8 | Balanced 8 | Demand 4 11

Demand 5 33 | Balanced 32 | Demand 5 32

Demand 5 8 | Balanced 11 | Demand 5 12

Land Use A: Retail (Shopping Ctr Bkstore)

ITE LU Code	820 868		
Size	154.5 KSF		
	Total	Internal	External
Enter	612	46	566
Exit	609	56	553
Total	1221	102	1119
	100	8	92

Exit to External: 553 | Enter from External: 566

Demand 3 17 | Balanced 16 | Demand 11 16

Demand 4 24 | Balanced 24 | Demand 12 27

Land Use C: Athletic Club Restaurants

ITE LU Code	493 932		
Size	51.0 KSF		
	Total	Internal	External
Enter	226	36	190
Exit	145	23	122
Total	371	59	312
	100	16	84

Enter from External: 190 | Exit to External: 122

Net External Trips for Multi-use Development

	LAND USE A	*LAND USE B*	*LAND USE C*	*TOTAL*	
Enter	566	255	190	1011	
Exit	553	242	122	917	
Total	1119	497	312	1928	*INTERNAL CAPTURE*
Single-Use Trip	1221	578	371	2170	11

Analyst: Dowling

Date: 9 17 2009

MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
Current Proposed Project (ITE 8th ed)

Name of Development: Curtis Park

The **total** of the internal trip capture rates at each retail site was constrained to equal the unconstrained rate in the ITE Trip Generation Handbook.

30% Unsoncstrained internal capture rate for trip origins

28% Unsoncstrained internal capture rate for trip destinations

Note: Daily peak hour internal capture rates were used for the Saturday peak hour.

Time Period: Saturday Peak Hour

Land Use B: Retail Grocery Store

ITE LU Code		850		
Exit to External	Size		53.5 KSF	
214		Total	Internal	External
	Enter	291	63	228
	Exit	279	65	214
228	Total	570	128	442
Enter from External		100	22	78

Demand 18 51 | Balanced 51 | Demand 6 51

Demand 17 49 | Balanced 49 | Demand 7 49

Demand 5 14 | Balanced 14 | Demand 6 14

Demand 5 14 | Balanced 14 | Demand 7 14

Land Use A: Retail (Shopping Ctr Bkstore)

ITE LU Code		820 868		
Exit to External	Size		154.5 KSF	
639		Total	Internal	External
	Enter	795	90	705
	Exit	724	85	639
705	Total	1519	174	1345
Enter from External		100	11	89

Demand 5 39 | Balanced 39 | Demand 18 39

Demand 5 36 | Balanced 36 | Demand 17 36

Land Use C: Athletic Club Restaurants

ITE LU Code		493 932		
	Size		51.0 KSF	Enter from External
	Total	Internal	External	167
Enter	217	50	167	
Exit	211	53	158	
Total	428	103	325	158
	100	24	76	Exit to External

Net External Trips for Multi-use Development

	LAND USE A	*LAND USE B*	*LAND USE C*	*TOTAL*	
Enter	705	228	167	1101	
Exit	639	214	158	1012	
Total	1345	442	325	2112	*INTERNAL CAPTURE*
Single-Use Trip	1519	570	428	2517	16

The **total** of the internal trip capture rates at each retail site was constrained to equal the unconstrained rate in the ITE Trip Generation Handbook.

30% Unsoncstrained internal capture rate for trip origins

28% Unsoncstrained internal capture rate for trip destinations

Time Period: Daily

Land Use B: Retail Grocery Store

ITE LU Code		850		
Exit to External	Size		53.5 KSF	
1917		Total	Internal	External
	Enter	2442	525	1917
	Exit	2442	525	1917
1917	Total	4884	1051	3833
Enter from External		100	22	78

Demand 18 451 | Balanced 421 | Demand 6 421

Demand 17 421 | Balanced 421 | Demand 7 451

Demand 4 105 | Balanced 105 | Demand 7 112

Demand 5 112 | Balanced 105 | Demand 6 105

Land Use A: Retail (Shopping Ctr Bkstore)

ITE LU Code		820 868		
Exit to External	Size		154.5 KSF	
5792		Total	Internal	External
	Enter	6491	699	5792
	Exit	6491	699	5792
5792	Total	12982	1398	11584
Enter from External		100	11	89

Demand 4 278 | Balanced 278 | Demand 18 298

Demand 5 298 | Balanced 278 | Demand 17 278

Land Use C: Athletic Club Restaurants

ITE LU Code		931 932		
	Size		55.4 KSF	Enter from External
	Total	Internal	External	1231
Enter	1614	383	1231	
Exit	1614	383	1231	
Total	3228	766	2462	1231
	100	24	76	Exit to External

Net External Trips for Multi-use Development

	LAND USE A	*LAND USE B*	*LAND USE C*	*TOTAL*	
Enter	5792	1917	1231	8940	
Exit	5792	1917	1231	8940	
Total	11584	3833	2462	17880	*INTERNAL CAPTURE*
Single-Use Trip	12982	4884	3228	21094	15

UPDATED PROJECT TRIP GENERATION

Curtis Park Village Land Use	ITE Land Use	ITE Land Use Code	Quantity	Units	Daily Trips		AM Peak Commuter Hour Trips					PM Peak Commuter Hour Trips					Saturday Peak Hour Trips				
					Equation / Average	Total	Equation / Average	Percent Entering	Entering	Exiting	Total	Equation / Average	Percent Entering	Entering	Exiting	Total	Equation / Average	Percent Entering	Entering	Exiting	Total
Retail without Grocery	Shopping Center	820	161.734	KSF	E	9,282	E	62%	130	79	209	E	48%	397	430	827	E	52%	621	574	1,195
Retail / Grocery Store	Supermarket	850	57.266	KSF	E	5,226	A	62%	121	74	195	E	51%	263	253	516	E	51%	335	322	657
Health Spa	Health / Fitness Club	492	40.000	KSF	A	1,317	A	50%	28	28	56	E	57%	79	60	139	A	45%	50	61	111
Grocery Fuel Center	Gasoline / Service Station with Convenience Market	945	16	Vehicle Fueling Positions	A	2,604	A	50%	82	81	163	A	50%	108	108	216	(3)	50%	108	108	216
Single-Family Residential	Single-Family Detached Housing	210	193	Units	E	1,923	E	25%	36	109	145	E	63%	120	70	190	E	54%	98	83	181
Multi-Family Residential	Apartment	220	244	Units	E	1,602	E	20%	25	98	123	E	65%	99	53	152	E (2)	54%	64	55	119
Senior Housing	Senior Adult Housing - Attached	252	91	Units	E	292	E	34%	6	12	18	E	54%	12	11	23	E	57%	17	12	29
Park / Open Space	City Park	411	7	Acres	A	13	(1)	50%	0	0	0	(1)	50%	0	0	0	(1)	50%	1	1	2
Total Trips Before Adjustments	Retail Subtotal					18,429		58%	361	262	623		50%	847	851	1,698		51%	1,114	1,065	2,179
	Residential Subtotal					3,817		23%	67	219	286		63%	231	134	365		54%	179	150	329
	Park / Open Space Subtotal					13		50%	0	0	0		50%	0	0	0		50%	1	1	2
	Total					22,259		47%	428	481	909		52%	1,078	985	2,063		52%	1,294	1,216	2,510
Transit Adjustments	Shopping Center				-1.8%	-167	-1.8%		-2	-2	-4	-1.8%		-7	-8	-15	-1.8%		-11	-11	-22
	Supermarket				-1.8%	-94	-1.8%		-2	-2	-4	-1.8%		-5	-4	-9	-1.8%		-6	-6	-12
	Health / Fitness Club				-1.8%	-24	-1.8%		-1	0	-1	-1.8%		-2	-1	-3	-1.8%		-1	-1	-2
	Gasoline / Service Station with Convenience Market				0.0%	0	0.0%		0	0	0	0.0%		0	0	0	0.0%		0	0	0
	Single-Family Detached Housing				-3.1%	-60	-3.7%		-1	-4	-5	-3.6%		-4	-3	-7	-3.1%		-3	-3	-6
	Apartment				-3.1%	-50	-3.7%		-1	-4	-5	-3.6%		-3	-2	-5	-3.1%		-2	-2	-4
	Senior Adult Housing - Attached				-3.1%	-9	-3.7%		0	-1	-1	-3.6%		-1	0	-1	-3.1%		-1	0	-1
	City Park					0			0	0	0			0	0	0			0	0	0
Total Trips After Transit Adjustments	Shopping Center					9,115			128	77	205			390	422	812			610	563	1,173
	Supermarket					5,132			119	72	191			258	249	507			329	316	645
	Health / Fitness Club					1,293			27	28	55			77	59	136			49	60	109
	Gasoline / Service Station with Convenience Market					2,604			82	81	163			108	108	216			108	108	216
	Retail Subtotal					18,144			356	258	614			833	838	1,671			1,096	1,047	2,143
	Residential Subtotal					3,698			65	210	275			223	129	352			173	145	318
	Park / Open Space Subtotal					13			0	0	0			0	0	0			1	1	2
	Total					21,855			421	468	889			1,056	967	2,023			1,270	1,193	2,463
Internal Trips - Mixed Use Adjustments	Shopping Center					-660			-1	0	-1			-17	-52	-68			-31	-31	-61
	Supermarket					-371			-1	0	-1			-11	-30	-42			-17	-17	-34
	Health / Fitness Club					-94			0	0	0			-3	-7	-11			-2	-3	-6
	Gasoline / Service Station with Convenience Market					-188			0	0	-1			-5	-13	-18			-5	-6	-11
	Retail					-1,313			-2	-1	-3			-37	-103	-139			-55	-57	-112
	Residential					-1,313			-1	-2	-3			-103	-37	-139			-57	-55	-112
	Park / Open Space					0			0	0	0			0	0	0			0	0	0
	Total					-2,626			-3	-3	-7			-139	-139	-279			-112	-112	-224
External Trips After Mixed Use Adjustments	Shopping Center					8,455			127	77	204			373	370	744			579	532	1,112
	Supermarket					4,761			118	72	190			247	219	465			312	299	611
	Health / Fitness Club					1,199			27	28	55			74	52	125			47	57	103
	Gasoline / Service Station with Convenience Market					2,416			82	81	162			103	95	198			103	102	205
	Retail Subtotal					16,831			354	257	611			796	735	1,532			1,041	990	2,031
	Residential Subtotal					2,385			64	208	272			120	92	213			116	90	206
	Park / Open Space Subtotal					13			0	0	0			0	0	0			1	1	2
	Total					19,229			418	465	882			917	828	1,744			1,158	1,081	2,239
Internal Trips - Retail Adjustments	Shopping Center					-1,513			-16	-15	-31			-20	-43	-63			-80	-140	-220
	Supermarket					-1,171			-16	-14	-30			-24	-19	-44			-103	-74	-178
	Health / Fitness Club					-337			-5	-5	-10			-12	-5	-17			-24	-11	-35
	Gasoline / Service Station with Convenience Market					-654			-12	-15	-27			-20	-8	-28			-43	-25	-68
	Retail					-3,675			-49	-49	-98			-76	-76	-153			-250	-250	-500
	Residential																				
	Park / Open Space																				
	Total					-3,675			-49	-49	-98			-76	-76	-153			-250	-250	-500
External Trips After Mixed Use and Retail Adjustments	Shopping Center					6,943			111	62	173			353	327	681			500	392	892
	Supermarket					3,589			102	58	160			222	199	421			209	225	434
	Health / Fitness Club					863			22	23	45			62	46	107			23	45	68
	Gasoline / Service Station with Convenience Market					1,761			70	66	136			83	86	170			59	78	137
	Retail Subtotal					13,156			305	208	513			720	659	1,379			791	740	1,531
	Residential Subtotal					2,385			64	208	272			120	92	213			116	90	206
	Park / Open Space Subtotal					13			0	0	0			0	0	0			1	1	2
	Total					15,554			369	416	785			840	751	1,592			908	831	1,739
Pass-By Trips	Shopping Center				32%	-2,222		32%	-28	-28	-56		34%	-116	-116	-232		26%	-116	-116	-232
	Supermarket				32%	-1,149		32%	-26	-26	-52		36%	-76	-76	-152		26%	-56	-56	-112
	Health / Fitness Club					0			0	0	0			0	0	0			0	0	0
	Gasoline / Service Station with Convenience Market				56%	-986		62%	-42	-42	-84		56%	-48	-48	-96		56%	-38	-38	-76
New External Trips	Shopping Center					4,721			83	34	117			237	211	449			384	276	660
	Supermarket					2,441			76	32	108			146	123	269			153	169	322
	Health / Fitness Club					863			22	23	45			62	46	107			23	45	68
	Gasoline / Service Station with Convenience Market					775			28	24	52			35	38	74			21	40	61
	Retail Subtotal					8,800			209	112	321			480	419	899			581	530	1,111
	Residential Subtotal					2,385			64	208	272			120	92	213			116	90	206
	Park / Open Space Subtotal					13			0	0	0			0	0	0			1	1	2
	Total					11,198			273	320	593			600	511	1,112			698	621	1,319

Analyst: DKS

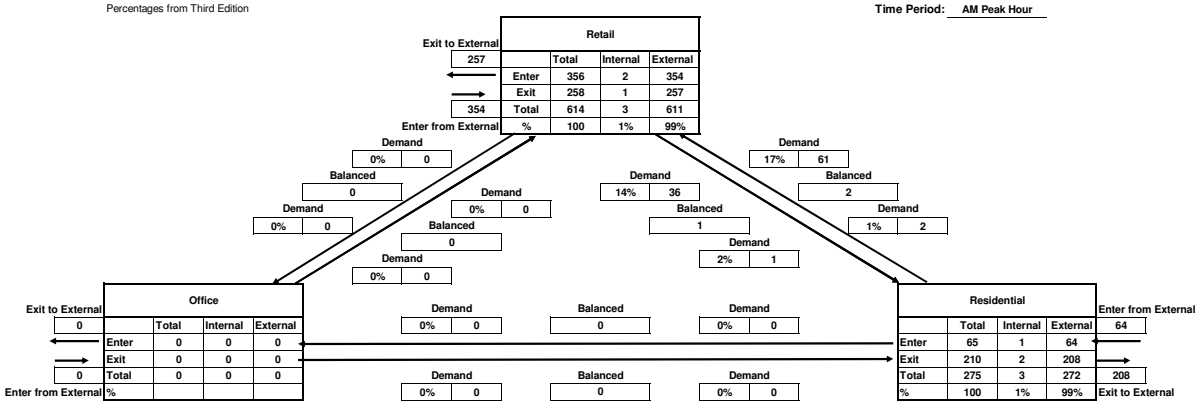
Date: 4/8/2015

MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
MIXED USE

Name of Development: Curtis Park Village

Percentages from Third Edition

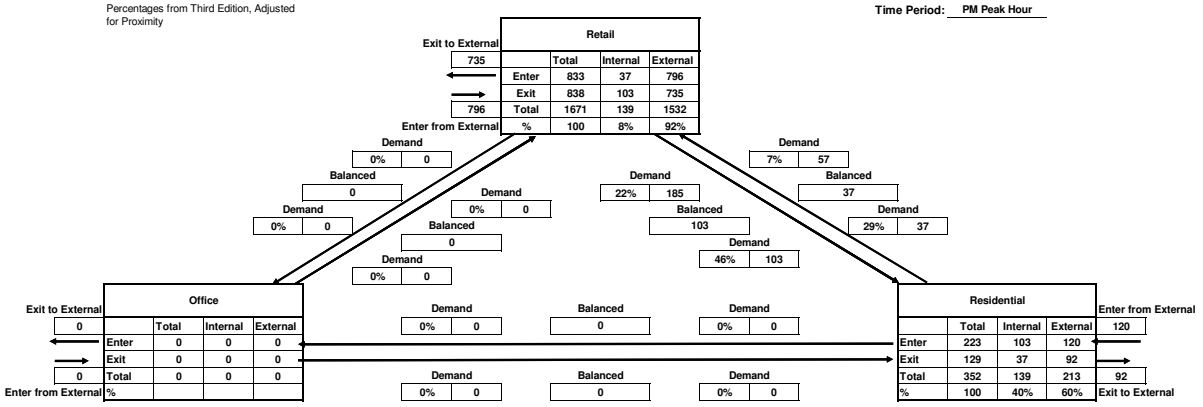
Time Period: AM Peak Hour



Net External Trips for Multi-use Development	*Office*	*Retail*	*Residential*	*TOTAL*	
Enter	0	354	64	418	
Exit	0	257	208	465	
Total	0	611	272	882	*INTERNAL CAPTURE*
Single-Use Trip Generation Est.	0	614	275	889	1%

Percentages from Third Edition, Adjusted for Proximity

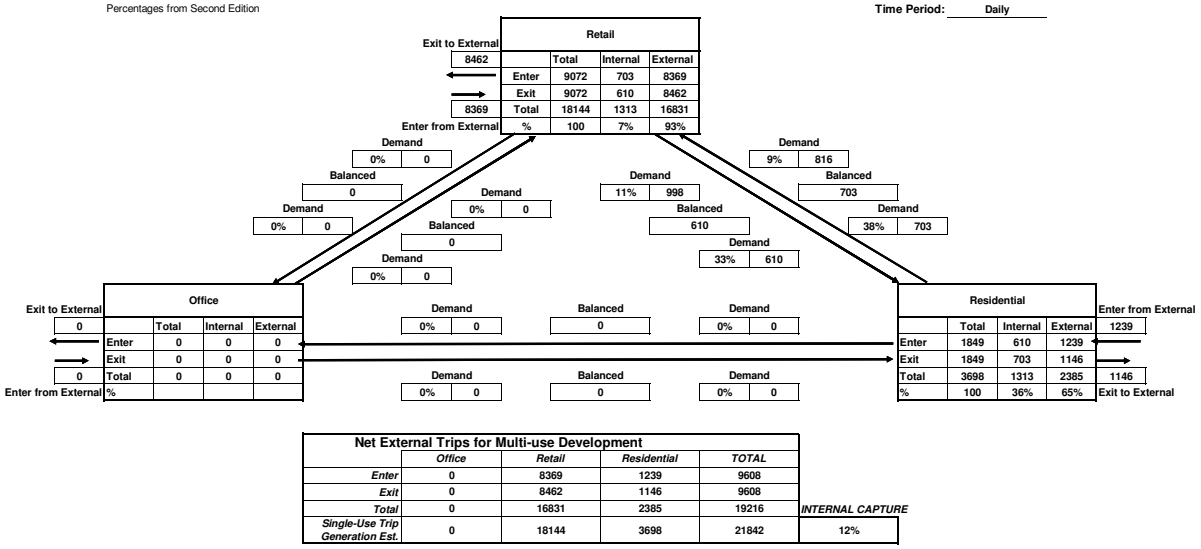
Time Period: PM Peak Hour



Net External Trips for Multi-use Development	*Office*	*Retail*	*Residential*	*TOTAL*	
Enter	0	796	120	917	
Exit	0	735	92	828	
Total	0	1532	213	1744	*INTERNAL CAPTURE*
Single-Use Trip Generation Est.	0	1671	352	2023	14%

Percentages from Second Edition

Time Period: Daily

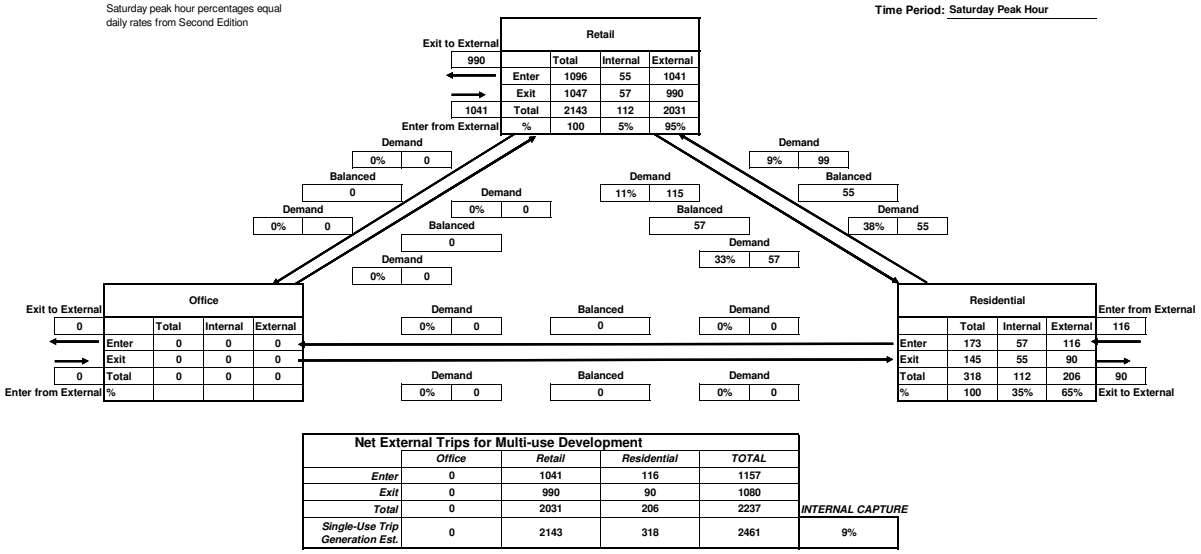


Net External Trips for Multi-use Development

	Office	*Retail*	*Residential*	*TOTAL*	
Enter	0	8369	1239	9608	
Exit	0	8462	1146	9608	
Total	0	16831	2385	19216	*INTERNAL CAPTURE*
Single-Use Trip Generation Est.	0	18144	3698	21842	12%

Saturday peak hour percentages equal daily rates from Second Edition

Time Period: Saturday Peak Hour



Net External Trips for Multi-use Development

	Office	*Retail*	*Residential*	*TOTAL*	
Enter	0	1041	116	1157	
Exit	0	990	90	1080	
Total	0	2031	206	2237	*INTERNAL CAPTURE*
Single-Use Trip Generation Est.	0	2143	318	2461	9%

Analyst: DKS

Date: 4/8/2015

MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
RETAIL

Name of Development: Curtis Park Village

Time Period: AM Peak Hour

Exiting Trips	Total	Unconstrained Percentage Total	Adjusted	Demand	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market		Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market	Unconstrained Percentage Total	Adjusted	Demand	Entering Trips
Shopping Center	77	20%	19%	15		8	2	5			10	4	11	128	20%	19%	25	Shopping Center
Supermarket	72	20%	19%	14	8		2	5		10		3	10	119	20%	19%	23	Supermarket
Health / Fitness Club	28	20%	19%	5	2	2		1		2	2		2	27	20%	19%	5	Health / Fitness Club
Gasoline / Service Station with Convenience Market	81	20%	19%	16	7	7	2			7	6	3		82	20%	19%	16	Gasoline / Service Station with Convenience Market
									Entering								

Balanced

Exiting	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market	
Shopping Center		8	2	5	15
Supermarket	8		2	5	14
Health / Fitness Club	2	2		1	5
Gasoline / Service Station with Convenience Market	7	6	2		15
	16	16	5	12	

Time Period: PM Peak Hour

Exiting Trips	Total	Unconstrained Percentage Total	Adjusted	Demand	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market		Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market	Unconstrained Percentage Total	Adjusted	Demand	Entering Trips
Shopping Center	422	20%	8%	33		19	11	16			36	9	16	390	20%	16%	61	Shopping Center
Supermarket	249	20%	8%	19	13		3	4		29		4	7	258	20%	16%	40	Supermarket
Health / Fitness Club	59	20%	8%	5	2	2		1		6	4		2	77	20%	16%	12	Health / Fitness Club
Gasoline / Service Station with Convenience Market	108	20%	8%	8	5	3	1			10	6	1		108	20%	16%	17	Gasoline / Service Station with Convenience Market
									Entering								

Balanced

Exiting	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market	
Shopping Center		19	9	16	43
Supermarket	13		3	4	19
Health / Fitness Club	2	2		1	5
Gasoline / Service Station with Convenience Market	5	3	1		8
	20	24	12	20	

Time Period: Daily

Exiting Trips	Total	Unconstrained Percentage Total	Adjusted	Demand	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market
Shopping Center	4,558	30%	23%	1061		603	3008	6057
Supermarket	2,566	30%	23%	597	418		59	120
Health / Fitness Club	647	30%	23%	150	81	81		23
Gasoline / Service Station with Convenience Market	1,302	30%	23%	303	178	100	25	

Entering Trips	Total	Unconstrained Percentage Total	Adjusted	Demand	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market
Shopping Center	4,558	28%	20%	923		525	132	266
Supermarket	2,566	28%	20%	520	364		52	104
Health / Fitness Club	647	28%	20%	131	71	40		20
Gasoline / Service Station with Convenience Market	1,302	28%	20%	264	155	87	22	

Balanced

Exiting	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market	
Shopping Center		525	132	266	923
Supermarket	364		52	104	520
Health / Fitness Club	71	40		20	131
Gasoline / Service Station with Convenience Market	155	87	22		264
	590	652	206	390	

Time Period: Saturday Peak Hour

Exiting Trips	Total	Unconstrained Percentage Total	Adjusted	Demand	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market
Shopping Center	563	30%	25%	138		94	30	65
Supermarket	316	30%	25%	78	62		5	11
Health / Fitness Club	60	30%	25%	15	9	9		2
Gasoline / Service Station with Convenience Market	108	30%	25%	27	16	9	1	

Entering Trips	Total	Unconstrained Percentage Total	Adjusted	Demand	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market
Shopping Center	610	28%	23%	140		91	17	31
Supermarket	329	28%	23%	76	58		6	11
Health / Fitness Club	49	28%	23%	11	6	4		1
Gasoline / Service Station with Convenience Market	108	28%	23%	25	15	8	2	

Balanced

Exiting	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market	
Shopping Center		91	17	31	140
Supermarket	58		5	11	74
Health / Fitness Club	6	4		1	11
Gasoline / Service Station with Convenience Market	15	8	1		25
	80	103	24	43	

UPDATED PROJECT TRIP GENERATION – SENSITIVITY ANALYSIS

Curtis Park Village Land Use	ITE Land Use	ITE Land Use Code	Quantity	Units	Daily Trips		AM Peak Commuter Hour Trips					PM Peak Commuter Hour Trips					Saturday Peak Hour Trips				
					Equation / Average	Total	Equation / Average	Percent Entering	Entering	Exiting	Total	Equation / Average	Percent Entering	Entering	Exiting	Total	Equation / Average	Percent Entering	Entering	Exiting	Total
Retail without Grocery	Shopping Center	820	161.734	KSF	E	9,282	E	62%	130	79	209	E	48%	397	430	827	E	52%	621	574	1,195
Retail / Grocery Store	Supermarket	850	57.266	KSF	E	5,226	A	62%	121	74	195	E	51%	263	253	516	E	51%	335	322	657
Health Spa	Health / Fitness Club	492	40.000	KSF	A	1,317	A	50%	28	28	56	E	57%	79	60	139	A	45%	50	61	111
Grocery Fuel Center	Gasoline / Service Station with Convenience Market	945	16	Vehicle Fueling Positions	A	4,600	A	50%	130	130	260	A	50%	140	140	280	(3)	50%	168	168	336
Single-Family Residential	Single-Family Detached Housing	210	193	Units	E	1,923	E	25%	36	109	145	E	63%	120	70	190	E	54%	98	83	181
Multi-Family Residential	Apartment	220	244	Units	E	1,602	E	20%	25	98	123	E	65%	99	53	152	E (2)	54%	64	55	119
Senior Housing	Senior Adult Housing - Attached	252	91	Units	E	292	E	34%	6	12	18	E	54%	12	11	23	E	57%	17	12	29
Park / Open Space	City Park	411	7	Acres	A	13	(1)	50%	0	0	0	(1)	50%	0	0	0	(1)	50%	1	1	2
Total Trips Before Adjustments	Retail Subtotal					20,425		57%	409	311	720		50%	879	883	1,762		51%	1,174	1,125	2,299
	Residential Subtotal					3,817		23%	67	219	286		63%	231	134	365		54%	179	150	329
	Park / Open Space Subtotal					13		50%	0	0	0		50%	0	0	0		50%	1	1	2
	Total					24,255		47%	476	530	1,006		52%	1,110	1,017	2,127		51%	1,354	1,276	2,630
Transit Adjustments	Shopping Center				-1.8%	-167	-1.8%		-2	-2	-4	-1.8%		-7	-8	-15	-1.8%		-11	-11	-22
	Supermarket				-1.8%	-94	-1.8%		-2	-2	-4	-1.8%		-5	-4	-9	-1.8%		-6	-6	-12
	Health / Fitness Club				-1.8%	-24	-1.8%		-1	0	-1	-1.8%		-2	-1	-3	-1.8%		-1	-1	-2
	Gasoline / Service Station with Convenience Market				0.0%	0	0.0%		0	0	0	0.0%		0	0	0	0.0%		0	0	0
	Single-Family Detached Housing				-3.1%	-60	-3.7%		-1	-4	-5	-3.6%		-4	-3	-7	-3.1%		-3	-3	-6
	Apartment				-3.1%	-50	-3.7%		-1	-4	-5	-3.6%		-3	-2	-5	-3.1%		-2	-2	-4
	Senior Adult Housing - Attached				-3.1%	-9	-3.7%		0	-1	-1	-3.6%		-1	0	-1	-3.1%		-1	0	-1
	City Park					0			0	0	0			0	0	0			0	0	0
Total Trips After Transit Adjustments	Shopping Center					9,115			128	77	205			390	422	812			610	563	1,173
	Supermarket					5,132			119	72	191			258	249	507			329	316	645
	Health / Fitness Club					1,293			27	28	55			77	59	136			49	60	109
	Gasoline / Service Station with Convenience Market					4,600			130	130	260			140	140	280			168	168	336
	Retail Subtotal					20,140			404	307	711			865	870	1,735			1,156	1,107	2,263
	Residential Subtotal					3,698			65	210	275			223	129	352			173	145	318
	Park / Open Space Subtotal					13			0	0	0			0	0	0			1	1	2
	Total					23,851			469	517	986			1,088	999	2,087			1,330	1,253	2,583
Internal Trips - Mixed Use Adjustments	Shopping Center					-594			-1	0	-1			-17	-50	-65			-29	-29	-58
	Supermarket					-335			-1	0	-1			-11	-29	-41			-16	-16	-32
	Health / Fitness Club					-84			0	0	0			-3	-7	-11			-2	-3	-5
	Gasoline / Service Station with Convenience Market					-300			-1	-1	-1			-6	-17	-23			-8	-9	-17
	Retail					-1,313			-2	-1	-3			-37	-103	-139			-55	-57	-112
	Residential					-1,313			-1	-2	-3			-103	-37	-139			-57	-55	-112
	Park / Open Space					0			0	0	0			0	0	0			0	0	0
	Total					-2,626			-3	-3	-7			-139	-139	-279			-112	-112	-224
External Trips After Mixed Use Adjustments	Shopping Center					8,521			127	77	204			373	372	747			581	534	1,115
	Supermarket					4,797			118	72	190			247	220	466			313	300	613
	Health / Fitness Club					1,209			27	28	55			74	52	125			47	57	104
	Gasoline / Service Station with Convenience Market					4,300			129	129	259			134	123	257			160	159	319
	Retail Subtotal					18,827			402	306	708			828	767	1,596			1,101	1,050	2,151
	Residential Subtotal					2,385			64	208	272			120	92	213			116	90	206
	Park / Open Space Subtotal					13			0	0	0			0	0	0			1	1	2
	Total					21,225			466	514	979			949	860	1,808			1,218	1,141	2,359
Internal Trips - Retail Adjustments	Shopping Center					-1,635			-19	-15	-34			-22	-44	-66			-84	-142	-226
	Supermarket					-1,182			-18	-14	-32			-25	-20	-46			-99	-75	-174
	Health / Fitness Club					-335			-5	-5	-10			-12	-6	-18			-22	-11	-34
	Gasoline / Service Station with Convenience Market					-1,082			-15	-24	-39			-23	-11	-35			-62	-39	-100
	Retail					-4,234			-58	-58	-115			-82	-82	-164			-267	-267	-533
	Residential																				
	Park / Open Space																				
	Total					-4,234			-58	-58	-115			-82	-82	-164			-267	-267	-533
External Trips After Mixed Use and Retail Adjustments	Shopping Center					6,886			109	62	170			352	328	681			497	392	889
	Supermarket					3,615			100	58	158			222	199	421			214	225	439
	Health / Fitness Club					874			22	23	45			62	46	108			24	46	70
	Gasoline / Service Station with Convenience Market					3,218			114	106	220			111	112	223			98	121	219
	Retail Subtotal					14,593			344	248	592			746	685	1,431			834	783	1,617
	Residential Subtotal					2,385			64	208	272			120	92	213			116	90	206
	Park / Open Space Subtotal					13			0	0	0			0	0	0			1	1	2
	Total					16,991			408	456	864			867	778	1,644			951	874	1,825
Pass-By Trips	Shopping Center				32%	-2,203		32%	-27	-27	-54		34%	-116	-116	-232		26%	-116	-116	-232
	Supermarket				32%	-1,157		32%	-25	-25	-50		36%	-76	-76	-152		26%	-57	-57	-114
	Health / Fitness Club					0			0	0	0			0	0	0			0	0	0
	Gasoline / Service Station with Convenience Market				56%	-1,802		62%	-68	-68	-136		56%	-62	-62	-124		56%	-61	-61	-122
New External Trips	Shopping Center					4,682			82	35	116			236	212	449			381	276	657
	Supermarket					2,458			75	33	108			146	123	269			157	168	325
	Health / Fitness Club					874			22	23	45			62	46	108			24	46	70
	Gasoline / Service Station with Convenience Market					1,416			46	38	84			49	50	99			37	60	97
	Retail Subtotal					9,431			224	128	352			492	431	923			600	549	1,149
	Residential Subtotal					2,385			64	208	272			120	92	213			116	90	206
	Park / Open Space Subtotal					13			0	0	0			0	0	0			1	1	2
	Total					11,829			288	336	624			613	524	1,136			717	640	1,357

Analyst: DKS

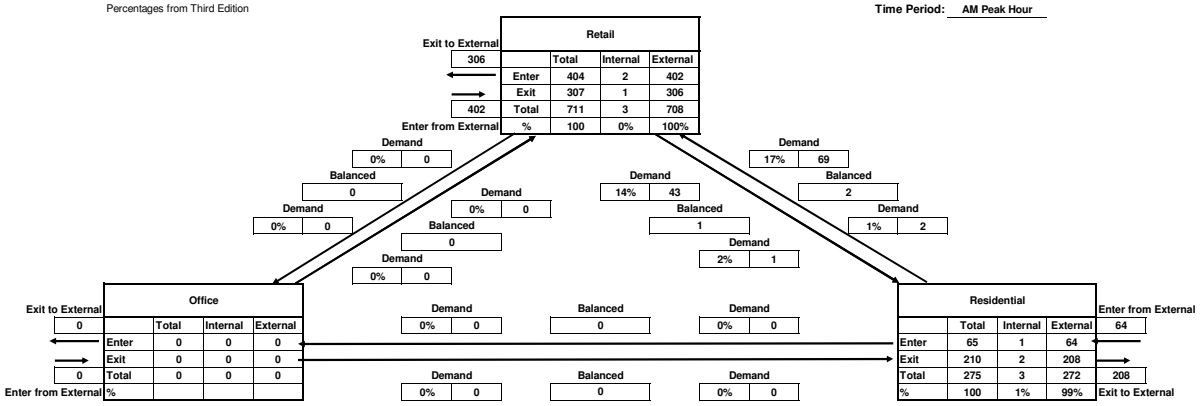
Date: 4/8/2015

MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
MIXED USE

Name of Development: Curtis Park Village

Percentages from Third Edition

Time Period: AM Peak Hour

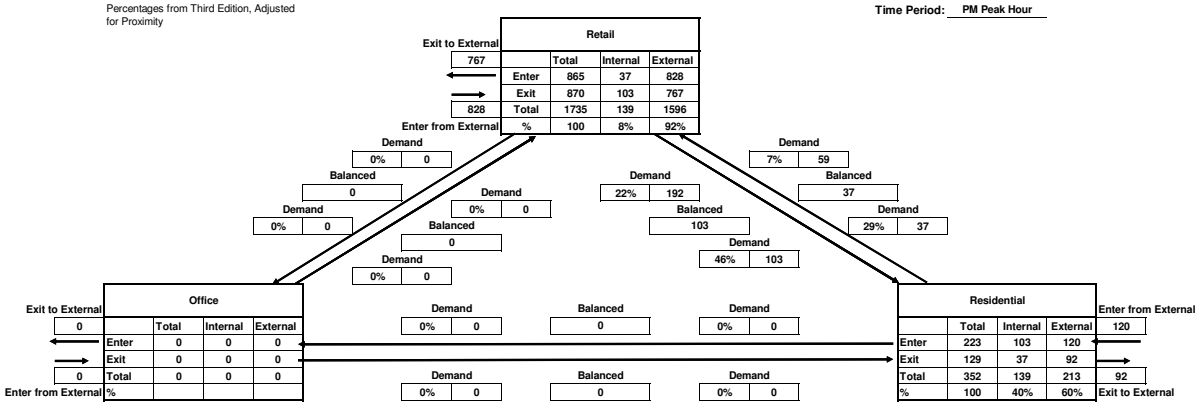


Net External Trips for Multi-use Development

	Office	*Retail*	*Residential*	*TOTAL*	
Enter	0	402	64	466	
Exit	0	306	208	514	
Total	0	708	272	979	*INTERNAL CAPTURE*
Single-Use Trip Generation Est.	0	711	275	986	1%

Percentages from Third Edition, Adjusted for Proximity

Time Period: PM Peak Hour

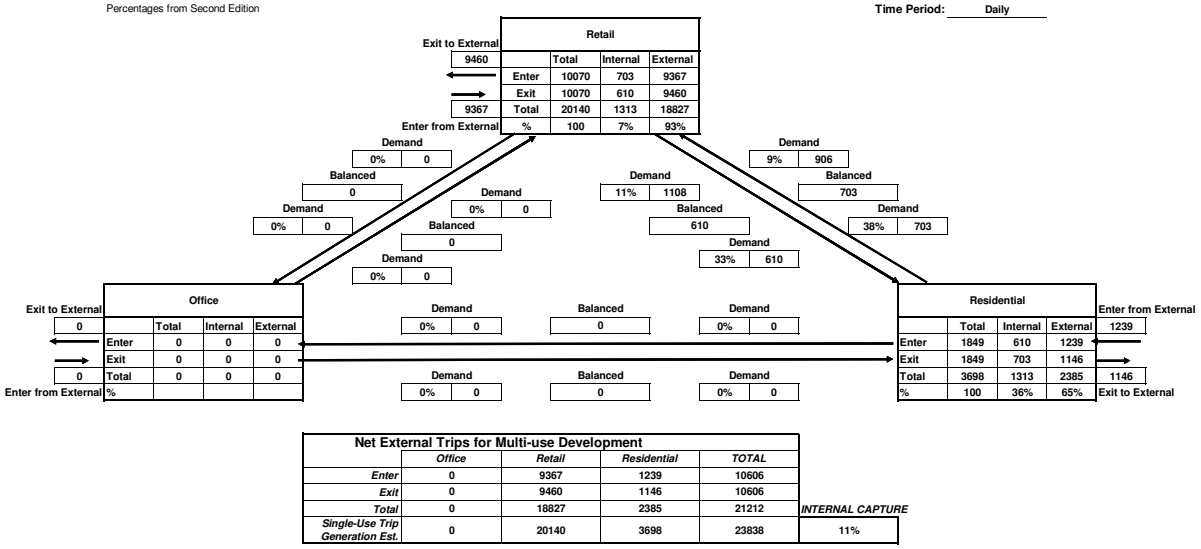


Net External Trips for Multi-use Development

	Office	*Retail*	*Residential*	*TOTAL*	
Enter	0	828	120	949	
Exit	0	767	92	860	
Total	0	1596	213	1808	*INTERNAL CAPTURE*
Single-Use Trip Generation Est.	0	1735	352	2087	13%

Percentages from Second Edition

Time Period: Daily

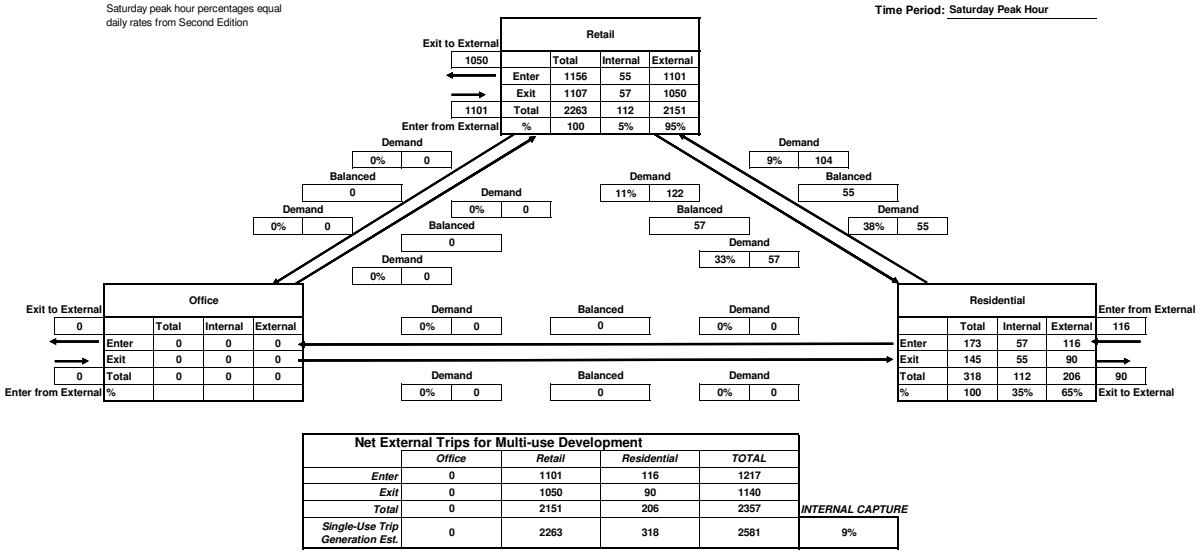


Net External Trips for Multi-use Development

	Office	*Retail*	*Residential*	*TOTAL*	
Enter	0	9367	1239	10606	
Exit	0	9460	1146	10606	
Total	0	18827	2385	21212	*INTERNAL CAPTURE*
Single-Use Trip Generation Est.	0	20140	3698	23838	11%

Saturday peak hour percentages equal daily rates from Second Edition

Time Period: Saturday Peak Hour



Net External Trips for Multi-use Development

	Office	*Retail*	*Residential*	*TOTAL*	
Enter	0	1101	116	1217	
Exit	0	1050	90	1140	
Total	0	2151	206	2357	*INTERNAL CAPTURE*
Single-Use Trip Generation Est.	0	2263	318	2581	9%

Analyst: DKS

Date: 4/8/2015

MULTI-USE DEVELOPMENT
TRIP GENERATION
AND INTERNAL CAPTURE SUMMARY
RETAIL

Name of Development: Curtis Park Village

Time Period: AM Peak Hour

Exiting Trips	Total	Unconstrained Percentage Total	Adjusted	Demand	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market	Total	Unconstrained Percentage Total	Adjusted	Demand	Entering Trips
Shopping Center	77	20%	20%	15		6	1	7		8	3	14	128	20%	19%	25	Shopping Center
Supermarket	72	20%	20%	14	6		1	6	8		3	13	119	20%	19%	23	Supermarket
Health / Fitness Club	28	20%	20%	5	2	2		2	1	1		2	27	20%	19%	5	Health / Fitness Club
Gasoline / Service Station with Convenience Market	130	20%	20%	25	12	11	3		11	10	4		130	20%	19%	25	Gasoline / Service Station with Convenience Market
							Entering										

Balanced

Exiting	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market	
Shopping Center		6	1	7	15
Supermarket	6		1	6	14
Health / Fitness Club	1	1		2	5
Gasoline / Service Station with Convenience Market	11	10	3		24
	19	18	5	15	

Time Period: PM Peak Hour

Exiting Trips	Total	Unconstrained Percentage Total	Adjusted	Demand	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market	Total	Unconstrained Percentage Total	Adjusted	Demand	Entering Trips
Shopping Center	422	20%	8%	35		19	10	18		34	8	19	390	20%	16%	61	Shopping Center
Supermarket	249	20%	8%	20	13		3	5	28		4	9	258	20%	16%	41	Supermarket
Health / Fitness Club	59	20%	8%	5	2	2		1	6	4		2	77	20%	16%	12	Health / Fitness Club
Gasoline / Service Station with Convenience Market	140	20%	8%	11	6	4	1		13	8	2		140	20%	16%	22	Gasoline / Service Station with Convenience Market
							Entering										

Balanced

Exiting	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market	
Shopping Center		19	8	18	44
Supermarket	13		3	5	20
Health / Fitness Club	2	2		1	6
Gasoline / Service Station with Convenience Market	6	4	1		11
	22	25	12	23	

Time Period: Daily

Exiting Trips	Total	Unconstrained Percentage Total	Adjusted	Demand	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market
Shopping Center	4,558	30%	24%	1091		508	2556	9092
Supermarket	2,566	30%	24%	614	373		53	188
Health / Fitness Club	647	30%	24%	155	75	75		38
Gasoline / Service Station with Convenience Market	2,300	30%	24%	551	323	182	46	

	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market
Shopping Center		446	112	400
Supermarket	328		46	165
Health / Fitness Club	66	37		33
Gasoline / Service Station with Convenience Market	284	160	40	

Entering Trips	Total	Unconstrained Percentage Total	Adjusted	Demand
Shopping Center	4,558	28%	21%	958
Supermarket	2,566	28%	21%	539
Health / Fitness Club	647	28%	21%	136
Gasoline / Service Station with Convenience Market	2,300	28%	21%	484

Balanced

Exiting	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market	
Shopping Center		446	112	400	958
Supermarket	328		46	165	539
Health / Fitness Club	66	37		33	136
Gasoline / Service Station with Convenience Market	284	160	40		484
	677	643	199	598	

Time Period: Saturday Peak Hour

Exiting Trips	Total	Unconstrained Percentage Total	Adjusted	Demand	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market
Shopping Center	563	30%	25%	140		84	25	85
Supermarket	316	30%	25%	79	58		5	16
Health / Fitness Club	60	30%	25%	15	8	8		2
Gasoline / Service Station with Convenience Market	168	30%	25%	42	26	14	2	

	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market
Shopping Center		82	16	44
Supermarket	54		5	16
Health / Fitness Club	6	3		2
Gasoline / Service Station with Convenience Market	23	13	2	

Entering Trips	Total	Unconstrained Percentage Total	Adjusted	Demand
Shopping Center	610	28%	23%	142
Supermarket	329	28%	23%	76
Health / Fitness Club	49	28%	23%	11
Gasoline / Service Station with Convenience Market	168	28%	23%	39

Balanced

Exiting	Shopping Center	Supermarket	Health / Fitness Club	Gasoline / Service Station with Convenience Market	
Shopping Center		82	16	44	142
Supermarket	54		5	16	75
Health / Fitness Club	6	3		2	11
Gasoline / Service Station with Convenience Market	23	13	2		39
	84	99	22	62	

QUEUING ANALYSIS

Curtis Park Village Fuel Center
82 Customers Per Hour

Model 4 (M/M/s Queue):
Multiple servers, Infinite population, Poisson arrival, FCFS, Exponential service time, Unlimited waiting room
Yellow cells need user inputed values

Inputs

Unit of time	hour	
Arrival rate (lambda)	82	customers per hour
Service rate (mu)	12	customers per hour
Number of identical servers (s)	16	servers

Outputs

Direct outputs from inputs

Mean time between arrivals	0.012	hour
Mean time per service	0.083333333	hour
Traffic intensity	0.427083333	

Summary measures

Average utilization rate of server	42.7%	
Average number of customers waiting in line (Lq)	0.00151	customers
Average number of customers in system (L)	6.83485	customers
Average time waiting in line (Wq)	0.00002	hour
Average time in system (W)	0.08335	hour
Probability of no customers in system (P0)	0.00108	(this is the probability of empty system)
Probability that all servers are busy	0.2%	(this is also the "percentage who wait in queue")
Probability that at least one server is idle	99.8%	(this is also the "percentage who don't wait in queue'

Distribution of number of customers in system

n (customers)	P(n in system)
2	0.025148

Distribution of time in queue

t (time in queue)	P(wait > t)
0.333333333	0.000000

Number in System	Probability	Cumulative
0	0.11%	0.11%
1	0.74%	0.84%
2	2.51%	3.36%
3	5.73%	9.09%
4	9.79%	18.87%
5	13.37%	32.25%
6	15.23%	47.48%
7	14.87%	62.35%
8	12.70%	75.05%
9	9.64%	84.69%
10	6.59%	91.28%
11	4.09%	95.37%
12	2.33%	97.70%
13	1.23%	98.93%
14	0.60%	99.52%
15	0.27%	99.80%
16	0.12%	99.91%
17	0.05%	99.96%
18	0.02%	99.98%
19	0.01%	99.99%
20	0.00%	100.00%
21	0.00%	100.00%
22	0.00%	100.00%
23	0.00%	100.00%
24	0.00%	100.00%
25	0.00%	100.00%
26	0.00%	100.00%
27	0.00%	100.00%
28	0.00%	100.00%
29	0.00%	100.00%
30	0.00%	100.00%
31	0.00%	100.00%
32	0.00%	100.00%
33	0.00%	100.00%
34	0.00%	100.00%
35	0.00%	100.00%
36	0.00%	100.00%
37	0.00%	100.00%
38	0.00%	100.00%
39	0.00%	100.00%
40	0.00%	100.00%
41	0.00%	100.00%
42	0.00%	100.00%
43	0.00%	100.00%
44	0.00%	100.00%
45	0.00%	100.00%
46	0.00%	100.00%
47	0.00%	100.00%
48	0.00%	100.00%
49	0.00%	100.00%
50	0.00%	100.00%

Curtis Park Village Fuel Center
108 Customers Per Hour

Model 4 (M/M/s Queue):
Multiple servers, Infinite population, Poisson arrival, FCFS, Exponential service time, Unlimited waiting room
Yellow cells need user inputed values

Inputs

Unit of time	hour	
Arrival rate (lambda)	108	customers per hour
Service rate (mu)	12	customers per hour
Number of identical servers (s)	16	servers

Outputs

Direct outputs from inputs

Mean time between arrivals	0.009	hour
Mean time per service	0.083333333	hour
Traffic intensity	0.5625	

Summary measures

Average utilization rate of server	56.3%	
Average number of customers waiting in line (Lq)	0.03203	customers
Average number of customers in system (L)	9.03203	customers
Average time waiting in line (Wq)	0.00030	hour
Average time in system (W)	0.08363	hour
Probability of no customers in system (P0)	0.00012	(this is the probability of empty system)
Probability that all servers are busy	2.5%	(this is also the "percentage who wait in queue")
Probability that at least one server is idle	97.5%	(this is also the "percentage who don't wait in queue'

Distribution of number of customers in system

n (customers)	P(n in system)
2	0.004983

Distribution of time in queue

t (time in queue)	P(wait > t)
0.333333333	0.000000

Number in System	Probability	Cumulative
0	0.01%	0.01%
1	0.11%	0.12%
2	0.50%	0.62%
3	1.50%	2.12%
4	3.36%	5.48%
5	6.05%	11.54%
6	9.08%	20.62%
7	11.68%	32.29%
8	13.14%	45.43%
9	13.14%	58.57%
10	11.82%	70.39%
11	9.67%	80.06%
12	7.26%	87.32%
13	5.02%	92.34%
14	3.23%	95.57%
15	1.94%	97.51%
16	1.09%	98.60%
17	0.61%	99.21%
18	0.34%	99.56%
19	0.19%	99.75%
20	0.11%	99.86%
21	0.06%	99.92%
22	0.03%	99.96%
23	0.02%	99.98%
24	0.01%	99.99%
25	0.01%	99.99%
26	0.00%	100.00%
27	0.00%	100.00%
28	0.00%	100.00%
29	0.00%	100.00%
30	0.00%	100.00%
31	0.00%	100.00%
32	0.00%	100.00%
33	0.00%	100.00%
34	0.00%	100.00%
35	0.00%	100.00%
36	0.00%	100.00%
37	0.00%	100.00%
38	0.00%	100.00%
39	0.00%	100.00%
40	0.00%	100.00%
41	0.00%	100.00%
42	0.00%	100.00%
43	0.00%	100.00%
44	0.00%	100.00%
45	0.00%	100.00%
46	0.00%	100.00%
47	0.00%	100.00%
48	0.00%	100.00%
49	0.00%	100.00%
50	0.00%	100.00%

Curtis Park Village Fuel Center
130 Customers Per Hour

Model 4 (M/M/s Queue):
Multiple servers, Infinite population, Poisson arrival, FCFS, Exponential service time, Unlimited waiting room
Yellow cells need user inputed values

Inputs

Unit of time	hour	
Arrival rate (lambda)	130	customers per hour
Service rate (mu)	12	customers per hour
Number of identical servers (s)	16	servers

Outputs

Direct outputs from inputs

Mean time between arrivals	0.008	hour
Mean time per service	0.083333333	hour
Traffic intensity	0.677083333	

Summary measures

Average utilization rate of server	67.7%	
Average number of customers waiting in line (Lq)	0.21582	customers
Average number of customers in system (L)	11.04916	customers
Average time waiting in line (Wq)	0.00166	hour
Average time in system (W)	0.08499	hour
Probability of no customers in system (P0)	0.00002	(this is the probability of empty system)
Probability that all servers are busy	10.3%	(this is also the "percentage who wait in queue")
Probability that at least one server is idle	89.7%	(this is also the "percentage who don't wait in queue'

Distribution of number of customers in system

n (customers)	P(n in system)
2	0.001134

Distribution of time in queue

t (time in queue)	P(wait > t)
0.333333333	0.000000

Number in System	Probability	Cumulative
0	0.00%	0.00%
1	0.02%	0.02%
2	0.11%	0.14%
3	0.41%	0.55%
4	1.11%	1.65%
5	2.40%	4.06%
6	4.34%	8.40%
7	6.71%	15.11%
8	9.09%	24.20%
9	10.94%	35.14%
10	11.86%	47.00%
11	11.68%	58.68%
12	10.54%	69.22%
13	8.78%	78.00%
14	6.80%	84.80%
15	4.91%	89.71%
16	3.32%	93.03%
17	2.25%	95.28%
18	1.52%	96.80%
19	1.03%	97.84%
20	0.70%	98.54%
21	0.47%	99.01%
22	0.32%	99.33%
23	0.22%	99.55%
24	0.15%	99.69%
25	0.10%	99.79%
26	0.07%	99.86%
27	0.05%	99.90%
28	0.03%	99.94%
29	0.02%	99.96%
30	0.01%	99.97%
31	0.01%	99.98%
32	0.01%	99.99%
33	0.00%	99.99%
34	0.00%	99.99%
35	0.00%	100.00%
36	0.00%	100.00%
37	0.00%	100.00%
38	0.00%	100.00%
39	0.00%	100.00%
40	0.00%	100.00%
41	0.00%	100.00%
42	0.00%	100.00%
43	0.00%	100.00%
44	0.00%	100.00%
45	0.00%	100.00%
46	0.00%	100.00%
47	0.00%	100.00%
48	0.00%	100.00%
49	0.00%	100.00%
50	0.00%	100.00%

Curtis Park Village Fuel Center
140 Customers Per Hour

Model 4 (M/M/s Queue):
Multiple servers, Infinite population, Poisson arrival, FCFS, Exponential service time, Unlimited waiting room
Yellow cells need user inputed values

Inputs

Unit of time	hour	
Arrival rate (lambda)	140	customers per hour
Service rate (mu)	12	customers per hour
Number of identical servers (s)	16	servers

Outputs

Direct outputs from inputs

Mean time between arrivals	0.007	hour
Mean time per service	0.083333333	hour
Traffic intensity	0.729166667	

Summary measures

Average utilization rate of server	72.9%	
Average number of customers waiting in line (Lq)	0.45892	customers
Average number of customers in system (L)	12.12559	customers
Average time waiting in line (Wq)	0.00328	hour
Average time in system (W)	0.08661	hour
Probability of no customers in system (P0)	0.00001	(this is the probability of empty system)
Probability that all servers are busy	17.0%	(this is also the "percentage who wait in queue")
Probability that at least one server is idle	83.0%	(this is also the "percentage who don't wait in queue'

Distribution of number of customers in system

n (customers)	P(n in system)
2	0.000558

Distribution of time in queue

t (time in queue)	P(wait > t)
0.333333333	0.000000

Number in System	Probability	Cumulative
0	0.00%	0.00%
1	0.01%	0.01%
2	0.06%	0.07%
3	0.22%	0.28%
4	0.63%	0.92%
5	1.48%	2.39%
6	2.87%	5.26%
7	4.79%	10.05%
8	6.98%	17.03%
9	9.05%	26.08%
10	10.56%	36.63%
11	11.20%	47.83%
12	10.88%	58.71%
13	9.77%	68.48%
14	8.14%	76.62%
15	6.33%	82.95%
16	4.62%	87.57%
17	3.37%	90.94%
18	2.45%	93.39%
19	1.79%	95.18%
20	1.31%	96.49%
21	0.95%	97.44%
22	0.69%	98.13%
23	0.51%	98.64%
24	0.37%	99.01%
25	0.27%	99.28%
26	0.20%	99.47%
27	0.14%	99.61%
28	0.10%	99.72%
29	0.08%	99.80%
30	0.06%	99.85%
31	0.04%	99.89%
32	0.03%	99.92%
33	0.02%	99.94%
34	0.02%	99.96%
35	0.01%	99.97%
36	0.01%	99.98%
37	0.01%	99.98%
38	0.00%	99.99%
39	0.00%	99.99%
40	0.00%	99.99%
41	0.00%	100.00%
42	0.00%	100.00%
43	0.00%	100.00%
44	0.00%	100.00%
45	0.00%	100.00%
46	0.00%	100.00%
47	0.00%	100.00%
48	0.00%	100.00%
49	0.00%	100.00%
50	0.00%	100.00%

Curtis Park Village Fuel Center
168 Customers Per Hour

Model 4 (M/M/s Queue):
Multiple servers, Infinite population, Poisson arrival, FCFS, Exponential service time, Unlimited waiting room
Yellow cells need user inputed values

Inputs

Unit of time	hour	
Arrival rate (lambda)	168	customers per hour
Service rate (mu)	12	customers per hour
Number of identical servers (s)	16	servers

Outputs

Direct outputs from inputs

Mean time between arrivals	0.006	hour
Mean time per service	0.083333333	hour
Traffic intensity	0.875	

Summary measures

Average utilization rate of server	87.5%	
Average number of customers waiting in line (Lq)	3.55938	customers
Average number of customers in system (L)	17.55938	customers
Average time waiting in line (Wq)	0.02119	hour
Average time in system (W)	0.10452	hour
Probability of no customers in system (P0)	0.00000	(this is the probability of empty system)
Probability that all servers are busy	50.8%	(this is also the "percentage who wait in queue")
Probability that at least one server is idle	49.2%	(this is also the "percentage who don't wait in queue'

Distribution of number of customers in system

n (customers)	P(n in system)
2	0.000060

Distribution of time in queue

t (time in queue)	P(wait > t)
0.333333333	0.000171

Number in System	Probability	Cumulative
0	0.00%	0.00%
1	0.00%	0.00%
2	0.01%	0.01%
3	0.03%	0.03%
4	0.10%	0.13%
5	0.27%	0.41%
6	0.64%	1.04%
7	1.28%	2.32%
8	2.23%	4.56%
9	3.48%	8.03%
10	4.87%	12.90%
11	6.19%	19.09%
12	7.23%	26.32%
13	7.78%	34.10%
14	7.78%	41.89%
15	7.26%	49.15%
16	6.36%	55.51%
17	5.56%	61.07%
18	4.87%	65.94%
19	4.26%	70.19%
20	3.73%	73.92%
21	3.26%	77.18%
22	2.85%	80.03%
23	2.50%	82.53%
24	2.18%	84.71%
25	1.91%	86.62%
26	1.67%	88.30%
27	1.46%	89.76%
28	1.28%	91.04%
29	1.12%	92.16%
30	0.98%	93.14%
31	0.86%	94.00%
32	0.75%	94.75%
33	0.66%	95.40%
34	0.57%	95.98%
35	0.50%	96.48%
36	0.44%	96.92%
37	0.38%	97.31%
38	0.34%	97.64%
39	0.29%	97.94%
40	0.26%	98.20%
41	0.23%	98.42%
42	0.20%	98.62%
43	0.17%	98.79%
44	0.15%	98.94%
45	0.13%	99.07%
46	0.12%	99.19%
47	0.10%	99.29%
48	0.09%	99.38%
49	0.08%	99.46%
50	0.07%	99.53%

City of SACRAMENTO
Department of Public Works

To: Tom Buford, Senior Planner
From: Samar Hajeer, Senior Engineer
Subject: Curtis Park Fuel Station (P14 -036) □ Buchannan Street Location Traffic Evaluation
Date: 11/6/2015

This memorandum evaluates the proposed Buchannan Street fuel station location (site plan dated 9/2015) in relation with the original Crocker Drive location (site plan dated 3/16/2015). This memorandum focuses on traffic operation/circulation review, and provides recommendations related to access and circulation.

Project Background

Curtis Park Village is an approved mixed-use development project located on the site of the former Western Pacific Railroad railyard in the City of Sacramento. The project has been the subject of earlier transportation analyses as part of the CEQA environmental review process. Portions of the project are currently under construction.

In September 2014, the applicant proposed the inclusion of a fuel center (gas station) with an associated retail kiosk to the retail site of Curtis Park Village. According to the project development application, P14-036, the Crocker Drive fuel station would contain 16 vehicle fueling positions with a retail kiosk of approximately 850 square feet. The transportation analysis for the Crocker Drive location (Curtis Park Village Fuel Center Transportation Analysis, *April 10, 2015, DKS Associates)* evaluated the trip generation comparison between the previously approved CEQA analyses in the Curtis Park Village DEIR and the Crocker Drive location land use and on-site circulation for the referenced site plan. The analysis concluded that the total peak hour and daily traffic volumes are lower than those utilized for the traffic analysis in the project DEIR and FEIR. Recommendations were also provided to accommodate on-site traffic.

Buchannan Street Location

In September 2015, the applicant provided the City with a second site plan (Buchannan Street location) which shows the fuel center and retail kiosk to be located in the southwest corner of the Curtis Park Village, north of Sutterville Road and east of Buchannan Street. The Buchannan Street location site plan shows that the existing driveway on the west side of the property would be relocated to the north (approximately 50 feet) and would accommodate outbound traffic only onto Buchannan Street. No changes are proposed to City streets as part of the proposed Buchannan Street location.

Per request from Public Works staff, the project applicant provided a sight distance evaluation (see attached Sight Distance Analysis for Curtis Park Village Refueling Center, November 8, 2015, Richard McGrath) documenting the available sight distance for outbound

traffic at the Buchannan Street driveway. The study shows that there is sufficient stopping sight distance and corner sight distance to safely accommodate a 25 MPH traveling vehicle on Buchannan Street. Therefore, the location of the driveway at Buchannan Street meets the standard requirements.

The following is a comparison between the Buchannan Street location and the original Crocker Drive location:

- The number of fuel pumps is the same at both locations.
- Trip generation estimate is similar on both sites.
- Trip distribution at the Buchannan Street may be slightly different from the Crocker Drive site. It is expected that traffic exiting the fuel station would go northbound and southbound on Buchannan Street which is designed to accommodate this traffic.
- All traffic accessing the Buchannan Street location will enter the fuel station from the parking lot area. No inbound access to this site is provided from Buchannan Street yet would be at various locations along Crocker Drive or the private easement The Crocker Drive location access points are in close proximity to Crocker Drive and the private easement in addition to access from the parking lot.
- Buchannan Street location allows for vehicular queuing on the project site without spill back onto public streets.
- The outbound traffic for the Buchannan Street location is directed to exit the site at the Buchannan Street driveway. It is expected that minimal traffic from the shopping center will use this driveway. The outbound traffic for the Crocker Drive location will likely be using the same driveways for inbound and outbound.
- The driveway on Buchannan Street will serve the outbound traffic only (right turn and left turn movements allowed). No inbound traffic is allowed at this driveway. This will minimize the several points of conflicts between inbound and outbound traffic.

In summary, the proposed Buchannan Street location south of the grocery store is not expected to impact City streets and the traffic study prepared by DKS is considered appropriate to evaluate the overall impact of the Buchannan Street location. Additionally, the evaluation for sight distance prepared by Richard McGrath provided more specific analysis for the Buchannan Street location. Therefore no new impacts are anticipated from the Buchannan Street location.

Recommendations

1) Install on-site signage directing vehicles to fuel center;

2) Provide signing and striping to California MUTCD 2014 Edition standards. This should include One-Way and Do Not Enter signage, as well as stop bar at the exit of the fuel area/driveway on Buchannan Street;

3) Utilization of personnel (fuel ambassadors) to help direct traffic at the fuel station area during busy periods is encouraged.

STOPPING SIGHT DISTANCE AND CORNER SIGHT DISTANCE ANALYSIS

FOR

CURTIS PARK VILLAGE REFUELING CENTER

NOVEMBER 8, 2015

PREPARED FOR

PETROVICH DEVELOPMENT

PREPARED BY

RICHARD McGRATH
RCE 31952

INTRODUCTION

A refueling center is proposed to be constructed within the Curtis Park Village project. The station will be located near the southwesterly corner of the project site on Buchanan Street. City of Sacramento staff are concerned if there is sufficient stopping sight distance and corner sight distance at the proposed driveway.

Buchanan Street has been recently constructed as part of the initial phase of the Curtis Park Village project and is a minor collector street. The street has been striped as a two lane street and contains one 20 MPH Speed Table approximately 275 feet north of the southerly driveway of the proposed refueling center. There are no speed limits sign constructed on Buchanan Street as of yet.

West Pacific Bypass street is 34 feet wide. The street crosses under the Sutterville Road Overpass bridge about 220 feet south of the project. The street has been constructed with two back to back highway curves with radii of 112 feet and 122 feet. The curves allow travel on West Pacific Bypass to turn in a northeasterly direction approximately 96^0. Speed limit signs at this curve location have been installed and indicated the speed limit for traveling around the curve to be 15 MPH.

BACKGROUND

A field inspection of the site was conducted. The following items were noted. Approaching northbound vehicles have to travel around a 112 foot radius horizontal curve with a length of 101 feet when traveling from West Pacific Bypass to Buchanan Street. The only observed sight distance obstruction in the southerly direction from the proposed driveway to West Pacific Bypass was an existing bridge column for the Sutterville Road Overpass. This column is located just behind the newly constructed Buchanan St, sidewalk and is approximately 100 feet south of the proposed driveway. The column would effect northbound line of sight for northbound motorist as well as for exiting vehicles from the proposed fuel station driveway. No traffic traveled on the street during the field visit .

In determining the stopping sight distance for the project the Caltrans Highway Design Manual, the City of Sacramento Design and Procedure Manual, Section 15, Street Design Standards, and the American Association of State Highway Official (AASHTOO) Highway Safety Manual were utilized.

Section 15 of the City's Design and Procedure Manual indicates to use Caltrans Highway Design Manual and the AASHTOO manual for determining stopping sight distances. The AASHTOO manual is very general in regards to stopping sight distance for local streets and indicates in Chapter Five that stopping sight distance for Local Urban Streets should be 100 to 200 feet. Caltrans Highway Design Manual indicates to use Chapters 200 and 400 in determining stopping sight distance and the corner sight distance for Local Streets. Therefore, the Caltrans Highway

Design Manual was the primary technical reference used in the analysis because it contains the most detailed and specific criteria for determining stopping sight distance and corner sight distance for local streets.

STOPPING SITE DISTANCE ANALYSIS

Copies of the computer design and construction files for the newly constructed Buchanan Street were obtained to obtain the exact geometric data of the street (i.e. street width, road curves, street grades and slopes). Caltrans Highway Design Manual, Chapter 200, Section 201.3 - Stopping Sight Distance, indicates stopping sight distance should be measured 3 1/2 feet above the pavement surface, to an object 1/2 foot high above the road (See Appendix A). A passenger vehicle was used as the design vehicle for the analysis to meet the 3 1/2 foot height criteria. The drivers eye path for the vehicle at the driveway was located 10 feet behind the face of curb per Caltrans Highway Design Manual Chapter 400, Section 405.1

An exiting vehicle was located at the refueling center proposed driveway which is 63 feet north of the most southerly driveway that was constructed with the Village 2B/3 project. A sight distance line was then plotted from the exiting vehicle at the proposed driveway to an approaching north bound vehicle. The drivers eye path for the approaching vehicle was located approximately 4 feet east of the striped center line of the road. The approaching vehicle was located at the approximate center of the 112 foot radius curve where the vehicle would be in a position very close to being parallel to the center line of Buchannan Street.

The plotted sight distance line indicates the Stopping Sight Distance from the driveway to West Pacific Bypass to be 190 feet. The line of sight line is approximately 14 feet west of the Sutterville Road bridge column. Stopping Sight Distance for southbound travel was determined in a similar manner with the line of unobstructed sight in this direction being 221 feet. The Caltrans Highway Design Manual , Chapter 200, Table 201.1 indicates the 190 foot stopping sight distance would accommodate vehicular speeds of 25 MPH.

CORNER SITE DISTANCE ANALYSIS

The Caltrans Highway Design Manual , Chapter 400 indicates criteria for Corner Sight Distance for local streets. The Caltrans Manual in Chapter 400, Section 405.1(2)d - Urban Driveways indicates corner sight distance does not apply to urban streets (See Appendix B). Section 405.1(2)d refers that urban driveways should be designed and constructed in accordance with Chapter 200, Section 205.3. The proposed driveway will be designed in accordance with city standards and the Caltrans Highway design Manual.

CONCLUSION

There is sufficient stopping sight distance for northbound and southbound vehicles to observe exiting vehicles from the proposed refueling center driveway. The Stopping Sight Distance and Corner Sight distance are 190 feet and can safely accommodate a 25 MPH traveling speed.

It is recommend that at one more speed table be constructed on Buchanan Street approximately 300 feet north of the existing speed table(See Appendix C). In addition, the city should also install no parking signs on the westerly side of Buchanan Street to prohibit parking approximately 80 feet south of the driveway to 80 feet north of the driveway. The no parking signs should be installed at the indicated distances with curbing painted red between the sign locations.dumpling10

APPENDIX A

TECHNICAL REFERENCE

CALTRANS HIGHWAY DESIGN MANUAL
STOPPING SIGHT DISTANCE

AASHTO
DESIGN VEHICLE

CHAPTER 200
GEOMETRIC DESIGN AND STRUCTURE STANDARDS

Topic 201 - Sight Distance

Index 201.1 - General

Sight distance is the continuous length of highway ahead, visible to the highway user. Four types of sight distance are considered herein: passing, stopping, decision, and corner. Passing sight distance is used where use of an opposing lane can provide passing opportunities (see Index 201.2). Stopping sight distance is the minimum sight distance for a given design speed to be provided on multilane highways and on 2-lane roads when passing sight distance is not economically obtainable. Stopping sight distance also is to be provided for all users, including motorists and bicyclists, at all elements of interchanges and intersections at grade, including private road connections (see Topic 504, Index 405.1, & Figure 405.7). Decision sight distance is used at major decision points (see Indexes 201.7 and 504.2). Corner sight distance is used at intersections (see Index 405.1, Figure 405.7, and Figure 504.3J).

Table 201.1 shows the minimum standards for stopping sight distance related to design speed for motorists. Stopping sight distances given in the table are suitable for Class II and Class III bikeways. The stopping sight distances are also applicable to roundabout design on the approach roadway, within the circulatory roadway, and on the exits prior to the pedestrian crossings. Also shown in Table 201.1 are the values for use in providing passing sight distance.

See Chapter 1000 for Class I bikeway sight distance guidance.

Chapter 3 of "A Policy on Geometric Design of Highways and Streets," AASHTO, contains a thorough discussion of the derivation of stopping sight distance.

201.2 Passing Sight Distance

Passing sight distance is the minimum sight distance required for the driver of one vehicle to pass another vehicle safely and comfortably. Passing must be accomplished assuming an oncoming vehicle comes into view and maintains the design speed, without reduction, after the overtaking maneuver is started.

Table 201.1
Sight Distance Standards

Design Speed[1] (mph)	Stopping[2] (ft)	Passing (ft)
10	50	---
15	100	---
20	125	800
25	150	950
30	200	1,100
35	250	1,300
40	300	1,500
45	360	1,650
50	430	1,800
55	500	1,950
60	580	2,100
65	660	2,300
70	750	2,500
75	840	2,600
80	930	2,700

(1) See Topic 101 for selection of design speed.
(2) For sustained downgrades, refer to advisory standard in Index 201.3

The sight distance available for passing at any place is the longest distance at which a driver whose eyes are 3 ½ feet above the pavement surface can see the top of an object 4 ¼ feet high on the road. See Table 201.1 for the calculated values that are associated with various design speeds.

In general, 2-lane highways should be designed to provide for passing where possible, especially those routes with high volumes of trucks or recreational vehicles. Passing should be done on tangent horizontal alignments with constant grades or a slight sag vertical curve. Not only are drivers reluctant to pass on a long crest vertical curve, but it is impracticable to design crest vertical curves to provide for passing sight distance because of high

cost where crest cuts are involved. Passing sight distance for crest vertical curves is 7 to 17 times longer than the stopping sight distance.

Ordinarily, passing sight distance is provided at locations where combinations of alignment and profile do not require the use of crest vertical curves.

Passing sight distance is considered only on 2-lane roads. At critical locations, a stretch of 3- or 4-lane passing section with stopping sight distance is sometimes more economical than two lanes with passing sight distance.

Passing on sag vertical curves can be accomplished both day and night because headlights can be seen through the entire curve.

See Part 3 of the California Manual on Uniform Traffic Control Devices (California MUTCD) for criteria relating to the placement of barrier striping for no-passing zones. Note, that the passing sight distances shown in the California MUTCD are based on traffic operational criteria. Traffic operational criteria are different from the design characteristics used to develop the values provided in Table 201.1 and Chapter 3 of AASHTO, A Policy on Geometric Design of Highways and Streets. The aforementioned table and AASHTO reference are also used to design the vertical profile and horizontal alignment of the highway. Consult the Headquarters (HQ) Traffic Liaison when using the California MUTCD criteria for traffic operating-control needs.

Other means for providing passing opportunities, such as climbing lanes or turnouts, are discussed in Index 204.5. Chapter 3 of AASHTO, A Policy on Geometric Design of Highways and Streets, contains a thorough discussion of the derivation of passing sight distance.

201.3 Stopping Sight Distance

The minimum stopping sight distance is the distance required by the user, traveling at a given speed, to bring the vehicle or bicycle to a stop after an object ½-foot high on the road becomes visible. Stopping sight distance for motorists is measured from the driver's eyes, which are assumed to be 3 ½ feet above the pavement surface, to an object ½-foot high on the road. See Index 1003.1(10) for Class I bikeway stopping sight distance guidance.

The stopping sight distances in Table 201.1 should be increased by 20 percent on sustained downgrades steeper than 3 percent and longer than one mile.

201.4 Stopping Sight Distance at Grade Crests

Figure 201.4 shows graphically the relationships between length of highway crest vertical curve, design speed, and algebraic difference in grades. Any one factor can be determined when the other two are known.

201.5 Stopping Sight Distance at Grade Sags

From the curves in Figure 201.5, the minimum length of vertical curve which provides headlight sight distance in grade sags for a given design speed can be obtained.

If headlight sight distance is not obtainable at grade sags, lighting may be considered. The Design Coordinator and the HQ Traffic Liaison shall be contacted to review proposed grade sag lighting to determine if such use is appropriate.

201.6 Stopping Sight Distance on Horizontal Curves

Where an object off the pavement such as a bridge pier, building, cut slope, or natural growth restricts sight distance, the minimum radius of curvature is determined by the stopping sight distance.

Available stopping sight distance on horizontal curves is obtained from Figure 201.6. It is assumed that the driver's eye is 3 ½ feet above the center of the inside lane (inside with respect to curve) and the object is ½-foot high. The line of sight is assumed to intercept the view obstruction at the midpoint of the sight line and 2 feet above the center of the inside lane when the road profile is flat (i.e. no vertical curve). Crest vertical curves can cause additional reductions in sight distance. The clear distance (m) is measured from the center of the inside lane to the obstruction.

The design objective is to determine the required clear distance from centerline of inside lane to a retaining wall, bridge pier, abutment, cut slope, or other obstruction for a given design speed. Using radius of curvature and minimum sight distance for that design speed, Figure 201.6 gives the clear

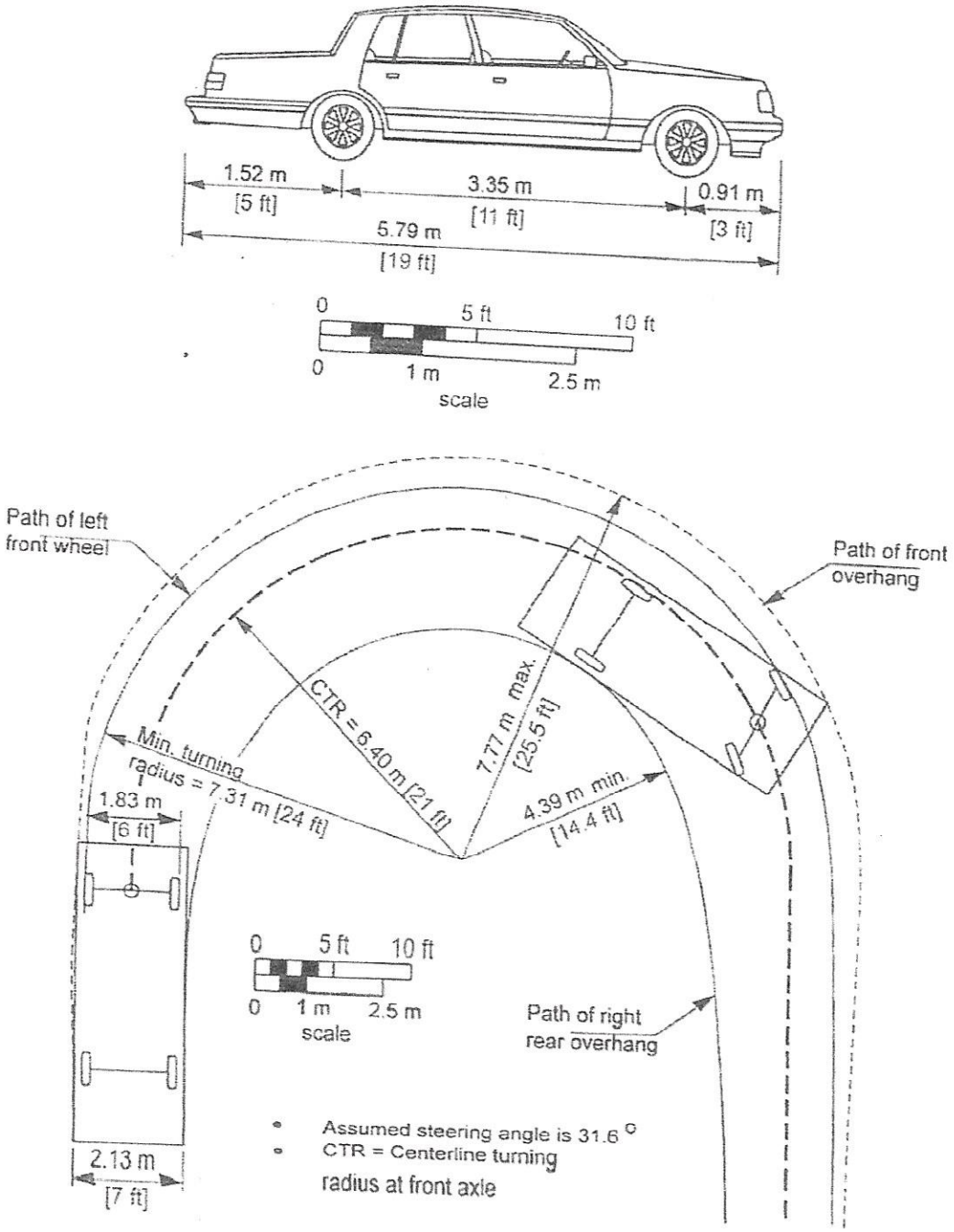


Exhibit 2-3. Minimum Turning Path for Passenger Car (P) Design Vehicle

US Customary

Design Vehicle Type	Passenger Car	Single-Unit Truck	Intercity Bus (Motor Coach)		City Transit Bus	Conventional School Bus (65 pass.)	Large[2] School Bus (84 pass.)	Articulated Bus	Intermediate Semi-trailer	Intermediate Semi-trailer
Symbol	P	SU	BUS-40	BUS-45	CITY-BUS	S-BUS36	S-BUS40	A-BUS	WB-40	WB-50
Minimum Design Turning Radius (ft)	24	42	45	45	42.0	38.9	39.4	39.8	40	45
Centerline[1] Turning Radius (CTR) (ft)	21	38	40.8	40.8	37.8	34.9	35.4	35.5	36	41
Minimum Inside Radius (ft)	14.4	28.3	27.6	25.5	24.5	23.8	25.4	21.3	19.3	17.0

Design Vehicle Type	Interstate Semitrailer		"Double Bottom" Combination	Triple Semi-trailer/ trailers	Turnpike Double Semi-trailer/ trailer	Motor Home	Car and Camper Trailer	Car and Boat Trailer	Motor Home and Boat Trailer	Farm[3] Tractor w/One Wagon
Symbol	WB-62*	WB-65** or WB-67	WB-67D	WB-100T	WB-109D*	MH	P/T	P/B	MH/B	TR/W
Minimum Design Turning Radius (ft)	45	45	45	45	60	40	33	24	50	18
Centerline[1] Turning Radius (CTR) (ft)	41	41	41	41	56	36	30	21	46	14
Minimum Inside Radius (ft)	7.9	4.4	19.3	9.9	14.9	25.9	17.4	8.0	35.1	10.5

* = Design vehicle with 48-ft trailer as adopted in 1982 Surface Transportation Assistance Act (STAA).

** = Design vehicle with 53-ft trailer as grandfathered in with 1982 Surface Transportation Assistance Act (STAA).

1 = The turning radius assumed by a designer when investigating possible turning paths and is set at the centerline of the front axle of a vehicle. If the minimum turning path is assumed, the CTR approximately equals the minimum design turning radius minus one-half the front width of the vehicle.

2 = School buses are manufactured from 42-passenger to 84-passenger sizes. This corresponds to wheelbase lengths of 11.0 ft to 20.0 ft, respectively. For these different sizes, the minimum design turning radii vary from 28.8 ft to 39.4 ft and the minimum inside radii vary from 14.0 ft to 25.4 ft.

3 = Turning radius is for 150–200 hp tractor with one 18.5 ft long wagon attached to hitch point. Front wheel drive is disengaged and without brakes being applied.

Exhibit 2-2. Minimum Turning Radii of Design Vehicles (Continued)

APPENDIX B

TECHNICAL REFERENCE

CALTRANS HIGHWAY DESIGN MANUAL
CORNER SIGHT DISTANCE

404.5 Turning Templates & Vehicle Diagrams

Figures 404.5A through G are computer-generated turning templates at an approximate scale of 1"=50' and their associated vehicle diagrams for the design vehicles described in Index 404.3. The radius of the template is measured to the outside front wheel path at the beginning of the curve. Figures 404.5A through G contain the terms defined as follows:

(1) *Tractor Width* - Width of tractor body.

(2) *Trailer Width* - Width of semitrailer body.

(3) *Tractor Track* - Tractor axle width, measured from outside face of tires.

(4) *Trailer Track* – Semitrailer axle width, measured from outside face of tires.

(5) *Lock To Lock Time* - The time in seconds that an average driver would take under normal driving conditions to turn the steering wheel of a vehicle from the lock position on one side to the lock position on the other side. The default in AutoTurn software is 6 seconds.

(6) *Steering Lock Angle* - The maximum angle that the steering wheels can be turned. It is further defined as the average of the maximum angles made by the left and right steering wheels with the longitudinal axis of the vehicle.

(7) *Articulating Angle* - The maximum angle between the tractor and semitrailer.

Topic 405 - Intersection Design Standards

405.1 Sight Distance

(1) *Stopping Sight Distance.* See Index 201.1 for minimum stopping sight distance requirements.

(2) *Corner Sight Distance.*

(a) General--At unsignalized intersections a substantially clear line of sight should be maintained between the driver of a vehicle, bicyclist or pedestrian waiting at the crossroad and the driver of an approaching vehicle. Line of sight for all users should be included in right of way, in order to preserve sight lines. Adequate time must be provided for the waiting user to either cross all lanes of through traffic, cross the near lanes and turn left, or turn right, without requiring through traffic to radically alter their speed.

The values given in Table 405.1A provide 7-1/2 seconds for the driver on the crossroad to complete the necessary maneuver while the approaching vehicle travels at the assumed design speed of the main highway. The 7-1/2 second criterion is normally applied to all lanes of through traffic in order to cover all possible maneuvers by the vehicle at the crossroad. However, by providing the standard corner sight distance to the lane nearest to and farthest from the waiting vehicle, adequate time should be obtained to make the necessary movement. On multilane highways a 7-1/2 second criterion for the outside lane, in both directions of travel, normally will provide increased sight distance to the inside lanes. Consideration should be given to increasing these values on downgrades steeper than 3 percent and longer than 1 mile (see Index 201.3), where there are high truck volumes on the crossroad, or where the skew of the intersection substantially increases the distance traveled by the crossing vehicle.

In determining corner sight distance, a set back distance for the vehicle waiting at the crossroad must be assumed. **Set back for the driver of the vehicle on the crossroad shall be a minimum of 10 feet plus the shoulder width of the major road but not less than 15 feet.** Line of sight for corner sight distance is to be determined from a 3 and 1/2-foot height at the location of the driver of the vehicle on the minor road to a 4 and 1/4-foot object height in the center of the approaching lane of the major road as illustrated in Figure 504.3J. If the major road has a median barrier, a 2-foot object height should be used to determine the median barrier set back.

In some cases the cost to obtain 7-1/2 seconds of corner sight distances

may be excessive. High costs may be attributable to right of way acquisition, building removal, extensive excavation, or immitigable environmental impacts. In such cases a lesser value of corner sight distance, as described under the following headings, may be used.

(b) Public Road Intersections (Refer to Topic 205)--At unsignalized public road intersections (see Index 405.7) corner sight distance values given in Table 405.1A should be provided.

At signalized intersections the values for corner sight distances given in Table 405.1A should also be applied whenever possible. Even though traffic flows are designed to move at separate times, unanticipated conflicts can occur due to violation of signal, right turns on red, malfunction of the signal, or use of flashing red/yellow mode.

Table 405.1A
Corner Sight Distance
(7-1/2 Second Criteria)

Design Speed (mph)	Corner Sight Distance (ft)
25	275
30	330
35	385
40	440
45	495
50	550
55	605
60	660
65	715
70	770

Where restrictive conditions exist, similar to those listed in Index 405.1(2)(a), the minimum value for corner sight distance at both signalized and unsignalized intersections shall be equal to the stopping sight distance as given in Table 201.1, measured as previously described.

(c) Private Road Intersections (Refer to Index 205.2) and Rural Driveways (Refer to Index 205.4)--**The minimum corner sight distance shall be equal to the stopping sight distance as given in Table 201.1, measured as previously described.**

(d) Urban Driveways (Refer to Index 205.3)--Corner sight distance requirements as described above are not applied to urban driveways.

(3) *Decision Sight Distance.* At intersections where the State route turns or crosses another State route, the decision sight distance values given in Table 201.7 should be used. In computing and measuring decision sight distance, the 3.5-foot eye height and the 0.5-foot object height should be used, the object being located on the side of the intersection nearest the approaching driver.

The application of the various sight distance requirements for the different types of intersections is summarized in Table 405.1B.

(4) *Acceleration Lanes for Turning Moves onto State Highways.* At rural intersections, with "STOP" control on the local cross road, acceleration lanes for left and right turns onto the State facility should be considered. At a minimum, the following features should be evaluated for both the major highway and the cross road:

- divided versus undivided
- number of lanes
- design speed
- gradient
- lane, shoulder and median width
- traffic volume and composition of highway users, including trucks and transit vehicles
- turning volumes
- horizontal curve radii
- sight distance
- proximity of adjacent intersections
- types of adjacent intersections

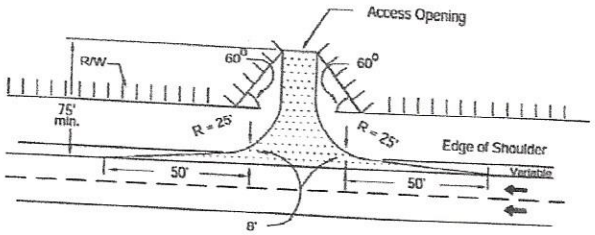
(3) *Recessed Access Openings.* Recessed access openings, as shown on Figure 205.1, are desirable at all points where private access is permitted and should be provided whenever they can be obtained without requiring alterations to existing adjacent improvements. When recessed openings are required, the opening should be located a minimum distance of 75 feet from the nearest edge of the traveled way.

(4) *Joint Openings.* A joint access opening serving two or more parcels of land is desirable whenever feasible. If the property line is not normal to the right of way line, care should be taken in designing the joint opening so that both owners are adequately served.

(5) *Surfacing.* All points of private access should be surfaced with adequate width and depth of pavement to serve the anticipated traffic. The surfacing should extend from the edge of the traveled way to the right of way line.

Figure 205.1

Access Openings on Expressways



RECESSED OPENING

NOTES:

- By widening the expressway shoulder, deceleration lanes may be provided where justified.
- This detail, without the recess, may be used on conventional highways.

205.2 Private Road Connections

The minimum private road connection design is shown on Figure 205.1. Sight distance requirements for the minimum private road connection are shown on Figure 405.7 (see Index 405.1(2)(c)).

205.3 Urban Driveways

These instructions apply to the design of driveways to serve property abutting on State highways in cities or where urban type development is encountered.

Details for driveway construction are shown on the Standard Plans. Corner sight distance requirements are not applied to urban driveways. See Index 405.1(2) for further information.

(1) *Correlation with Local Standards.* Where there is a local requirement regulating driveway construction, the higher standard will normally govern.

(2) *Driveway Width.* The width of driveways for both residential and commercial usage is measured at the throat, exclusive of any flares. ("W" as shown in Standard Plan A87A).

(3) *Residential Driveways.* The width of single residential driveways should be 12 feet minimum and 20 feet maximum. The width of a double residential driveway such as used for multiple dwellings should be 20 feet minimum and 30 feet maximum. The width selected should be based on an analysis of the anticipated volume, type and speed of traffic, location of buildings and garages, width of street, etc.

(4) *Commercial Driveways.* Commercial driveways should be limited to the following maximum widths:

(a) When the driveway is used for one-way traffic, the maximum width should be 25 feet. If the driveway serves a large parcel, where large volumes of vehicles or large vehicles are expected, the entrance maximum width should be 40 feet and the exit maximum width should be 35 feet.

(b) When the driveway is used for two-way traffic, the maximum width should be 35 feet. If the driveway serves a large parcel, where large volumes of vehicles or

large vehicles are expected, then the maximum width should be 45 feet.

(c) When only one driveway serves a given property, in no case should the width of the driveway including the side slope distances exceed the property frontage.

(d) When more than one driveway is to serve a given property, the total width of all driveways should not exceed 70 percent of the frontage where such a frontage is 100 feet or less. Where the frontage is more than 100 feet, the total driveway width should not exceed 60 percent of the frontage. In either case, the width of the individual driveway should not exceed those given in the preceding paragraphs. Where more than one driveway is necessary to serve any one property, not less than 20 feet of full height curb should be provided between driveways. This distance between driveways also applies to projects where curbs and gutters are not to be placed.

(e) Certain urban commercial driveways may need to accommodate the maximum legal vehicle. The width will be determined by the use of truck turn templates.

(5) *Surfacing.* Where curbs, gutters, and sidewalks are to be placed, driveways should be constructed of portland cement concrete. Where only curbs and gutters are to be placed and pedestrian traffic or adjacent improvements do not warrant concrete driveway construction, the driveway may be paved with the same materials used for existing surfacing on the property to be served.

(6) *Pedestrian Access.* Where sidewalks traverse driveways, the sidewalk shall continue across the driveway to alert driveway users that they are crossing a pedestrian walkway, and must yield to pedestrians on the sidewalk. Driveway corner radii should also be minimized to encourage low-speed turns by motorized vehicles and bicycles. For accessibility requirements, see DIB 82. Provision of this feature, as indicated in the Standard Plans, may require the acquisition of a construction easement or additional right of way. Assessment of these needs must be performed early enough in the design to allow time for acquiring any necessary permits or right of way. Additionally, designers should consider the following:

- In many cases providing the pathway along the back of the driveway will lower the elevation at the back of the sidewalk. Depending on grades behind the sidewalk the potential may exist for roadway generated runoff to enter private property. The need for features such as low berms within the construction easement, or installation of catch basins upstream of the driveway should be determined.

When there are no sidewalks or other pedestrian facilities that follow the highway, the designer may develop driveway details that eliminate the flatter portion along the back edge in lieu of using the Standard Plans for driveways. Refer to Topic 105 for additional information related to pedestrian facilities.

205.4 Driveways on Frontage Roads and in Rural Areas

On frontage roads and in rural areas where the maximum legal vehicle must be accommodated, standard truck-turn templates should be used to determine driveway widths where the curb or edge of traveled way is so close to the right of way line that a usable connection cannot be provided within the standard limits.

Where county or city regulations differ from the State's, it may be desirable to follow their regulations, particularly where jurisdiction of the frontage road will ultimately be in their hands.

Details for driveway construction are shown on the Standard Plans. For corner sight distance, see Index 405.1(2)(c).

Driveways connecting to State highways shall be paved a minimum of 33 feet or to the edge of State right of way, whichever is less to minimize or eliminate gravel from being scattered on the highway and to provide a good surface for vehicles

APPENDIX C

TECHNICAL REFERENCE

CITY OF SACRAMENTO
SPEED HUMP PROGRAM GUIDELINES
SPEED TABLE CRITERIA

City of Sacramento Standard Specifications. (Refer to Page 11 for a drawing of the proposed speed lump cross section for a typical residential street of 33 feet or less in width).

Construction Specifications (Speed Tables)

Upon installation of speed tables, the asphalt concrete speed tables will have a width of 22 feet, made up of a 6' long vertical curvature of 72 feet reaching a minimum height of three and one-quarter inches and a maximum height of three and three-quarters inches (3 ¼" to 3 ¾") on each end of a 10' long flat surface (Refer to Page 12). There will be a two-foot (2') horizontal taper originating at the crest of the speed table and converging at the lip of curb. Asphalt concrete shall be mixed and placed in accordance with Section 22 of the City of Sacramento Standard Specifications. (Refer to Page 12 for the proposed speed hump cross section).

Location Selection Guidelines

In selecting precise locations for the speed hump installation, the following guidelines shall be adhered to:

- Speed humps shall not be located over manholes, water valves, or street monumentation, or whenever possible, within twenty-five feet of fire hydrants, as they prevent/impede access to these facilities.
- Speed humps should be located five to ten feet away from driveways, whenever possible, to minimize their effect on driveway access.
- Speed humps should be located on or near property lines, whenever possible, to minimize the impact on (access to) individual properties.
- Speed humps should be located near streetlights, whenever possible, in order to enhance their visibility at night.
- Speed humps should be located a minimum distance of 200 feet from corners, whenever possible, and should never be located within a corner radius.
- No speed humps shall be located on any horizontal curve(s) with less than a 650' radius.
- Speed humps shall be spaced at a minimum interval of 250 feet and a maximum interval of 600 feet. Speed humps will be placed no closer than 200 feet from traffic control devices or four-way intersections.
- Where possible, at least two speed humps will be placed on a residential or parks and schools street or qualifying contiguous segments, as two humps are the minimum for effective speed control. When speed humps are to be installed at a

Bypass location, one hump may be placed if the street segment or one of the streets in a series of street segments is less than 600 feet in length. The maximum number of speed humps is dictated by street length and spacing requirements.

- To deter driver from driving around speed humps where no vertical curb exists, a two-inch (2") pipe shall be set in the sidewalk, centered on the speed hump in each approach direction. The pipes shall be placed at a maximum of six inches (6") from the back of curb and shall allow a minimum of 48" of clear sidewalk width to allow for wheelchair access. (Refer to Pages 10 -12).

Signs and markings

All signs and markings required with the speed humps shall be part of the contract bid package, unless these items are to be installed by City crews.

There are two types of advanced warning devices used to alert motorists of upcoming speed humps: street signs and pavement markings. The signing includes a 30-inch sign stating "SPEED HUMP" in four-inch (4") letters and a second line with an advisory speed of 15 MPH. Above this text is a pictorial of a speed hump. (Refer to Pages 10 and 11). Signage for a speed table includes a 30-inch sign stating "SPEED TABLE" in four-inch (4") letters and a second line with an advisory speed of 20 MPH. Above this text is a pictorial of a speed table. (Refer to Page 12).

Pavement markings for speed humps and speed tables shall include twelve-inch (12") wide stripes, forming a chevron, extending six feet (6') from the approach edge of the speed hump to the apex of the speed hump and centered in each travel lane. Sixty feet (60') of centerline shall be striped across the hump, extending thirty feet (30") from the apex of the speed hump in both directions. Speed tables shall be striped with seventy feet (70') of centerline, extending thirty-five feet (35') from the apex of the speed table in both directions. Pavement markings for speed lumps shall include diamond striping on the center lump(s) and chevron markings on the side lumps. A reflective pavement marker will indicate the middle of the center lump(s) to assist RT and fire truck drivers to center their vehicle over the lump. (Refer to Pages 10 -12).

Additional Speed Humps

Adding additional speed humps on a street may be considered when all of the criteria listed below are met.

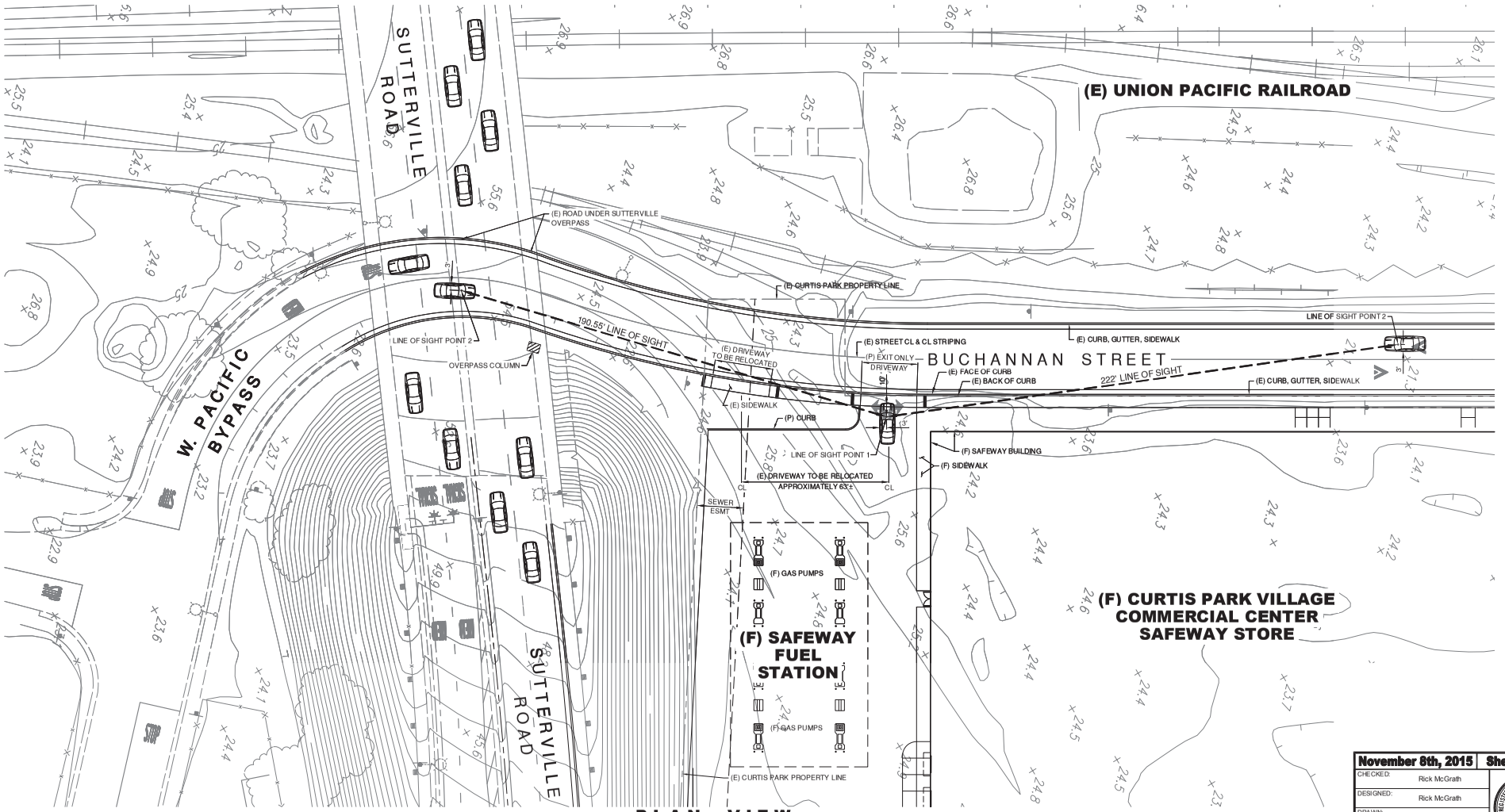
1. <u>For Residential and Parks and Schools Locations:</u> Where speed humps are ineffective in reducing speeds of vehicles based on speed survey conducted for 24-hour period. The 85th percentile speed must be 5 mph or greater than the posted or prima facie speed on the street segment.

   <u>For Bypass Locations:</u> Where speed humps are ineffective in reducing the volume of vehicles, based on an average daily traffic (ADT) count. Traffic volumes must

Sight Distance and Stopping Exhibit for

Curtis Park Village
Future Safeway Fuel Station

City of Sacramento ~ California



PLAN VIEW

SCALE: 1 in = 20 ft

November 8th, 2015	Sheet 1 of 1
CHECKED:	Rick McGrath
DESIGNED:	Rick McGrath
DRAWN:	Orest Kravets
QUANTITIES:	STAFF

REGISTERED PROFESSIONAL ENGINEER RICK McGRATH No.31952 12-31-2016 CIVIL STATE OF CALIFORNIA

PRELIMINARY - NOT FOR CONSTRUCTION

Curtis Park Village Safeway Fuel Center (Sutterville Rd and Buchannan)

November 8th, 2015 - Safeway Fuel Center Sight Distance Exhibit

J:\JOBS\1113505 - CURTIS PARK PLAN (PDC)\CAD\FUEL SIGHT DISTANCE\1113505_CURTIS PARK VILLAGE FUEL CENTER SITE DISTANCE EXHIBIT_15-1 Nov 09, 2015-01:30 pm OREST KRAVETS

Attachment E
Health Risk Assessment for Crocker Road Location

Available upon request:
Attachment A – AERMOD Input Files
Attachment B – Health Risk Calculation Databases

RAMBOLL ENVIRON

ENVIRONMENT
& HEALTH

Tom Buford, Senior Planner
Environmental Planning Services
City of Sacramento
300 Richards Blvd., Third Floor
Sacramento, CA 95811

RE: HEALTH RISK ANALYSIS FOR PROPOSED SAFEWAY FUEL CENTER, SACRAMENTO, CALIFORNIA

Date May 06, 2015

Ramboll Environ
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USA

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Dear Mr. Buford:

Ramboll Environ US Corporation (Ramboll Environ) conducted a health risk assessment (HRA) for a proposed Safeway Fuel Center gas dispensing facility (GDF) located in Sacramento, California within the jurisdiction of the Sacramento Metropolitan Air Quality Management District (SMAQMD or "the District") to evaluate potential health impacts associated with air emissions from the proposed GDF to nearby exposed populations.

The analysis shows that all health impacts are within an acceptable range and would not warrant a denial of the permit and are below California Environmental Quality Act (CEQA) thresholds of significance. The estimated cancer risk is in the range that SMAQMD defines as "acceptable risk, provide TBACT [Toxic Best Available Control Technology]". TBACT is California Air Resources Board- (CARB) certified vapor recovery equipment, which is already included in the Fuel Center design. Both the chronic and acute non-cancer Hazard Indices (HIs) are in the range that SMAQMD defines as "within acceptable range."

Project Understanding

Safeway proposes to construct a GDF near the Sutterville Road and Crocker Road intersection in Sacramento, California. The GDF would be sited within the vicinity of existing and future residential and worker populations. The GDF is expected to have an annual throughput of 7.45 million gallons. Safeway will not have other stationary sources (e.g., standby engine).

We understand that the HRA will be used by Safeway to support air permitting for the GDF by SMAQMD and to support environmental documentation for the CEQA entitlement process. Thus, the analysis was prepared consistent with the District's

permitting guidance, which includes the SMAQMD GDF Policy Manual,[1] the California Air Pollution Control Officers Association (CAPCOA) Air Toxics "Hot Spots" Program Industrywide Risk Assessment Guidelines for Gasoline Service Stations,[2] and Office of Environmental health Hazard Assessment's (OEHHA) most recent Air Toxic Hot Spots Program Guidance Manual for the Preparation of Risk Assessments (Guidance Manual) (OEHHA 2015).[3]

The SMAQMD Thresholds of Significance

SMAQMD provides action levels for permit review based on estimated levels of cancer risk and non-cancer health risk (acute and chronic) in their GDF Policy Manual. These are summarized below:

Excess Cancer Risk	**Action Required**
≤ 0.1 per million	Exempt from further toxic review.
> 0.1 per million but ≤ 1 per million	No significant risk; No action required.
> 1 per million but ≤ 10 per million	Acceptable risk; Provide TBACT[4]
> 10 per million but ≤ 100 per million	Permit denied unless the Air Pollution Control Officer (APCO) makes a finding that not approving the project may result in a greater negative impact to the public than approving
> 100 per million	Denial of permit.

Non-Cancer HI (Chronic and Acute)	**Action Required**
HI < 1	Health risk is within acceptable range
HI ≥ 1	Consult OEHHA for further guidance

SMAQMD also provides thresholds of significance for CEQA analyses in their CEQA Guidelines.[5] For individual stationary sources, SMAQMD sets the threshold of significance for cancer risk at 10 in a million and for non-cancer HI (chronic and acute) at 1. These thresholds correspond to impacts in the acceptable risk range in the GDF Policy Manual.

[1] SMAQMD. 2012. Gasoline Dispensing Facilities Policy Manual. August.

[2] CAPCOA. 1997. Air Toxics Hot Spots Program Industrywide Risk Assessment Guidelines for Gasoline Service Stations. November. Available at: http://www.arb.ca.gov/ab2588/rrap-iwra/GasIWRA.pdf.

[3] OEHHA. 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessment. March 6. Available at: http://oehha.ca.gov/air/hot_spots/hotspots2015.html.

[4] SMAQMD GDF Policy Manual states that "For a GDF, TBACT has been determined to be the use of CARB certified vapor recovery equipment" which is included in this analysis

[5] SMAQMD. 2014. CEQA Guide SMAQMD Thresholds of Significance Table. November. Available at: http://www.airquality.org/ceqa/cequguideupdate/Ch2TableThresholds.pdf.

Toxic Air Contaminant Emissions Calculation

The cancer risk and non-cancer impacts are based on emissions of toxic air contaminants (TACs). The operation of the GDF will emit TACs in the form of benzene, as discussed in the CAPCOA guidance. Benzene is a toxic constituent of gasoline vapors, which CAPCOA estimates is 0.3% by weight of gasoline vapors (e.g., breathing, loading, and refueling emissions) and 1% by weight of liquid (i.e., spillage emissions). Reformulated gasoline contains other toxic substances, but their compositions in vapor are not known at this time according to CAPCOA guidance. Thus, only benzene emissions are estimated, consistent with SMAQMD and CAPCOA guidance.

As reported in guidance, benzene is emitted by four primary processes:

1. Loading of storage tanks;
2. Breathing losses due to temperature and pressure changes within storage tank vapor space;
3. Refueling of vehicles; and
4. Spillage during vehicle refueling.

CAPCOA's Scenario 6B emission factors were used for each process. Scenario 6B assumes that the gasoline station has underground storage tanks with vent valves, and Phase I (loading) as well as Phase II (refueling) vapor recovery systems in place. Emissions and calculation methodology are shown in Table 1.

Air Dispersion Modeling

Near-field air dispersion modeling of GDF emissions was conducted using the USEPA's AERMOD model version 14134, a Gaussian air dispersion model recommended by SMAQMD for use in preparing environmental documentation. Air dispersion models such as AERMOD require a variety of inputs such as source parameters, meteorological data, topography information, and receptor locations. As discussed below, when site-specific information is unknown, Ramboll Environ used default parameter sets that are designed to produce conservative (i.e., overestimates of) air concentrations.

Meteorological data: Air dispersion modeling applications require the use of meteorological data that ideally are spatially and temporally representative of conditions in the immediate vicinity of the site under consideration. An Auer Analysis (Figure 1) showed that the area is considered urban,[6] so AERMOD was set up with urban dispersion coefficients. The model was run with the most recent five years of pre-processed meteorological data provided by SMAQMD (i.e., 2010 to 2014) collected at Sacramento Executive Airport, approximately 1.3 miles away from the Facility. Sacramento's population of 475,122 resulted in the use of urban dispersion coefficients.[7] One-hour and annual average concentrations were estimated using AERMOD.

Terrain considerations: Elevation data from the National Elevation Dataset (NED) maintained by the USGS were used in USEPA's terrain preprocessor, AERMAP.

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[6] An Auer Analysis considers the land uses within 3 kilometers of the site. If over 50% of the area is high density, the area is considered urban and AERMOD can be run to calculate urban dispersion coefficients. Land use data obtained from the United States Geological Survey (USGS) for 2011 was used in this analysis and 52% of the area was categorized as "Developed High Intensity" or "Developed Medium Intensity", both considered "Urban" under Auer classification. Thus, the area is considered urban.

[7] State of California. 2014. E-1 Population Estimates for Cities, Counties and the State with Annual Percent Change — January 1, 2013 and 2014. Department of Finance. Sacramento, California. May. Available at: http://www.dof.ca.gov/research/demographic/reports/estimates/e-1/view.php

Emission rates: Emissions were modeled using the unit emission rate method, such that each source is modeled with a unit emission rate (i.e., 1 gram per second [g/s]), and the model estimates dispersion factors (with units of [µg/m^3]/[g/s]) at each receptor. Actual emissions were multiplied by the dispersion factors to obtain concentrations at each receptor from each source. Concentrations at each receptor were the sum of the concentration from each source at the receptor.

AERMOD estimated 1-hour maximum dispersion factors for use in the non-cancer acute HI analysis and annual average dispersion factors for use in non-cancer chronic HI and cancer risk analyses. Emissions were assumed to be constant throughout the day and year.

Source parameters: Source location and parameters are necessary to model the dispersion of air emissions. Consistent with CAPCOA guidance, a point source was used to estimate concentrations from loading and breathing emissions and volume sources were used to estimate concentrations from the refueling and spillage emissions. The fuel dispensers at the Safeway GDF are not arranged symmetrically, unlike the configuration shown in the guidance. Thus, the refueling and spillage sources are modeled as two adjacent volume sources instead of one large source, based on discussions with SMAQMD staff.[8] Source parameters are consistent with CAPCOA guidance. The location of the sources is shown in Figure 2 and the source parameters are summarized in Table 2a.

Building Downwash: Turbulent eddies can form on the downwind side of buildings, and may cause a plume from a stack or point source located near the building to be drawn towards the ground to a greater degree than if the building were not present. This is referred to as the "building downwash" effect. The effect can increase the resulting ground-level pollutant concentrations downwind of a building. Ramboll Environ used the dimensions and locations of nearby buildings, to allow AERMOD to incorporate algorithms to evaluate the downwash effect on point sources (i.e., breathing and loading). The modeled residential and non-residential building locations are presented in Figure 3, and the associated building heights are summarized in Table 2b.

Receptors: A nested grid of receptors was modeled with a fine grid near the GDF and a sparser grid further from the GDF. A grid with 10-meter spacing was used within 1,000 feet of the GDF. To ensure the maximally exposed individual was found, a grid with 25-meter spacing was added between 1,000 and 2,000 feet from the GDF. This grid includes existing and future worker and residential populations. Consistent with SMAQMD CEQA guidance, concentrations were estimated at a default breathing height of 1.8 meters. The modeled receptor locations are shown in Figure 4.

Health Risk Assessment

The health impacts including the cancer risk and non-cancer chronic and acute HI are evaluated based on the modeled benzene concentrations and the exposure parameters recommended in the 2015 OEHHA Hot Spots Guidance Manual and compared against the health risk thresholds from the District's GDF Policy Manual and CEQA Guidelines.[9]

[8] Communication between Brian Krebs (SMAQMD) and Sarah Manzano (Ramboll Environ) on February 26, 2015.
[9] Please refer to citation in footnote 5.

In response to concerns regarding children's health and to address the specific mandates of SB 25, OEHHA recently finalized the Hot Spots Program Guidance Manual for Preparation of HRAs to incorporate the critical information from the three previously released Technical Support Documents (TSDs) into one guidance manual. The updated Guidance Manual supersedes the 2003 OEHHA Hot Spots Guidance Manual.[10] The methodology used in this HRA follows the recommended approach in the 2015 Hot Spots Guidance Manual, including the incorporation of age-sensitivity factors (ASFs) in the cancer risk evaluation, age-specific breathing rates, reduced exposure durations for individual residents and workers, and incorporation of "fraction of time at home" (FAH) in residential risk evaluations. ASFs account for potential increased sensitivity to carcinogens during childhood.

Cancer risk was calculated using the modeled ambient annual benzene concentration, OEHHA default exposure parameters for a resident and an off-site worker (Table 3), cancer potency factors for benzene (Table 4), and age sensitivity factors (Table 5) following the OEHHA Guidance Manual. FAH is an exposure parameter that is newly incorporated in the 2015 Hot Spots Guidance Manual to adjust for time spent away from the home under the assumption that exposure to facility-specific emissions are not occurring away from the home for the residents. No schools or daycare facilities were identified in the project area within the 1 in a million cancer risk impact zone,[11,12,13] so the FAH was implemented as recommended in the OEHHA Guidance Manual for all age groups of the residents. FAH was not used to evaluate the worker exposure. The cancer risk calculation methodology is described in Table 6a.

OEHHA recommends applying an adjustment factor to the annual average concentration if concentrations are modeled assuming continuous emissions (i.e., 24 hours per day, 7 days per week) but actual emissions are less than 24 hours per day and exposures are concurrent source activities. Residents are assumed to be exposed to GDF emissions 24 hours per day, seven days per week. This assumption is consistent with how the annual average air concentration is modeled (24 hours per day, 7 days per week).[14] Thus, the annual average concentration need not be adjusted. Workers are assumed to be exposed during work hours, which are concurrent with the operating period. Thus, workers would be exposed to the maximum concentrations over the operating period. An adjustment factor of 1.5 was applied to the annual average concentration used in the evaluation of the worker in order to evaluate a more conservative case worker exposure if the Safeway GDF operates 16 hours a day ([24 hours/16 hours] = 1.5). Note that if the GDF operates 24 hours per day and 7 days per week, the modeling adjustment factor is not needed and the maximum worker exposure concentration would be lower.

The Chronic HI was also calculated from modeled ambient annual benzene concentrations using the methodology from the 2015 OEHHA Hot Spots Guidance Manual. Because benzene was the only contaminant evaluated for the calculation of chronic non-cancer hazard in this analysis, the chronic hazard

[10] OEHHA. 2003. Air Toxic Hot Spot Program Guidance Manual for the Preparation of Risk Assessments. Available at: http://oehha.ca.gov/air/hot_spots/pdf/HRAguidefinal.pdf

[11] Sensitive receptor locations within the 95822 zip code area were identified from searches of the following sources:
- Schools (public and private) – California Department of Education, California School Directory (CDE, 2013)
- Childcare and Elderly Care Centers – California Department of Social Services, Community Care Licensing Division (CCLD, 2012)

[12] California Department of Education (CDE). 2013. California School Directory. http://www.cde.ca.gov/re/sd/

[13] California Department of Social Services, Community Care Licensing Division (CCLD). 2012. CCLD Facility Search Form. http://www.ccld.ca.gov/docs/ccld_search/ccld_search.aspx

[14] Modeling of emissions of the GDF over 24 hours of the day, 7 days a week is consistent with CAPCOA Guidance recommendations by SMAQMD staff.

quotient (HQ) for benzene is the same as the overall chronic HI. The benzene chronic Reference Exposure Level (REL) for the chronic HI calculations is presented in Table 4. The chronic HI calculation methodology is also described in Table 6a.

The locations of the maximally exposed individual resident (MEIR) and maximally exposed individual worker (MEIW) are shown in Figure 5. As will be described in the next section, a refined spatial averaging analysis was conducted to evaluate more representative individual exposure for cancer risk. Table 6a shows the spatially averaged cancer risk for receptors in the immediate proximity of the MEIR (9.9 in a million) and the cancer risk for the MEIR (5.2 in a million). Both cancer risk values are in the acceptable range for permitting and below the CEQA threshold of significance. Also shown in Table 6a, the chronic HI for the MEIR and MEIW are 0.06 and 0.2, respectively, which are both in the acceptable range for permitting and below the CEQA threshold of significance.

The Acute HI was calculated from modeled ambient hourly benzene concentrations using the methodology from the 2015 OEHHA Hot Spots Guidance Manual. Similar to chronic HI, because benzene is the only contaminant evaluated the benzene acute HQ is equivalent to the overall acute HI. The benzene acute Reference Exposure Level (REL) for the acute HI calculations is presented in Table 4. The acute HI calculation methodology is described in Table 6b. As shown in Table 6b, the MEIR acute HI is 0.09 and the MEIW acute HI is 0.3, both of which are in the acceptable range for permitting and below the CEQA threshold of significance. **Health Risk Assessment Refinement – Spatial Averaging**

The 2015 OEHHA Guidance Manual states that *"...[b]asing risk estimates on a single highest point (PMI, MEIR, or MEIW) does not take into account that a person does not remain at one location on their property, or in one location at the workplace over an extended period of time. Therefore, the average air concentration over a small area is likely to be more representative than using the air concentration at a single point..."*, and introduced the concept of averaging air concentrations over a small area, or spatial averaging.

Ramboll Environ conducted a spatial averaging analysis following the methodology recommended in the OEHHA Guidance Manual. A 20-meter-by-20-meter nested grid centered at the MEIR was created. The receptors were set to have five-meter spacing, and the modeled cancer risk at each receptor is presented in Figure 6. Per recommendation by SMAQMD staff, the arithmetic mean of the cancer risk at the receptors located inside the residential parcels was calculated to represent the spatial average cancer risk for residents. As presented in Table 6c, the refined cancer risk is 9.9 in a million, which is in the acceptable range for permitting and below the SMAQMD CEQA threshold of significance. Note that this estimate is conservative because the MEIR is located at the boundary of a residential lot, roughly 10 meters from the location of the closest house where we would expect residents to spend most of their time (Figure 6). The average cancer risk for the residential building locations will be lower than 9.9 in a million.

Conclusion

Ramboll Environ evaluated the health impacts from the operation of the proposed gas dispensing facility at Safeway Fuel Center on nearby sensitive populations and workers. The maximum cancer risk, non-cancer chronic HI and non-cancer acute HI are in the acceptable impact range for SMAQMD permitted sources for all populations.

RAMBOLL ENVIRON

Please feel free to contact David Kim at 415-796-1940 or Kai Zhao at 415-796-1949 if you have any questions. Thank you for the opportunity to assist you with this matter.

Yours sincerely

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Attachments:

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Attachment A:	AERMOD Input Files
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Tables

Table 1
Gas Dispensing Facility Emissions
Safeway Fuel Center - Crocker Road
Sacramento, California

Emission Source	Throughput[1]	Emission Factor[2]	Gasoline Emissions[3]	Benzene Emissions[4]
	[gal/yr]	[lb/1000 gal]	[g/s]	[g/s]
Loading	7,450,000	0.084	0.009	2.7E-05
Breathing		0.025	0.003	8.0E-06
Refueling		0.74	0.079	2.4E-04
Spillage		0.42	0.045	4.5E-04

Notes:

1. Expected throughput of Fuel Center.
2. Consistent with SMAQMD GDF Policy Manual, the emission factors were obtained from the CAPCOA's Risk Assessment Guidelines for Scenario 6B (underground fuel tanks with vent values and Phase I/II vapor recovery systems in place).
3. Dispersion modeling conducted assuming that the gas station operates 24 hours a day, 7 days a week.
4. Consistent with the SMAQMD GDF Policy Manual, assumed benzene constitutes 0.3% by weight of vapors (i.e., loading, breathing, and refueling) and 1% by weight of liquid (i.e., spillage).

Abbreviations:

CAPCOA - California Air Pollution Control Officers Association
g - grams
gal - gallons
GDF - gasoline dispensing facilities
lb - pounds
s - seconds
SMAQMD - Sacramento Metropolitan Air Quality Management District
yr - year

References:

CAPCOA. 1997. Air Toxics "Hot Spots" Program. Gasoline Service Station Industrywide Risk Assessment Guidelines. November.
SMAQMD. 2012. Gasoline Dispensing Facilities Policy Manual. August.

Table 2a
Modeling Parameters
Safeway Fuel Center - Crocker Road
Sacramento, CA

Source	Source Type	Source Dimension[1]	Release Height[2]	Initial Vertical Dimension[2]	Initial Lateral Dimension[3]
		[m]	[m]	[m]	[m]
Refueling	Volume Source	21 x 21	1	1.9	4.9
		11 x 11	1	1.9	2.6
Spillage		21 x 21	0	1.9	4.9
		11 x 11	0	1.9	2.6

Source	Source Type	Exit Velocity[4]	Diameter[5]	Release Height[5]	Temperature[5]
		[m/s]	[m]	[m]	[K]
Breathing	Point Source	7.9E-04	0.051	3.7	289
Loading		2.6E-03	0.051	3.7	291

Notes:
1. The fuel dispensing area was represented with two volume sources scaled to maximize coverage of the area, consistent with guidance from SMAQMD.
2. The release height and initial vertical dimension was set to be consistent with the CAPCOA Gasoline Service Station Industrywide Risk Assessment Guidelines.
3. The initial lateral dimension was calculated to be consistent with the CAPCOA Gasoline Service Station Industrywide Risk Assessment Guidelines and is the length of the volume source side divided by 4.3 for adjacent volume sources representing a larger volume source.
4. The exit velocity is consistent with the CAPCOA Gasoline Service Station Industrywide Risk Assessment Guidelines for Scenario 6B and is the product of the source specific scaling factor and the number of million gallons of annual throughput.
5. The stack diameter, release height, and temperature was set to be consistent with the CAPCOA Gasoline Service Station Industrywide Risk Assessment Guidelines.

Abbreviations:
CAPCOA - California Air Pollution Control Officers Association
K - Kelvin
m - meters
s - seconds
SMAQMD - Sacramento Metropolitan Air Quality Management District

References:
California Air Pollution Control Officers Association (CAPCOA). 1997. Gasoline Service Station Industrywide Risk Assessment Guidelines. November.

Table 2b
Building Parameters
Safeway Fuel Center - Crocker Road
Sacramento, CA

Building[1]		Description[1]	UTMx (Centroid) [m]	UTMy (Centroid) [m]	Height[2] [m]
Commercial Development	Building 1	Fuel Kiosk	632,257	4,266,969	5.13
	Building 2 (Main)	Retail	632,263	4,266,947	7.40
	Tier 1				7.30
	Tier 2				9.60
	Tier 3				13.0
	Tier 4				9.60
	Building 3 (Main)	Retail	632,273	4,266,902	5.94
	Tier 1				7.11
	Tier 2				7.62
	Tier 3				7.11
	Tier 4				7.80
	Building 4 (Main)	Retail	632,281	4,266,870	6.40
	Tier 1				8.92
	Tier 2				8.92
	Building 5 (Main)	Grocery & Major Retail	632,153	4,266,903	9.00
	Tier 1				15.9
	Tier 2				14.2
	Tier 3				11.9
	Building 6	Retail & Bank	632,239	4,267,048	7.40
	Building 7	Retail	632,220	4,267,091	7.40
	Building 8	Retail	632,189	4,267,111	7.40
	Building 9	Major Retail	632,114	4,267,054	9.00
Residential Development			Varies	Varies	12.4

Notes:
1. The location and building height of the proposed commercial and residential buildings based on the plot plans provided by the client.

Abbreviations:
m - meters

Table 3
Exposure Parameters by Population
Safeway Fuel Center - Crocker Road
Sacramento, California

Exposure Parameter	Units	Resident				Worker
		Child			Adult	
		3rd Trimester	0 - <2 Years	2 - <16 Years	16 - <30 Years	
Daily Breathing Rate (DBR) [1]	[L/kg-day]	361	1090	745	335	230
Fraction at Home (FAH) [2]	Unitless	0.85	0.85	0.72	0.73	--
Exposure Frequency (EF) [3]	[days/year]	350	350	350	350	250
Exposure Duration (ED) [4]	[years]	0.25	2	14	14	25
Averaging Time (AT)	[days]	25,550	25,550	25,550	25,550	25,550
Intake Factor, Inhalation (IF_{inh})	[m^3/kg-day]	0.0011	0.025	0.10	0.047	0.056

Notes:
1. Daily breathing rate for offsite residents reflects the default 95th percentile breathing rates from OEHHA (2015). Daily breathing rate for a worker is the default 8-hour 95th percentile breathing rate for moderate intensity activities from OEHHA (2015).
2. Fraction of time at home for residents for each age group reflects default fractions at home from OEHHA (2015) for residents.
3. Exposure frequencies for residents and workers reflect default exposure frequencies from OEHHA (2015).
4. Exposure durations for residents and workers reflect default exposure durations from OEHHA (2015).

Calculation:
IF_{inh} = DBR * EF * ED * FAH * CF / AT
CF = 0.001 (m^3/L)

Abbreviations:
OEHHA - Office of Environmental Health Hazard Assessment
kg - kilogram
L - liter
m^3 - cubic meter

References:
Office of Environmental Health Hazard Assessment (OEHHA). 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

Table 4
Inhalation Carcinogenic and Noncarcinogenic Toxicity Values
Safeway Fuel Center - Crocker Road
Sacramento, California

Chemical	Cancer Potency Factor	Chronic Reference Exposure Level	Acute Reference Exposure Level
	$[mg/kg\text{-}day]^{-1}$	$[\mu g/m^3]$	$[\mu g/m^3]$
Benzene	0.1	3	27

Abbreviations:
ARB - California Air Resources Board
Cal/EPA - California Environmental Protection Agency
OEHHA - Office of Environmental Health Hazard Assessment
$[mg/kg\text{-}day]^{-1}$ - Per milligram per kilogram-day
$\mu g/m^3$ - Micrograms per cubic meter
PM - Particulate matter

References:
California Environmental Protection Agency (Cal/EPA). 2014. Office of Environmental Health Hazard Assessment (OEHHA)/California Air Resources Board (ARB) Consolidated Table of Approved Risk Assessment Health Values. July 3.

Table 5
Age Sensitivity Factors by Population[1]
Safeway Fuel Center - Crocker Road
Sacramento, California

Receptor			Age Sensitivity Factor (ASF)
Resident[2]	Child	3rd Trimester	10
		0 - <2 Years	10
		2 - <16 Years	3
	Adult	16 - <30 Years	1
Worker[3]			1

Notes:

1. Age sensitivity factors (ASF) as recommended by OEHHA (2015).

2. The residential exposure was conservatively assumed to start from 3rd trimester for 30 years.
3. A worker was assumed to represent ages 16 and older.

Abbreviations:
ASF - Age Sensitivity Factor
OEHHA - Office of Environmental Health Hazard Assessment

References:
Office of Environmental Health Hazard Assessment (OEHHA). 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

Table 6a
Long-Term Health Impacts Summary
Safeway Fuel Center - Crocker Road
Sacramento, CA

Receptor Type	UTMx	UTMy	Annual Average Benzene Concentration	Excess Lifetime Cancer Risk[1,2]	Chronic Hazard Index[3]
	[m]		[µg/m^3]	[In a million]	
Resident	632,274	4,267,040	0.19	9.9	0.06
Worker	632,237	4,267,020	0.62	5.2	0.2
			Threshold	**10**	**1**
			Above Threshold	**No**	**No**

Notes:

1. Excess lifetime cancer risks are estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to potential carcinogens. The estimated risk is expressed as a unitless probability. The cancer risk attributed to the emissions associated with the Project was calculated based on the modeled annual average benzene concentration shown above, the intake factors presented in Table 3, the CPF presented in Table 4, and the Age Sensitivity Factors presented in Table 5. As presented in Tables 3 and 5, four residential age groupings were evaluated in this analysis; to calculate total cancer risk at each residential receptor location, the cancer risks for all age groupings at that location were summed.
An adjustment factor of 1.5 was used for the worker receptors, assuming they would be exposed to the emissions only during operations hours (6 AM - 10 PM).

Calculation: $Riskinh = \Sigma Riskinh,i = \Sigma C_i \times CF \times IFinh \times CPFi \times ASF$

Where:

Riskinh: Cancer Risk; the incremental probability of an individual developing cancer as a result of inhalation exposure to a particular potential carcinogen (unitless)
Riskinh,i: Cancer Risk for Chemical i
C_i: Modeled Annual Average Concentration in air for Chemical i (µg/m^3)
CF: Conversion Factor (mg/µg)
IFinh: Intake Factor for Inhalation (m^3/kg-day)
CPFi: Cancer Potency Factor for Chemical i (mg chemical/kg body weight-day)
ASF: Age Sensitivity Factor

2. The resident cancer risk shown here is estimated by averaging the cancer risks at the residential receptors located within a 20 m x 20 m nested grid centered at the maximally exposed individual resident, as shown in Table 6C.

3. The potential for exposure to result in adverse chronic non-cancer effects is evaluated by comparing the estimated annual average air concentration (which is equivalent to the average daily air concentration) to the non-cancer chronic REL for each chemical. When calculated for a single chemical, the comparison yields a ratio termed a hazard quotient. To evaluate the potential for adverse chronic noncancer health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index. Because benzene is the only chemical in this analysis, the chronic hazard quotient for benzene is equivalent to the overall chronic hazard index. The chronic hazard index attributed to the emissions associated with the Project was calculated based on the modeled annual average benzene concentration shown above and the chronic REL presented in Table 4.

Calculation: $Chronic\ HI = \Sigma Chronic\ HQi = \Sigma [C_i / cRELi]$

Where:

HI: Hazard Index
HQi: Hazard Quotient for Chemical i
C_i: Average Daily Air Concentration for Chemical i (µg/m^3)
cRELi: Noncancer Chronic Reference Exposure Level for Chemical i (µg/m^3)

Abbreviations:

µg - microgram
kg - kilogram
m - meter
mg - milligram
REL - reference exposure level

Table 6b
Acute Health Impacts Summary
Safeway Fuel Center - Crocker Road
Sacramento, CA

Receptor Type	UTMx	UTMy	Maximum 1 Hour Benzene Concentration	Acute Hazard Index[2]
	[m]		[µg/m^3]	
Resident	632,284	4,267,001	2.3	0.09
Worker	632,216	4,266,983	7.4	0.28
			Threshold	**1**
			Above Threshold	**No**

Notes:
1. One-hour maximum concentration is based on the maximum hourly benzene emissions shown in Table 1.
2. Calculated with the acute REL as presented in Table 4.
3. The potential for exposure to result in adverse acute effects is evaluated by comparing the estimated one-hour maximum air concentration of a chemical to its acute REL. When calculated for a single chemical, the comparison yields a hazard quotient. To evaluate the potential for adverse acute health effects from simultaneous exposure to multiple chemicals, the hazard quotients for all chemicals are summed, yielding a hazard index. Because benzene is the only chemical in this analysis, the acute hazard quotient for benzene is equivalent to the overall acute hazard index. The acute hazard index attributed to the emissions associated with the Project was calculated based on the estimated one-hour maximum air concentrations and the acute REL presented in Table 4 for benzene.

Calculation: Acute HI = ΣAcute $HQ_i = \Sigma [C_i / aREL_i]$
Where:
HI: Hazard Index
HQ_i: Hazard Quotient for Chemical i
C_i: Estimated One-Hour Maximum Air Concentration for Chemical i (µg/m^3)
$aREL_i$: Noncancer Acute Reference Exposure Level for Chemical i (µg/m^3)

Abbreviations:
HI - hazard index
µg - microgram
m - meter
REL - reference exposure level

Table 6c
Cancer Risk Spatial Averaging
Safeway Fuel Center - Crocker Road
Sacramento, CA

Receptor Type	UTMx	UTMy	Excess Lifetime Cancer Risk[1]
	[m]		[In a million]
Resident	632,274	4,267,040	12.0
	632,275	4,267,035	12.0
	632,272	4,267,044	11.8
	632,276	4,267,030	11.8
	632,271	4,267,049	11.5
	632,277	4,267,046	10.1
	632,278	4,267,041	10.0
	632,276	4,267,051	9.9
	632,280	4,267,036	9.8
	632,281	4,267,031	9.4
	632,281	4,267,052	8.5
	632,282	4,267,047	8.4
	632,283	4,267,042	8.2
	632,284	4,267,037	7.9
	632,286	4,267,032	7.5
Average Cancer Risk			**9.9**

Notes:
1. Spatial averaging is done for receptors located in a 20 m x 20 m square centered around the MEIR (UTMx: 632,274, UTMy: 4,267,040) as shown in Figure 6, consistent with the OEHHA guidance.
2. Receptors located on the road were not included, as per a phone conversation with SMAQMD staff.

Abbreviations:
OEHHA - Office of Environmental Health Hazard Assessment
m - meter
MEIR - maximally exposed individual receptor
SMAQMD - Sacramento Metropolitan Air Quality Management District
UTM - Universal Transverse Mercator

References:
Office of Environmental Health Hazard Assessment (OEHHA). 2015. Air Toxics Hot Spots Program Risk Assessment Guidelines. Guidance Manual for Preparation of Health Risk Assessments. February.

Figures

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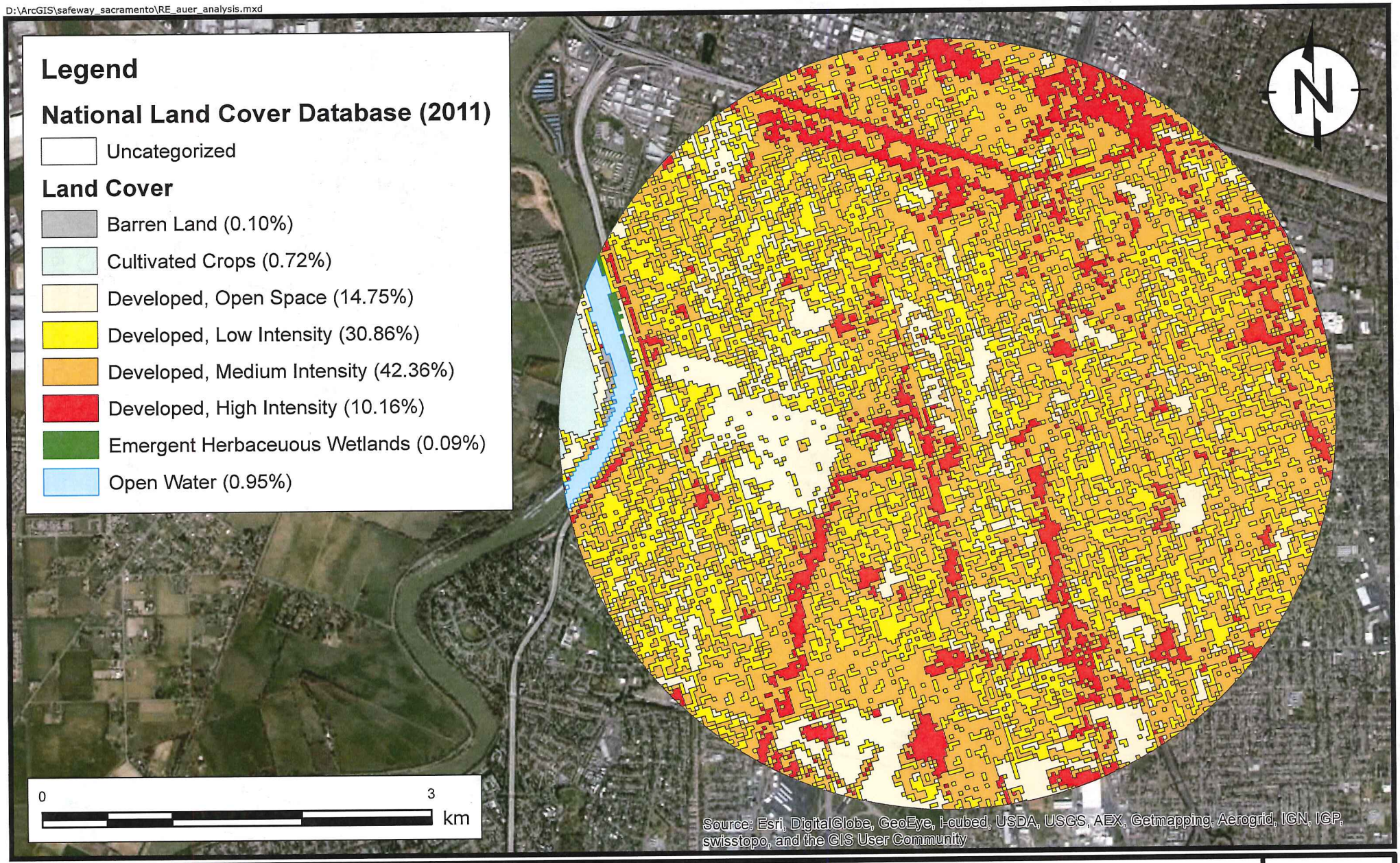

RAMBOLL ENVIRON

DRAFTED BY: DCW

DATE: 5/5/2015

Auer Analysis

Safeway Fuel Center
Crocker Road
Sacramento, CA

FIGURE
1

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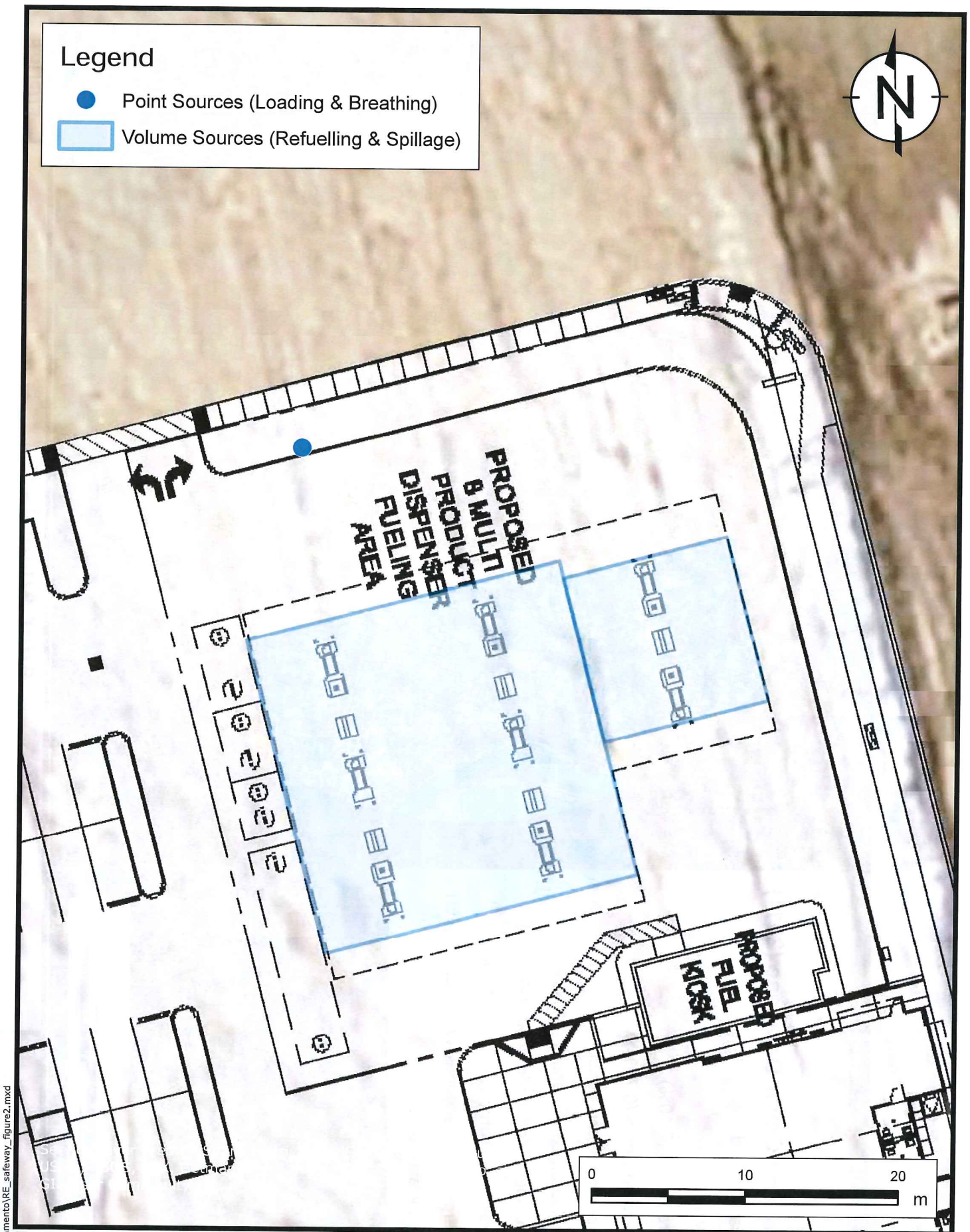

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RAMBOLL ENVIRON

DRAFTED BY: DCW | DATE: 5/5/2015

On-site Emission Sources
Safeway Fuel Center
Crocker Road
Sacramento, CA

FIGURE
2

03-36893A

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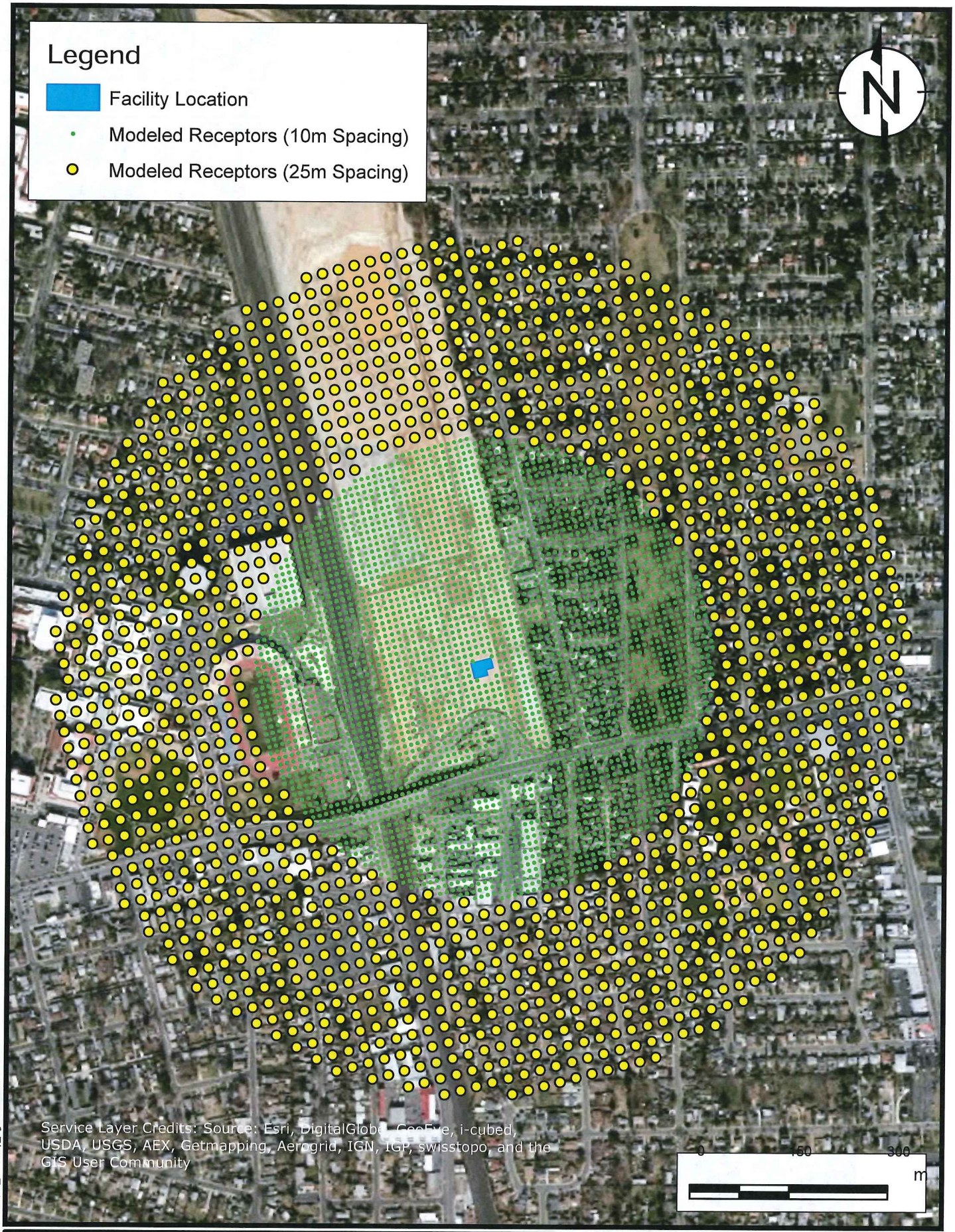
RAMBOLL ENVIRON

DRAFTED BY: DCW | DATE: 5/5/2015

Sources & Building Outlines
Safeway Fuel Center
Crocker Road
Sacramento, CA

FIGURE
3
03-36893A



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RAMBOLL ENVIRON

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Modeled Receptors

Safeway Fuel Center
Crocker Road
Sacramento, CA

FIGURE
4

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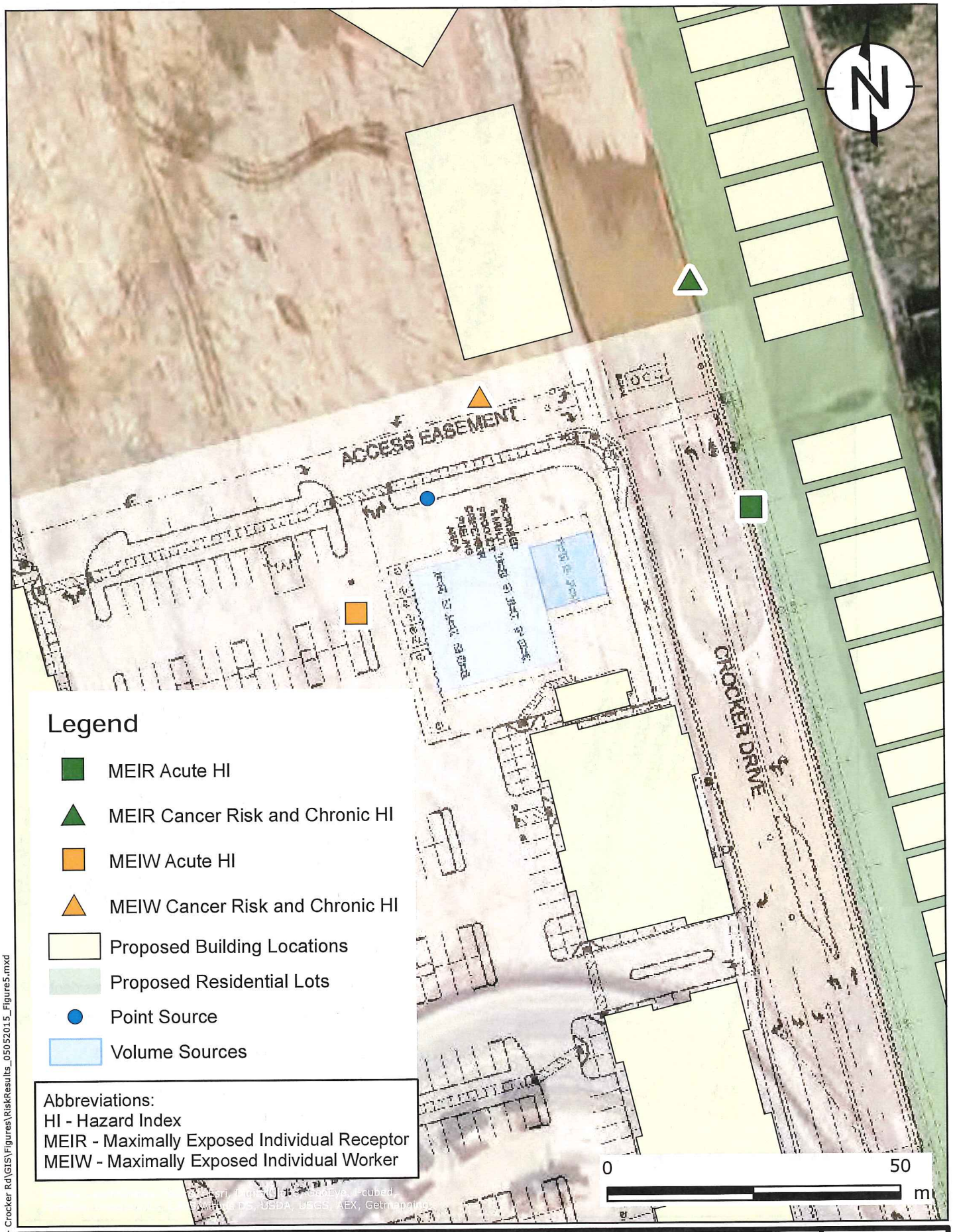

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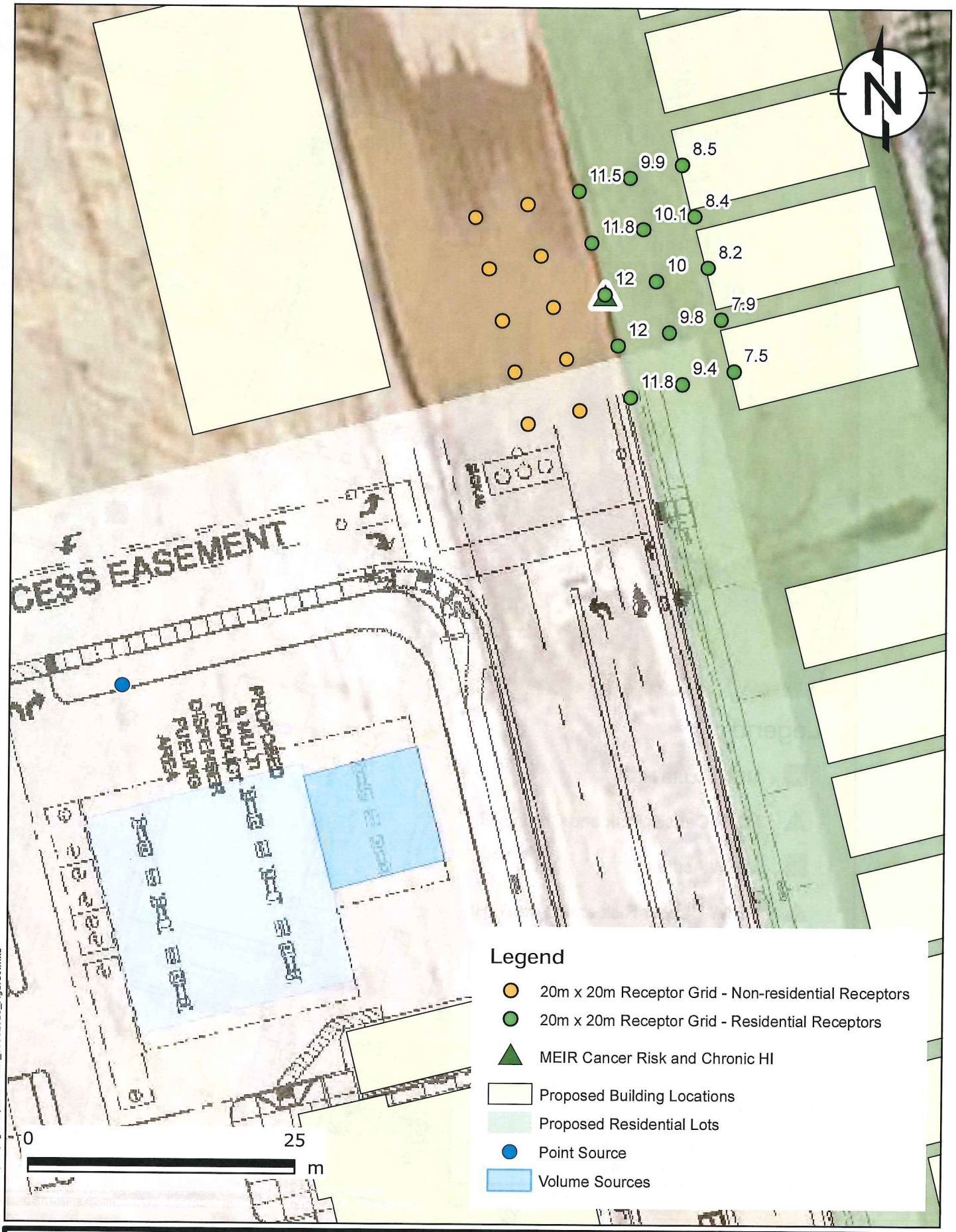
RAMBOLL ENVIRON

DRAFTED BY: VHS | DATE: 5/5/2015

Maximally Exposed Individual **Receptors**
Safeway Fuel Center
Crocker Road
Sacramento, CA

FIGURE
5
03-36893A



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RAMBOLL ENVIRON

DRAFTED BY: VHS | DATE: 5/5/2015

Cancer Risk Spatial Averaging
Safeway Fuel Center
Crocker Road
Sacramento, CA

FIGURE
6

03-36893A

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ENVIRONMENT
& HEALTH

Attachment A:

AERMOD Input Files

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ENVIRONMENT
& HEALTH

Attachment B:

Health Risk Calculation Databases

Attachment F

Health Risk Assessment Letter Report for

Buchannan Road Location

RAMBOLL ENVIRON

ENVIRONMENT
& HEALTH

Tom Buford, Senior Planner
Environmental Planning Services
City of Sacramento
300 Richards Blvd., Third Floor
Sacramento, CA 95811

RE: REVISED LOCATION FOR PROPOSED SAFEWAY FUEL CENTER, SACRAMENTO, CALIFORNIA

Date September 30, 2015

Ramboll Environ
201 California Street
Suite 1200
San Francisco, CA 94111
USA

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F +1 415 398 5812
www.ramboll-environ.com

Dear Mr. Buford:

Ramboll Environ US Corporation (Ramboll Environ) previously conducted a health risk assessment (HRA) for a proposed Safeway Fuel Center gas dispensing facility (GDF) located in Sacramento, California within the jurisdiction of the Sacramento Metropolitan Air Quality Management District (SMAQMD or "the District") to evaluate potential health impacts associated with air emissions from the proposed GDF to nearby exposed populations. The HRA was documented in our May 6, 2015 letter to you.

The analysis showed that all health impacts are within an acceptable range and would not warrant a denial of the permit and are below California Environmental Quality Act (CEQA) thresholds of significance. The estimated cancer risk is in the range that SMAQMD defines as "acceptable risk, provide TBACT [Toxic Best Available Control Technology]". TBACT is California Air Resources Board- (CARB) certified vapor recovery equipment, which is already included in the Fuel Center design. Both the chronic and acute non-cancer Hazard Indices (HIs) are in the range that SMAQMD defines as "within acceptable range."

Since the preparation of the HRA, we understand that Petrovich Development Company is proposing a revised location of the fuel center such that it will be further from the new homes to be located to the east on Crocker Drive. Figure 1 shows a comparison between the previous site and current site plan for the GDF. The previously identified maximally exposed individual residents (MEIR) for cancer risk, chronic health index (HI), and acute HI were located at the new homes on Crocker Drive. These residential receptors were as close as approximately 80 feet from the previously sited GDF.

The new proposed location of the GDF is now located roughly 500 feet west of the homes on Crocker Drive and roughly 500 feet west of the homes on Jeffrey Avenue. The new location is also roughly 400 feet east of tennis courts and over 1,000 feet east of the closest building of Sacramento City College.

This revised location will very likely result in lower estimated health impacts. It is about 400 feet further from residents in the predominant wind direction, compared to the initial site location. (The wind rose (Figure 2) indicates that the predominant wind direction is from the south west.) This will result in lower cancer risk, chronic HI, and acute HI. Based on Bay Area Air Quality Management District (BAAQMD) scaling methodologies for gas stations, this additional distance could reduce impacts by as much as 90%. SMAQMD does not have similar guidance, but we believe the BAAQMD guidance can be used to provide a reasonable estimate of the reduction in impacts. The new proposed location is closer to the community college to the east, but the community college location is still 400 feet away, which is further than the original maximally impacted receptors, and is not a residential location, further lowering health impacts. In addition, the community college is not in the predominant wind direction and therefore we believe that risks would be lower in this location than at the original MEI.

Conclusion

In summary, based on our professional judgment, we believe the health impacts resulting from air emissions would be lower at the new site than at the site originally evaluated. In order provide a quantitative estimate of the reduction, further dispersion modeling would be required. SMAQMD may require a revised HRA for permitting purposes if this location if finalized.

Please feel free to contact David Kim at 415-796-1940 or Shari Libicki at 415-796-1933 if you have any questions. Thank you for the opportunity to assist you with this matter.

Yours sincerely,

Shari Libicki
Principal
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slibicki@environcorp.com

David Kim
Senior Manager
D +1 415 796 1940
dkim@environcorp.com

cc: Brian Krebs
Program Coordinator
Sacramento Metropolitan Air Quality Management District

Phil Harvey, Architect
Senior Vice President of Development
Petrovich Development Company

RAMBOLL ENVIRON

Attachments:

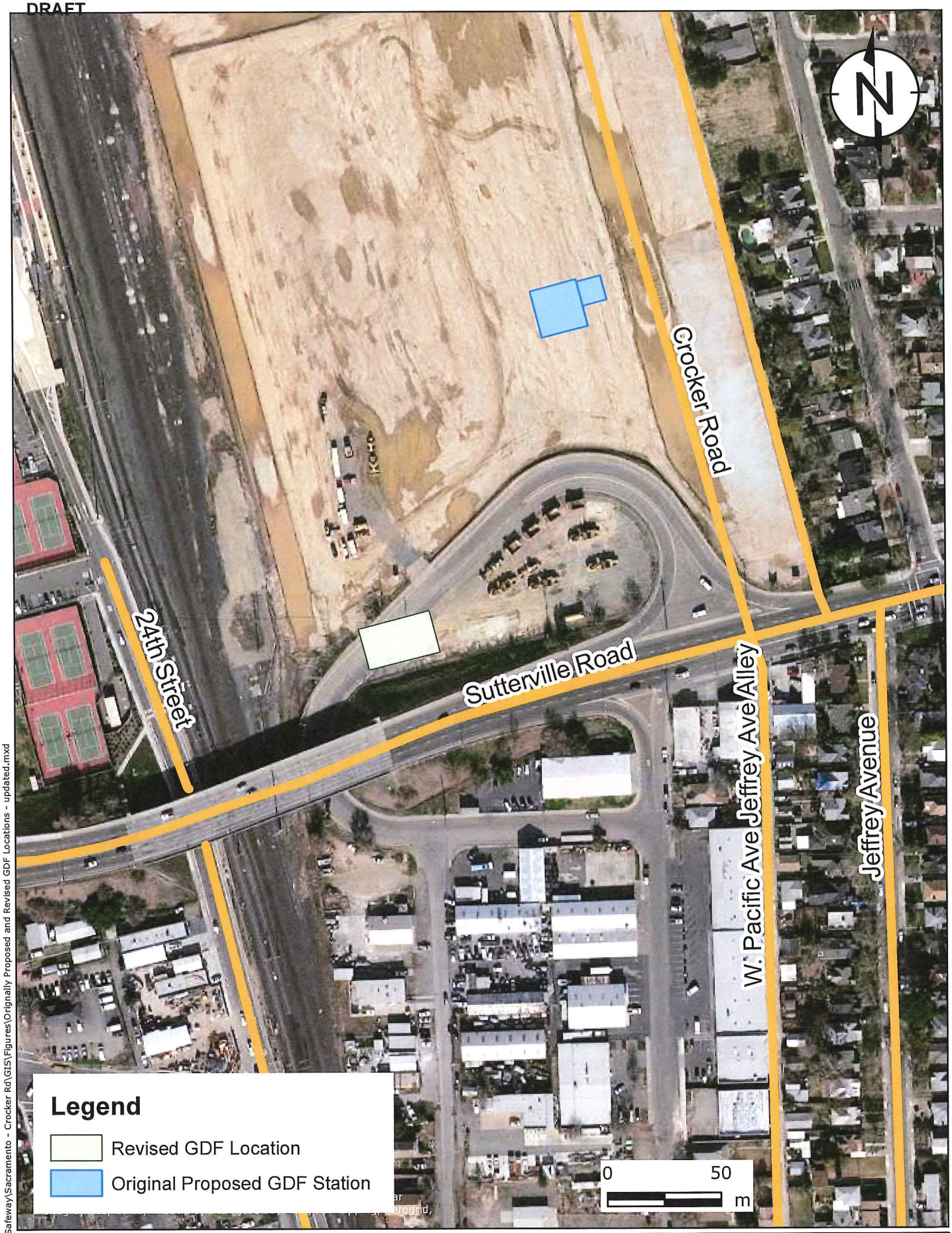
Figures:

Figure 1. Previous and Proposed GDF Location
Figure 2. Wind Rose

Attachment A: Revised Site Plan – Curtis Park Village Neighborhood Shopping Center

FIGURE

DRAFT



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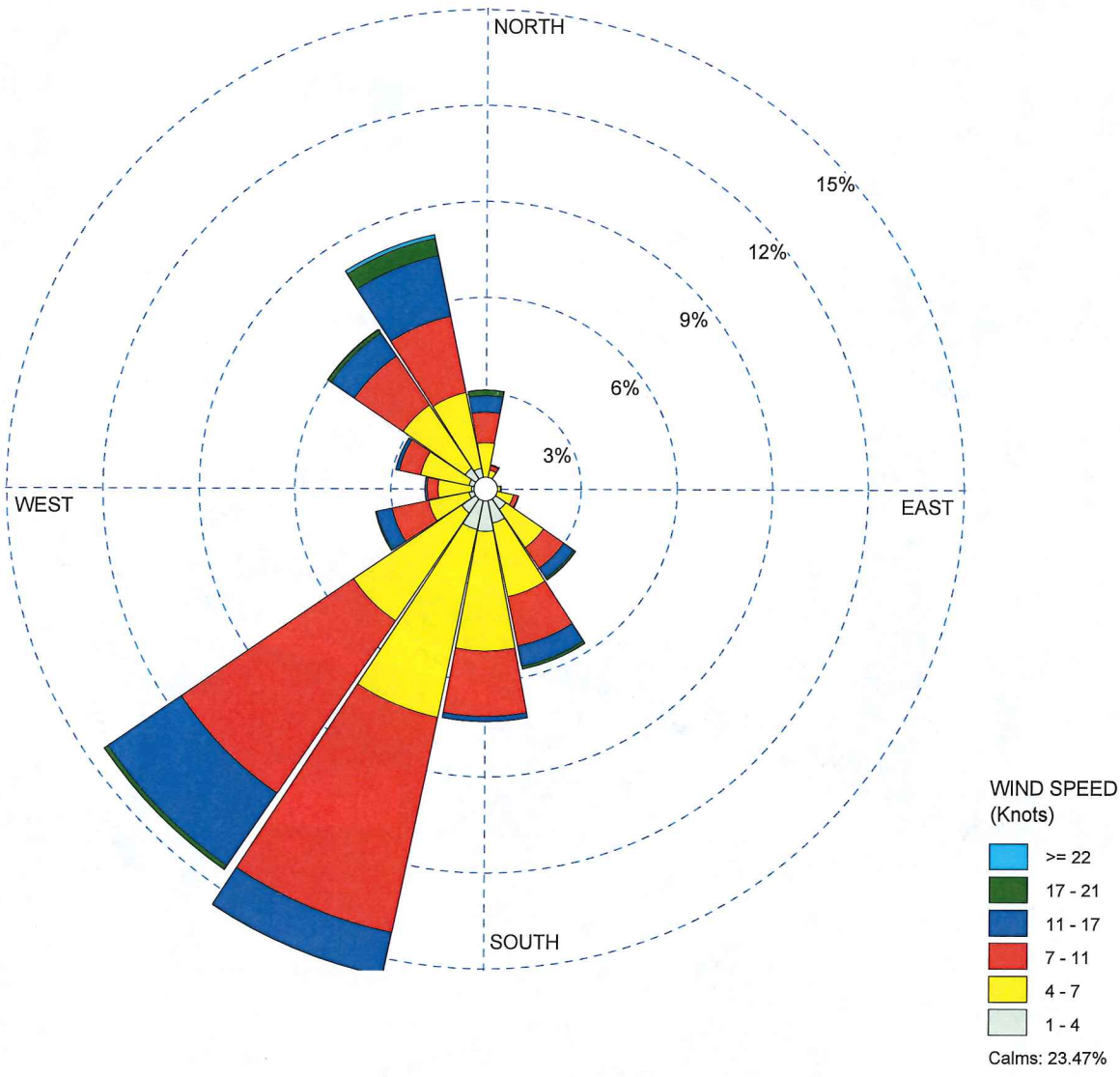
RAMBOLL ENVIRON	**Originally Proposed and Revised GDF Locations** Safeway Fuel Center Crocker Road	FIGURE **1**
DRAFTED BY: VHS / DATE: 5/5/2015		03-36893A

WIND ROSE PLOT:

Safeway Met Data
7AM to Midnight

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/2010 - 07:00** **End Date: 12/30/2014 - 22:00**	COMPANY NAME:	
			FIGURE 2
	CALM WINDS: **23.47%**	TOTAL COUNT: **29186 hrs.**	
	AVG. WIND SPEED: **5.64 Knots**	DATE: **5/4/2015**	

WRPLOT View - Lakes Environmental Software

Attachment G
Resolution No. 2010-174 (Certification of Curtis Park Village EIR)

RESOLUTION NO. 2010-174

Adopted by the Sacramento City Council

April 1, 2010

CERTIFYING THE ENVIRONMENTAL IMPACT REPORT FOR THE CURTIS PARK VILLAGE PROJECT (P04-109)

BACKGROUND

A. On February 25, 2010, the City Planning Commission conducted a public hearing on, and forwarded to the City Council a recommendation to approve with conditions the Curtis Park Village Project.

B. On April 1, 2010, the City Council conducted a public hearing, for which notice was given pursuant Sacramento City Code Section 17.200.010 (C)(2)(a, b, and c) (publication, posting, and mail (500 feet) and received and considered evidence concerning the Curtis Park Village Project.

BASED ON THE FACTS SET FORTH IN THE BACKGROUND, THE CITY COUNCIL RESOLVES AS FOLLOWS:

Section 1. The City Council finds that the Environmental Impact Report for Curtis Park Village Project (herein EIR) which consists of the Draft EIR and the Final EIR (Response to Comments) (collectively the "EIR") has been completed in accordance with the requirements of the California Environmental Quality Act (CEQA), the State CEQA Guidelines and the Sacramento Local Environmental Procedures.

Section 2. The City Council certifies that the EIR was prepared, published, circulated and reviewed in accordance with the requirements of CEQA, the State CEQA Guidelines and the Sacramento Local Environmental Procedures, and constitutes an adequate, accurate, objective and complete Final Environmental Impact Report in full compliance with the requirements of CEQA, the State CEQA Guidelines and the Sacramento Local Environmental Procedures.

Section 3. The City Council certifies that the EIR has been presented to it, that the City Council has reviewed the EIR and has considered the information contained in the EIR prior to acting on the proposed Project, and that the EIR reflects the City Council's independent judgment and analysis.

Adopted by the City of Sacramento City Council on April 1, 2010 by the following vote:

Ayes: Councilmembers Cohn, Fong, Hammond, McCarty, Pannell, Sheedy, Tretheway, Waters, and Mayor Johnson.

Noes: None.

Abstain: None.

Absent: None.

Mayor Kevin Johnson

Attest:

for Shirley Concolino, City Clerk

Attachment H
Resolution No. 2010-572 (Adoption of CEQA Findings, Statement of Overriding Considerations, Mitigation Monitoring Plan)

RESOLUTION NO. 2010-572

Adopted by the Sacramento City Council

September 28, 2010

ADOPTING THE FINDINGS OF FACT, STATEMENT OF OVERRIDING CONSIDERATIONS, AND THE MITIGATION MONITORING PROGRAM FOR THE CURTIS PARK VILLAGE PROJECT (P04-109)

BACKGROUND

A. On February 25, 2010, the City Planning Commission conducted a public hearing on, and forwarded to the City Council a recommendation to approve with conditions the Curtis Park Village Project

B. On April 1, 2010 the City Council conducted a public hearing, for which notice was given pursuant Sacramento City Code Section 17.200.010 (C)(2)(a, b, and c) (publication, posting, and mail (500 feet)) and received and considered evidence concerning the Curtis Park Village Project. The City Council certified the environmental impact report (EIR) for the project, entitled *Curtis Park Village Project* (State Clearinghouse Number 2004-082020). The EIR addressed the potential environmental impacts associated with construction and operation of the Curtis Park Village project and proposed update to the previously-approved Remedial Action Plan (RAP) (1995) for the remediation of the contamination on the project site.

C. Pursuant to California Environmental Quality Act Guidelines Section 15096, the Department of Toxic Substances Control (DTSC) could use the environmental impact report for the Curtis Park Village project in its capacity as Responsible Agency to review the potential environmental impacts of the proposed update to the 1995 RAP.

D. Subsequent to the certification of the EIR, DTSC began the process associated with an Explanation of Significant Differences (ESD) concerning the 1995 RAP. DTSC conducted a public meeting on September 15, 2010 to discuss the proposed changes to the 1995 RAP.

The ESD would supplement the 1995 RAP administrative record with the proposed changes to the 1995 RAP to assure that any negative impacts to the environment are minimized. The DTSC would file a Notice of Determination (NOD) in compliance with CEQA for the ESD when approved.

If the ESD is approved by the DTSC, the update to the RAP, as analyzed in the Curtis Park Village environmental impact, report would not be necessary.

E. These Findings of Fact and the Mitigation Monitoring Plan do not address any impacts or mitigation associated with the update to the 1995 RAP.

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact	Mitigation Measure		Monitoring Agency	Implementation Schedule	Sign-off
		5.2 Transportation and Circulation				
5.2-1	Impacts to study intersections under baseline plus project conditions.	5.2-1(a)	*At the Freeport Boulevard / 2nd Avenue intersection, provide protected left-turn phasing for the northbound and southbound approaches.*	Department of Transportation	Implement improvements prior to the first building permit	
		5.2-1(b)	*At the Sutterville Road / Road A intersection, provide overlap signal phasing to allow the southbound Road A right turning traffic to proceed on a green arrow simultaneously with the eastbound left turning movement, and prohibit U-turns for the eastbound left turning movement; add a southbound left-right lane to provide one left-turn lane, one left-right lane, and one right turn lane, and provide a dedicated right turn lane for the westbound Sutterville Road approach to the intersection.*	Department of Transportation	Show improvements on improvement plans and construct prior to the first building permit	
		5.2-1(c)	*Modify the southbound approach to the Sutterville Road / SR99 SB Ramps intersection to provide a left-turn lane, a combination left-through lane, and two right-turn lanes. This change would bring the right-turning movements under signal control. This mitigation measure is required at five percent of development based on trip generation. The design of the mitigation is subject to the approval of the City Transportation Department and*	Department of Transportation	Improvements shall be constructed at five percent of development based on trip generation	

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact		Mitigation Measure	Monitoring Agency	Implementation Schedule	Sign-off
			Caltrans			
		5.2-1(d)	*At the Road A / Area 3 intersection, provide separate right-turn and left-turn lanes on the eastbound approach.*	Department of Transportation	Show improvements on improvements plans and construct prior to the first building permit in Area 3	
5.2-2	Impacts to study roadway segments under baseline plus project conditions.	*5.2-2*	*The project developer shall work with the Regional Transit District to provide bus service or provide private shuttle service from 6:00 to 9:00 a.m. and from 4:00 to 7:00 p.m. between the commercial areas of the project site and the City College light rail station. As an alternative, the project developer shall coordinate with the City to reserve the required right of way needed to construct a pedestrian and bicycle bridge to provide access to the City College Station.*	Regional Transit District and/or City Department of Transportation	Prior to occupancy	
5.2-3	Impacts to freeway ramp under baseline plus project conditions.	*5.2-3*	*Implement Mitigation Measure 5.2-1(c).*	See 5.2-1(c)	See 5.2-1(c)	
5.2-7	Impacts to on-site traffic circulation and safety under baseline plus project conditions.	*5.2-7(a)*	*The design plans for the project shall be consistent with City standards. Any deviations are subject to the approval of the City Department of Transportation, Traffic Engineering Division. The horizontal curvatures shall be realigned or design elements such as "knuckles" shall*	Department of Transportation	Prior to approval of improvement plans	

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact		Mitigation Measure	Monitoring Agency	Implementation Schedule	Sign-off
			be installed in compliance with City standards.			
		5.2-7(b)	*The site design shall be modified to reduce the potential for vehicles leaving parking stalls to back across pedestrian crosswalks. This change may require the elimination of some angle parking spaces.*	Department of Transportation	Prior to approval of improvement plans	
5.2-9	Impacts during construction.	*5.2-9(a)*	*Before issuance of grading permits for the project site, the project applicant shall prepare a detailed Traffic Management Plan that will be subject to review and approval by the City Department of Transportation, Regional Transit, and local emergency service providers, including the City of Sacramento fire and police departments. The plan shall ensure maintenance of acceptable operating conditions on local roadways and transit routes. At a minimum, the plan shall include:* • *The number of truck trips, time, and day of street closures;* • *Time of day of arrival and departure of trucks;* • *Limitations on the size and type of trucks and provision of a staging area with a limitation on the number of trucks that can be waiting;* • *Provision of a truck circulation*	Department of Transportation Regional Transit City of Sacramento Fire and Police Departments	Prior to issuance of grading permits	

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact	Mitigation Measure	Monitoring Agency	Implementation Schedule	Sign-off
		pattern; • *Provision of a driveway access plan to maintain safe vehicular, pedestrian, and bicycle movements (e.g., steel plates, minimum distances of open trenches, and private vehicle pick up and drop off areas);* • *Safe and efficient access routes for emergency vehicles;* • *Efficient and convenient transit routes;* • *Manual traffic control when necessary;* • *Proper advance warning and posted signage concerning street closures;* • *Provisions for pedestrian safety; and* • *Provisions for temporary bus stops, if necessary.* *A copy of the construction traffic management plan shall be submitted to local emergency response agencies and these agencies shall be notified at least 14 days before the commencement of construction that would partially or fully obstruct roadways.*	City of Sacramento Fire and Police Departments	At least 14 days prior to commencement of construction that would partially or fully obstruct roadways	
5.2-10	Cumulative impacts to study intersections.	*5.2-10(a)* *24th Street / 2nd Avenue – The project applicant shall pay a fair share contribution to install a traffic signal at this intersection.* *5.2-10(b)* *24th Street / Portola Way – The project applicant shall pay a fair share*	Department of Transportation Department of Transportation	Prior to issuance of building permits Prior to issuance of building permits	

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact	Mitigation Measure	Monitoring Agency	Implementation Schedule	Sign-off
		contribution to install a traffic signal at this intersection..			
		5.2-10(c) Sutterville Road / Freeport Boulevard (north) – the applicant shall pay a fair share contribution to provide protected-permitted left turn phasing and install proper signage for southbound Freeport Boulevard. .	Department of Transportation	Prior to issuance of building permits	
		5.2-10(d) Sutterville Road / City College Drive – The applicant shall pay a fair share contribution to provide overlap signal phasing to allow the northbound right turn traffic on City College Drive to proceed on a green arrow simultaneously with the westbound left turning movement, and prohibit U-turns for the westbound Sutterville Road approach to the intersection.	Department of Transportation	Prior to issuance of building permits	
		5.2-10(e) Sutterville Road / Road A – apply Mitigation Measure 5.2-1(b) which would provide overlap signal phasing to allow the southbound Road A Right turning traffic to proceed on a green arrow simultaneously with the eastbound left turning movement; and prohibit U-turns for the eastbound left turning movement; provide one left-turn lane, one left-right lane, and one right-turn lane on the southbound approach; provide a dedicated right turn lane for the			

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact	Mitigation Measure	Monitoring Agency	Implementation Schedule	Sign-off
		westbound Sutterville Road approach to the intersection; provide an actuated exclusive pedestrian phase to serve pedestrians crossing Sutterville Road; and optimize signal timing..			
		~~*5.2-10(f) Not applicable. No feasible mitigation.*~~			
		5.2-10(g) Sutterville Road / Franklin Boulevard –The project applicant shall pay a fair share contribution to add an eastbound right-turn lane that would mitigate the Saturday peak hour. For a.m. and p.m. peak hour impacts, the cycle length would increase to 110 seconds..	Department of Transportation	Prior to issuance of building permits	
		5.2-10(h) Sutterville Road / SR 99 Northbound Ramps – The project applicant shall pay a fair share contribution to modify signal timing to provide split phase for all approaches and re-stripe the eastbound lanes to provide one left-turn, one left-through, and one through lane. Construct two receiving lanes on the on-ramp for the turning movement from eastbound 12th Avenue to the northbound SR 99 ramp.	Department of Transportation	Prior to issuance of building permits	
		5.2-10(i) Road A / Area 1 – The project applicant shall pay a fair share contribution to modify the signal phasing to provide overlaps for the eastbound right-turn movement; provide protected-permitted	Department of Transportation	Prior to issuance of building permits	

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact		Mitigation Measure	Monitoring Agency	Implementation Schedule	Sign-off
			phasing for the northbound left-turn movement; prohibit U-turn movement at this intersection; and increase the cycle length to 95 seconds.			
			5.3 Air Quality			
5.3-2	Impacts related to exhaust emissions and fugitive particulate matter emissions from project-associated construction activities.	*5.3-2(a)*	*The project applicant shall ensure that emissions from all off-road diesel powered equipment used on the project site do not exceed 40 percent opacity for more than three minutes in any one hour. Any equipment found to exceed 40 percent opacity (or Ringelmann 2.0) shall be repaired immediately, and SMAQMD shall be notified within 48 hours of identification of non-compliant equipment. A visual survey of all in-operation equipment shall be made at least weekly, and a monthly summary of the visual survey results shall be submitted throughout the duration of the project, except that the monthly summary shall not be required for any 30-day period in which no construction activity occurs. The monthly summary shall include the quantity and type of vehicles surveyed as well as the dates of each survey. The SMAQMD and/or other officials may conduct periodic site inspections to determine compliance. Nothing in this section shall supercede other SMAQMD or state rules or regulations.*	Community Development Department SMAQMD	Prior to and during construction	

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact	Mitigation Measure		Monitoring Agency	Implementation Schedule	Sign-off
		5.3-2(b)	*Prior to the approval of any grading permit, the project proponent shall submit a dust-control plan, approved by the SMAQMD, to the City of Sacramento Community Development Department. The dust-control plan shall stipulate grading schedules associated with the project phase, as well as the dust-control measures to be implemented. Grading of proposed project phases shall be scheduled so that the total area of disturbance would not exceed 15 acres on any given day. The dust control plan shall be incorporated into all construction contracts issued as part of the proposed project development. The dust-control plan shall, at a minimum, incorporate the following measures:* • *Apply water, chemical stabilizer/ suppressant, or vegetative cover to disturbed areas, including storage piles that are not being actively used for construction purposes, as well as any portions of the construction site that remain inactive for longer than 3 months;* • *Water exposed surfaces sufficient to control fugitive dust emissions during demolition, clearing, grading, earth-moving, or excavation operations. Actively disturbed areas should be kept moist at all times;*		Prior to approval of grading permit	

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact	Mitigation Measure	Monitoring Agency	Implementation Schedule	Sign-off
		• *Cover all vehicles hauling dirt, sand, soil or other loose material or maintain at least two feet of freeboard in accordance with the requirements of California Vehicle Code Section 23114;* • *Limit or expeditiously remove the accumulation of project-generated mud or dirt from adjacent public streets at least once every 24 hours when construction operations are occurring; and* • *Limit onsite vehicle speeds on unpaved surfaces to 15 mph, or less.*			
5.3-3	Impacts related to a temporary increase in NO_X emissions.	5.3-3(a) *Prior to issuance of a grading permit, the applicant shall submit a SMAQMD-approved plan, which demonstrates that the heavy-duty (>50 horsepower) off-road vehicles to be used during construction of the project (including owned, leased, and subcontracted vehicles) will achieve a project-wide average of 20 percent NO_X reduction and 45 percent particulate matter reduction, based on the most recent CARB fleet average at the time of construction. In addition, the applicant shall submit to SMAQMD a comprehensive inventory of all off-road construction equipment (>50 horsepower) that will be used an aggregate of 40 or more hours during any portion of the construction project. The inventory*	SMAQMD	Prior to issuance of grading permit	

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact		Mitigation Measure	Monitoring Agency	Implementation Schedule	Sign-off
			shall include the horsepower rating, engine production year, and project hours of use or fuel throughput for each piece of equipment. The inventory shall be updated and submitted monthly throughout the duration of the project. Inventory shall not be required for any 30-day period in which construction activities do not occur. At least 48 hours prior to the use of subject heavy-duty off-road equipment, the applicant shall provide SMAQMD with the anticipated construction timeline, including the start date and the name and phone number of the project manager and on-site foreman.			
		5.3-3(b)	*Prior to issuance of a grading permit, the applicant shall provide a construction mitigation fee to the SMAQMD sufficient to offset project emissions of NO_X above 85 pounds per day. The amount of the fee shall be based on updated construction scheduling and equipment lists, and shall be calculated using the SMAQMD method of estimating excess emissions. The current price of NO_X construction offsets calculated by SMAQMD is $16,000 per ton.*	SMAQMD Community Development Department	Prior to issuance of grading permit	
5.3-5	Impacts related to long-term increases of criteria air pollutants.	*5.3-5(a)*	*Prior to the issuance of any grading permit, the project applicant shall coordinate with the SMAQMD and the City of Sacramento Community Development Department to develop a project Air Quality Mitigation*	SMAQMD Community Development Department	Prior to issuance of grading permit	

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact	Mitigation Measure	Monitoring Agency	Implementation Schedule	Sign-off
		Plan (AQMP). In accordance with SMAQMD recommendations, the AQMP shall achieve a minimum overall reduction of 15 percent in the project's anticipated operational emissions. SMAQMD-recommended measures and corresponding emissions-reduction benefits are identified in SMAQMD's Guidance for Land Use Emission Reductions, which can be found in Appendix E of the SMAQMD document. The AQMP shall be reviewed and endorsed by SMAQMD staff prior to project implementation. Available measures to be included in the AQMP include, but are not limited to, the following: • *Prohibit the installation of wood-burning fireplaces and stoves;* • *Provide onsite bicycle storage and showers for employees that bike to work sufficient to meet peak season maximum demand;* • *Provide preferential parking (e.g., near building entrance, sheltered area, etc.) for carpool and vanpool vehicles;* • *Provide transit enhancing infrastructure that includes: transit shelters, benches, etc.; street lighting; route signs and displays; and/or bus turnouts/bulbs;* • *Incorporate onsite transit facility*			

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact	Mitigation Measure	Monitoring Agency	Implementation Schedule	Sign-off
		improvements (e.g., pedestrian shelters, route information, benches, lighting) to coincide with existing or planned transit service; • *Incorporate landscaping and sun screens to reduce energy use. Deciduous trees should be utilized for building shading to increase solar heating during the winter months. Install sun-shading devices (e.g., screens) or recessed windows on newly proposed buildings;* • *Install efficient lighting and lighting control systems;* • *Install energy-efficient heating and cooling systems, appliances and equipment;* • *Install light colored "cool" roofs and pavements (i.e., high reflectance, high emittance roof surfaces, or exceptionally high reflectance and low-emittance surfaces) and strategically placed shade trees to the extent practical;* • *Limit hours of operation of outdoor lighting to the extent practical; and* • *Provide shade (within 5 years) and/or use light-colored/high-albedo materials (reflectance of at least 0.3) and/or open grid pavement for at least 30 percent of the site's non-roof impervious surfaces,*	SMAQMD Community	Prior to issuance of occupancy permit	

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact		Mitigation Measure	Monitoring Agency	Implementation Schedule	Sign-off
			including parking lots, walkways, plazas, etc.; or, place a minimum of 50 percent of parking spaces underground or covered by structured parking; or, use an open-grid pavement system (less than 50 percent impervious) for a minimum of 50 percent of the parking lot area.	Development Department		
		5.3-5(b)	*Documentation confirming implementation of the Air Quality Mitigation Plan shall be provided to the SMAQMD and City prior to issuance of occupancy permits.*			
5.3-8	Cumulative contribution to regional air quality conditions.	*5.3-8*	*Implement Mitigation Measures. 5.3-2(a) and (b) and 5.3-4(a) and (b).*	See 5.3-2 (a) and (b)	See 5.3-2(a) and (b)	
			5.4 Noise and Vibration			
5.4-2	Construction noise impacts to surrounding existing uses.	*5.4-2*	*Construction activities shall be limited to the hours set forth below, unless an exception is granted by the Community Development Department:* • *Monday through Saturday 7:00 a.m. to 6:00 p.m.* • *Sunday 9:00 a.m. to 6:00 p.m.* *These restricted hours shall be included on all grading and construction plans submitted for the review and approval of the Community Development Department*	Community Development Department	Prior to issuance of grading and building permits	

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact	Mitigation Measure		Monitoring Agency	Implementation Schedule	Sign-off
			prior to issuance of grading and construction permits.			
5.4-7	Railroad noise levels at exterior noise spaces of proposed project residences.	*5.4-7*	*Prior to the issuance of building permits, a noise barrier shall be shown on the plans along the western boundary of the project site, from the northern boundary of the CPV site to the southern end of any parcel with residences for the review and approval of the City Engineer. A barrier 10 feet in height (relative to nearest outdoor activity elevations) would intercept line of sight to railroad pass-bys; thereby reducing future UPRR noise levels to 70 dB Ldn or less at the nearest outdoor activity areas proposed adjacent to the tracks.* *Barriers can take the form of earthen berms, solid walls, or a combination of the two. Appropriate materials for noise walls include precast concrete or masonry block. Other materials may be acceptable provide they have a surface density of approximately four pounds per square foot.*	City Engineer	Prior to the issuance of building permits	
5.4-8	Railroad noise levels at interior spaces of proposed residences on the project site.	*5.4-8(a)*	*Prior to the issuance of building permits, all residential lots and residential buildings located within the 70 dB Ldn contour shall include noise insulation features such as the following:* • *Sound-rated windows and doors with STC rating of 35; and*	Community Development Department	Prior to issuance of building permits	

MITIGATION MONITORING PLAN
Curtis Park Village

Impact Number	Impact	Mitigation Measure		Monitoring Agency	Implementation Schedule	Sign-off
			• *Stucco exterior siding.*			
		5.4-8(b)	*Prior to sale of any residential lots, statements shall be included in the title for all properties within the 65 dB Ldn contour that informs the buyer of elevated noise levels during train passages, and that train passages routinely occur during nighttime hours.*	Community Development Department	Prior to sale of residential lots	
5.4-9	Noise-producing commercial uses proposed within the project site.	*5.4-9(a)*	*Unshielded (i.e. unloading activities which are visible from any residential window), nighttime truck unloading shall be prohibited within 200 feet of any residential unit.*	Community Development Department	Prior to issuance of building permit and during project operations	
		5.4-9(b)	*Prior to issuance of a building permit, the site plans shall indicate that a parapet wall shall be constructed along the edge of the roofs of the commercial buildings of sufficient height to intercept line of sight from rooftop mechanical equipment at the nearest residences to reduce noise levels at those nearby residences.*	Community Development Department	Prior to issuance of building permit	
5.4-10	Park generated noise at residential uses proposed within the project site.	*5.4-10*	*Park activities shall be restricted to daytime hours, with exceptions allowed on a case-by-case basis subject to the approval of the Director of the Parks and Recreation.*	Parks and Recreation Department	During project operations	
		5.5 Biological Resources				
5.5-2	Impacts to burrowing owl.	*5.5-2*	*Prior to any ground disturbance associated with grading or construction, the applicant*	CDFG	Prior to any ground disturbance	

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Impact Number	Impact		Mitigation Measure	Monitoring Agency	Implementation Schedule	Sign-off
			shall initiate a burrowing owl consultation with the California Department of Fish and Game (CDFG) and shall implement the following mitigation measures or equivalents, based on the results of the consultation. *The developer shall arrange for burrowing owl surveys to be performed consistent with the CDFG's 1995 Staff Report on Burrowing Owl and the California Burrowing Owl Consortium's (CBOC) Survey Protocol (1997) not less than 30 days prior to ground disturbance for each phase of project grading. If burrowing owls are not detected, further mitigation is not necessary. However, if burrowing owls are detected the following steps shall be taken:* *If site disturbance commences during the nesting season (between February 1 and August 31) and burrowing owls are detected, a fenced buffer shall be erected on the project site by the developer not less than 250 feet between the nest burrow(s) and construction activities. The 250-foot buffer shall be observed and the fence left intact until a qualified raptor biologist determines that the young are foraging independently, the nest has failed, or the owls are not using any burrows within the buffer.*		associated with grading or construction	

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		If ground disturbance associated with grading or construction commences outside of the nesting season, and burrowing owl(s) are present on-site or within 160 feet of site disturbance, passive relocation consistent with the CDFG Staff Report (1995) and the CBOC Survey Protocol (1997), shall be performed. At least one or more weeks will be necessary to accomplish this and allow the owls to acclimate to off-site burrows. The pre-construction surveys shall be repeated if more than 30 days elapse between the last survey and the start of construction activities.			
5.5-3	Impacts to Swainson's hawk nesting and foraging habitat.	5.5-3 *If site disturbance, associated with grading or construction activities is proposed by the developer during breeding season (February to August), a pre-construction survey for Swainson's hawk nests shall be conducted within 30 days prior to site disturbance/construction activities by a qualified biologist in order to identify active nests in the project site vicinity. The results of the survey shall be submitted to CDFG and the Community Development Department. If active nests are not found during the pre-construction survey, further mitigation is not required. If active nests are found, pursuant to consultation with CDFG, a fenced buffer shall be erected by the developer on the project site not less*	CDFG Community Development Department	Pre-construction survey prior to site disturbance or construction	

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			than one-quarter mile (approximately 1,300 feet) around the active nest. Site disturbance associated with grading or construction activities that may cause nest abandonment or forced fledging shall not be initiated within this buffer zone between March 1 and September 1. Any trees containing nests that must be removed as a result of project implementation shall be removed during the non-breeding season (September to January).			
5.5-4	Impacts to raptors and migratory birds.	*5.5-4(a)*	*Prior to any grading or construction activities during the nesting season (February 1 to August 15), a preconstruction survey shall be conducted by a qualified wildlife biologist within 15 days of the start of project-related activities. If nests of migratory birds are detected on site, or within 75 feet (for migratory passerine birds) or 250 feet (for birds of prey) of the site, the developer shall consult with the CDFG to determine the size of a suitable buffer in which new site grading or construction disturbance is not permitted until August 15, or the qualified biologist determines that the young are foraging independently, or the nest has been abandoned.*	Community Development Department CDFG	Pre-construction survey prior to grading or construction activities	
		5.5.4(b)	*Prior to any grading or construction activities from March 15 to May 15 within 100 feet of the overcrossing of the railroad*			

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Impact Number	Impact	Mitigation Measure	Monitoring Agency	Implementation Schedule	Sign-off
		tracks on Sutterville Road, adjacent to the project site, a preconstruction survey shall be conducted by a qualified biologist within 15 days of the start of project-related activities. If active nests are present in the overcrossing, no construction shall be conducted within 100 feet of the edge of the purple martin colony (as demarcated by the active nest hole closest to the construction activity) at the beginning of the purple martin breeding season from March 15 to May 15. The buffer area shall be avoided to prevent disturbance to the nest(s) until it is no longer active. The size of the buffer area may be adjusted if a qualified biologist and CDFG determine it would not be likely to have adverse effects on the purple martins. No project activity shall commence within the buffer area until a qualified biologist, confirms that the nest(s) is no longer active.			