BLACK OLIVE VILLAGE

FINAL ENVIRONMENTAL IMPACT REPORT

State Clearinghouse No. 2017072065

Prepared for:

TOWN OF PARADISE
5555 SKYWAY
PARADISE, CA 95969

Prepared by:

Michael Baker INTERNATIONAL

140 INDEPENDENCE CIRCLE, SUITE C
CHICO, CA 95973

AUGUST 2018

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Prepared for:

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Prepared by:

MICHAEL BAKER INTERNATIONAL
140 INDEPENDENCE CIRCLE, SUITE C
CHICO, CA 95973

AUGUST 2018

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1.0 Introduction

1.1 PURPOSE OF THIS DOCUMENT

This final environmental impact report (EIR) has been prepared in accordance with the California Environmental Quality Act (CEQA; Public Resources Code Sections 21000–21177) for the Black Olive Village Project (proposed project [SCH # 2017072065]). The Final EIR for this project comprises this document, together with the Draft EIR (incorporated by reference in accordance with State CEQA Guidelines Section 15150). The Town of Paradise (Town) is the lead agency for the proposed project, which is summarized below and presented in greater detail in Section 2.0, Project Description, of the Draft EIR.

This Final EIR contains public comments received on the Draft EIR during the public review period for the proposed project and includes written responses to environmental issues raised in those comments. As required by State CEQA Guidelines Sections 15088 and 15132, the lead agency (in this case, the Town of Paradise) is required to evaluate comments on environmental issues received from persons who have reviewed the Draft EIR and to prepare written responses to those comments. In accordance with State CEQA Guidelines Section 15088(b), the written responses describe the disposition of significant environmental issues raised. The Town and its consultants have provided a good faith effort to respond in detail to all significant environmental issues raised by the comments. This Final EIR also contains minor corrections and revisions made to the Draft EIR (see Section 4.0, Revisions to the Draft EIR) initiated by Town staff and/or the consultants based on their ongoing review.

The comments and responses that make up the Final EIR, in conjunction with the Draft EIR, as amended by the text changes, constitute the EIR that will be considered for certification by the Town of Paradise.

1.2 PROJECT UNDER REVIEW

The proposed Black Olive Village is in the Town of Paradise, Butte County, between Chico and Magalia in the lower Sierra Nevada foothills. The project site, which consists of five parcels, is directly west of the intersection of Skyway and Black Olive Drive in an existing commercial area. The General Plan designates the project site as Town Commercial (TC). The site is zoned Community Commercial (CC). These designations provide for a full range of locally and regionally oriented commercial uses, including retail, retail centers, restaurants, service stations, and other uses, and the project is consistent with the General Plan and the Zoning Code. The project requires approval of a Conditional Use Permit for the Safeway store and adjacent retail space in accordance with CC zoning district requirements for a large retail project.

The proposed project would result in the creation of 67,473 square feet of retail uses on 7.63 acres, which would consist of a 54,471-square-foot Safeway-branded grocery store, a 9 station (18 pumps) fueling center with illuminated canopy, a 1,002-square-foot fueling center kiosk, 7,800 square feet of additional retail adjoining the store, a 4,200-square-foot restaurant pad, and a 276-space parking lot. The grocery store would operate 7 days per week, 24 hours per day. The existing approximately 35,000-square-foot Safeway store in Old Town Plaza on Clark Road would be closed. A new use or tenant for the vacated store has not been identified, and there are no plans to demolish the space.

Off-site frontage improvements to Skyway to accommodate the proposed project would include a primary driveway entrance aligned opposite to Black Olive Drive (which would be a signalized intersection following improvements by the Town in 2017–18, unrelated to the proposed project); a secondary access driveway (northern driveway) for the fueling center; curb, gutter, and sidewalk; and a public bus turnout and shelter on Skyway south of the primary driveway entrance. A 6-foot-

wide bicycle and pedestrian pathway would be constructed along the Skyway frontage and dedicated to the Town. Landscaping, consisting of trees, shrubs, and plants, would be installed throughout the parking lot, along Skyway, and along the north, west, and south boundaries of the site.

Delivery truck access to the project is proposed via the northern driveway. Delivery trucks accessing the site would enter via the northern driveway, proceed to the two loading docks via a one-way route at the rear of the Safeway store, and exit via the primary driveway at Black Olive Drive. Smaller delivery trucks would use either driveway to access the site.

Water service for the project would be provided by the Paradise Irrigation District (PID). The proposed project would include an on-site wastewater secondary treatment system. Stormwater from the proposed project would be collected into mechanical structures and treated in on-site stormwater detention basins prior to discharge into the Town's stormwater drainage system in Skyway.

Existing structures on the site would be demolished, and 180 trees greater than 10 inches in diameter would be removed. The Town has not identified any of the trees on-site as a heritage tree. The project applicant will be required to obtain a Tree Felling Permit from the Town, and the California Department of Forestry and Fire Protection (Cal Fire) will require the preparation of a Timber Harvest Plan.

Grading of the site to create a level pad for the buildings and parking lot would require cut-and-fill operations and the import of 20,900 cubic yards of fill material. A retaining wall would be installed on the west side of the site, along the property line, at the bottom of a slope created by fill placement. The retaining wall would range in height from 14 to 16 feet along most of the western property line, decreasing to 5 feet near the southwest corner. A retaining wall would also be placed on the north side of the site ranging from 16 feet below the grade of the pad at the northwest corner to 10 feet above the pad grade near the center of the northern property line.

The boundaries of the five existing parcels would be modified to provide for individual parcels for future retail tenants and the restaurant pad.

1.3 PUBLIC PARTICIPATION AND REVIEW PROCESS

Following the Town's preliminary review of the proposed project, the Town determined the proposed project may have a significant effect on the environment and concluded that an EIR would be required. The Town of Paradise published a Notice of Preparation (NOP) of an EIR on July 28, 2017. This notice was circulated to the public, local, state, and federal agencies, and other interested parties for 30 days to solicit comments on the proposed project. The Town conducted a scoping meeting on August 22, 2017, to receive input on the content of the EIR.

An initial study checklist was prepared, although it was not required pursuant to CEQA Guidelines Section 15063(a). The Initial Study is included in Appendix B in the Draft EIR. The Town determined the scope for the Draft EIR based on the Initial Study and comments in response to the NOP. The following environmental topics are addressed in detail the Draft EIR: aesthetics, air quality, greenhouse gas emissions, noise, and traffic. Sections 4.1 through 4.5 in this EIR provide an integrated presentation of the setting, environmental impacts, and mitigation measures. Potential effects of implementing the proposed project, including cumulative effects, are identified, along with mitigation measures recommended to reduce identified impacts. In cases where mitigation would not reduce an impact to a level that is less than significant or no mitigation is available, this fact is noted.

The Draft EIR was circulated for public and agency review and comment for 45 days. The review period for the Draft EIR was from February 12, 2018 to March 28, 2018. This Final EIR contains the written comments submitted on the Draft EIR and responses to those comments.

1.4 ORGANIZATION OF THIS DOCUMENT

The Final EIR is organized as follows:

Section 1 – Introduction: This section includes a summary of the project description and the process and requirements for a Final EIR.

Section 2 – List of Agencies and Persons Commenting: This section contains a list of all agencies or persons who submitted comments on the Draft EIR during the public review period.

Section 3 – Comments and Responses: This section contains the comment letters received on the Draft EIR and the corresponding response to each comment. For this Final EIR, comments and responses are grouped by letters from agencies and individuals. Responses are provided after the letter in the order in which the comments appear. Where appropriate, responses are cross-referenced between letters. The responses following each comment letter are intended to supplement, clarify, or amend information in the Draft EIR or refer the commenter to the appropriate place in the document where the requested information can be found.

Section 4 – Revisions to the Draft EIR: This section presents minor corrections and revisions made to the Draft EIR initiated by Town of Paradise staff based on their ongoing review and/or in response to comments on the Draft EIR.

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2.0 List of Commenters

2.1 COMMENTER LIST

The following agencies and individuals submitted comments on the Draft EIR:

Letter Number	Commenter	Date Submitted
	Agencies	
A	Governor's Office of Planning and Research, State Clearinghouse	April 2, 2018
B	California Department of Transportation (Caltrans)	April 6, 2018
C	Butte County Air Quality Management District	March 27, 2018
	Individuals	
1	Dave Schott	March 16, 2018

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3.0 COMMENTS AND RESPONSES

3.1 REQUIREMENTS FOR RESPONDING TO COMMENTS ON A DRAFT EIR

CEQA Guidelines Section 15088 requires the lead agency to evaluate all comments on environmental issues received on the Draft EIR and prepare a written response. The written response must address the significant environmental issue raised and must provide a detailed response, especially when specific comments or suggestions (e.g., additional mitigation measures) are not accepted. In addition, the written response must be a good faith and reasoned analysis. However, lead agencies need only to respond to significant environmental issues associated with the project and do not need to provide all the information requested by a comment, as long as a good faith effort at full disclosure is made in the EIR (CEQA Guidelines Section 15204).

CEQA Guidelines Section 15204 recommends that commenters provide detailed comments that focus on the sufficiency of the Draft EIR in identifying and analyzing the possible impacts on the environment and ways in which the significant effects of the project might be avoided or mitigated. CEQA Guidelines Section 15204 also notes that commenters should provide an explanation and evidence supporting their comments. Pursuant to CEQA Guidelines Section 15064, an effect will not be considered significant in the absence of substantial evidence supporting such a conclusion.

3.2 RESPONSES TO COMMENT LETTERS

Written comments on the Draft EIR are reproduced on the following pages, along with responses to those comments. To assist in referencing comments and responses, the following coding system is used:

- Public agency comment letters are coded by letters, and each issue raised in the comment letter is assigned a number (e.g., Comment Letter A, comment 1: A-1).

- Individual comment letters are coded by numbers, and each issue raised in the comment letter is assigned a number (e.g., Comment Letter 1, comment 1: 1-1).

Comments that do not raise environmental issues or relate to the adequacy of the information or analysis in the Draft EIR do not require a response, per CEQA Guidelines Section 15132. Comments that relate exclusively to the merits of the proposed project are so noted.

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Letter A

STATE OF CALIFORNIA
GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

April 2, 2018

Craig Baker
Town of Paradise
5555 Skyway
Paradise, CA 95969

Subject: Black Olive Village Project
SCH#: 2017072065

Dear Craig Baker:

The enclosed comment (s) on your Draft EIR was (were) received by the State Clearinghouse after the end of the state review period, which closed on March 28, 2018. We are forwarding these comments to you because they provide information or raise issues that should be addressed in your final environmental document. **A-1**

The California Environmental Quality Act does not require Lead Agencies to respond to late comments. However, we encourage you to incorporate these additional comments into your final environmental document and to consider them prior to taking final action on the proposed project.

Please contact the State Clearinghouse at (916) 445-0613 if you have any questions concerning the environmental review process. If you have a question regarding the above-named project, please refer to the ten-digit State Clearinghouse number (2017072065) when contacting this office.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
1-916-322-2318 FAX 1-916-558-3184 www.opr.ca.gov

Letter A Continued late 3-28-18 5

Christine Asiata

From: Kabirinassab, Nima@DOT <Nima.Kabirinassab@dot.ca.gov>
Sent: Friday, March 30, 2018 2:30 PM
To: cbaker@townofparadise.com
Cc: OPR State Clearinghouse
Subject: 03-BUT-2018-00078 - Black Olive Village Project
Attachments: Comment Letter.pdf

Dear Craig Baker,

Thank you for including California Department of Transportation (Caltrans) in the review for Black Olive Village Project. Caltrans' new mission, vision, and goals signal a modernization of our approach to California's transportation system. We review this local development for impacts to the State Highway System in keeping with our mission, vision and goals for sustainability/livability/economy, and safety/heath. We provide these comments consistent with the state's mobility goals that support a vibrant economy, and build communities, not sprawl. **A-2**

Please provide our office with copies of any further actions regarding this project. We would appreciate the opportunity to review and comment on any changes related to this development.

Please reply to this email to confirm receipt of the attached comments.

If you should have any questions concerning these comments or require additional information, please feel free to contact me.

Thank you,

Nima Kabirinassab
Transportation Planner
Caltrans - District 3
703 B Street
Marysville, CA 95901
(530) 741-5452
Nima.Kabirinassab@DOT.ca.gov

Caltrans
CALIFORNIA DEPARTMENT OF TRANSPORTATION

State Office of Planning & Research
MAR 30 2018
STATE CLEARINGHOUSE

1

Letter A Continued

STATE OF CALIFORNIA--CALIFORNIA STATE TRANSPORTATION AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 3
703 B STREET
MARYSVILLE, CA 95901
PHONE (530) 741-4286
FAX (530) 741-5346
TTY 711
www.dot.ca.gov

Serious drought.
Help save water!

March 30, 2018

GTS# 03-BUT-2018-00078
03-BUT-191 PM 11.387
SCH# 2017072065

Mr. Craig Baker
Town of Paradise
5555 Skyway
Paradise, CA 95969

Black Olive Village Project

Dear Craig Baker:

Thank you for including the California Department of Transportation (Caltrans) in the environmental/application review process for the project referenced above. The mission of Caltrans is to provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability. The Local Development-Intergovernmental Review (LD-IGR) Program reviews land use projects and plans through the lenses of our mission and state planning priorities of infill, conservation, and travel-efficient development. To ensure a safe and efficient transportation system, we encourage early consultation and coordination with local jurisdictions and project proponents on all development projects that utilize the multimodal transportation network.

The project consists of the construction and operation of 67,473 square feet (sq. ft.) of retail uses, which would include a Safeway supermarket (54,471 sq. ft.) and 7,800 sq. ft. of additional retail adjoining the store; a 4,200 sq. ft. restaurant which could accommodate a high-turnover, sit-down restaurant; a 18-station (9 pumps) fueling center with canopy; a 1,002 sq. ft. fueling center kiosk; and a landscaped parking lot with 278 parking spaces. The project is located west side of Skyway, adjacent to the intersection of Skyway and Black Olive Drive, 1-mile west of State Route (SR) 191 Paradise, California. The following comments are based on the Draft Environmental Impact Report (EIR) received.

"Provide a safe, sustainable, integrated, and efficient transportation system to enhance California's economy and livability"

Letter A Continued

Traffic Operations

The traffic study should depict potential impacts at the intersections of SR 191 and Pearson/Buschmann Road. There will likely be a change in through movements turning left towards the new grocery location, increasing conflicts at these intersections. Regarding the Site Plan (Figure 2), it is unclear as to what the future holds for "Pad A" in relation to the landscaping that will be built in the initial project. At a minimum, it should include all frontage improvements along Skyway including traffic signal, sidewalk, curb ramps, a bus turn out (in coordination with local transit authorities), and a full length of curb line within the parking lot along the traffic signal access driveway opposite Black Olive Dr.

More than the minimum number of ADA spaces have been provided in the site plan, but it is difficult to determine from this image how many van accessible spaces there are. Two are required for the 12 spaces shown, but given the separated nature of the business entrances (Safeway, shops, Pad A, gas kiosk) consider having one van accessible space in each location.

The "STOP" word marking is not used at the driveway traffic signal approach. Consider a roundabout intersection as an alternative to a new traffic signal control, as they have been known to have enhanced safety performance and traffic calming features. Truck design would also need to be accounted for in the circulating roadway.

Forecasting

Trip generation rates shown in Table 4 of the traffic impact report (TIR) is consistent with ITE trip generation rates. Caltrans forecasting concerns:

1. SR 191/Pearson Road intersection and SR 191/Elliott Road intersection should have been considered in the impact analysis. Please provide the rationale on this matter. According to page 19 of the TIR, trip distribution shows that 55% of the project generated traffic will use Pearson and Elliott Road. Please perform analysis for these two intersections and re-submit.
2. Figure 3 (Baseline AM Peak Traffic Volumes) and Figure 5 (2040 Baseline AM Peak Traffic Volumes) show same volume counts. Please correct volume in figure 5 and all associated analysis done using this future baseline volume.
3. Figures 3 to 12 show intersection 6 is shown in the wrong location. It is shown at Pearson/Foster Road junction instead of Pearson/Black Olive Drive junction.

Letter A Continued

Please provide our office with copies of any further actions regarding this project. We would appreciate the opportunity to review and comment on any changes related to this development.

If you have any question regarding these comments or require additional information, please contact Nima Kabirinassab, Intergovernmental Review Coordinator for Butte County, by phone (530) 741-5452 or via email at Nima.Kabirinassab@dot.ca.gov.

Sincerely,

KEVIN YOUNT, Branch Chief
Office of Transportation Planning
Regional Planning Branch—North

"Provide a safe, sustainable, integrated, and efficient transportation system to enhance California's economy and livability"

LETTER A: GOVERNOR'S OFFICE OF PLANNING AND RESEARCH, STATE CLEARINGHOUSE

Response A-1

This comment states that one state agency (California Department of Transportation [Caltrans]) submitted a comment letter to the State Clearinghouse, but that it was received after the end of the state review period, which was March 28, 2018. As provided by CEQA Guidelines Section 15088 and as noted in the comment, CEQA does not require lead agencies to respond to late comments but encourages lead agencies to incorporate them and consider them prior to taking final action on a proposed project.

Response A-2

Caltrans submitted its comment letter via email on March 30, 2018 to the State Clearinghouse and to the Town. Caltrans staff subsequently submitted a revised comment letter (dated April 6, 2018) directly to the Town. The Town has considered the comments in the April 6 letter and has prepared responses to those comments, which are provided in Responses B-1 through B-3.

Letter B

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
DISTRICT 3
703 B STREET
MARYSVILLE, CA 95901
PHONE (530) 741-4286
FAX (530) 741-5346
TTY 711
www.dot.ca.gov

Serious drought.
Help save water!

April 6, 2018

GTS# 03-BUT-2018-00078
03-BUT-191 PM 11.387
SCH# 2017072065

Mr. Craig Baker
Town of Paradise
5555 Skyway
Paradise, CA 95969

Black Olive Village Project

Dear Craig Baker:

Thank you for including the California Department of Transportation (Caltrans) in the environmental/application review process for the project referenced above. The mission of Caltrans is to provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability. The Local Development-Intergovernmental Review (LD-IGR) Program reviews land use projects and plans through the lenses of our mission and state planning priorities of infill, conservation, and travel-efficient development. To ensure a safe and efficient transportation system, we encourage early consultation and coordination with local jurisdictions and project proponents on all development projects that utilize the multimodal transportation network.

The project consists of the construction and operation of 67,473 square feet (sq. ft.) of retail uses, which would include a Safeway supermarket (54,471 sq. ft.) and 7,800 sq. ft. of additional retail adjoining the store; a 4,200 sq. ft. restaurant which could accommodate a high-turnover, sit-down restaurant; a 18-station (9 pumps) fueling center with canopy; a 1,002 sq. ft. fueling center kiosk; and a landscaped parking lot with 278 parking spaces. The project is located west side of Skyway, adjacent to the intersection of Skyway and Black Olive Drive, 1-mile west of State Route (SR) 191 Paradise, California. The following comments are based on the Draft Environmental Impact Report (EIR) received.

"Provide a safe, sustainable, integrated, and efficient transportation system to enhance California's economy and livability"

Letter B Continued

Traffic Operations

The traffic study should depict potential impacts at the intersection of SR 191 and Pearson Road. There will likely be a change in through movements turning left towards the new grocery location, increasing conflicts at these intersections.

Forecasting

Trip generation rates shown in Table 4 of the traffic impact report (TIR) is consistent with ITE trip generation rates. Caltrans forecasting concerns: B-1

1. SR 191/Pearson Road intersection should have been considered in the impact analysis. Please provide the rationale on this matter. According to page 19 of the TIR, trip distribution shows that 55% of the project generated traffic will use Pearson and Elliott Road. Please perform analysis on SR 191/Pearson Road and re-submit.
2. Figure 3 (Baseline AM Peak Traffic Volumes) and Figure 5 (2040 Baseline AM Peak Traffic Volumes) show same volume counts. Please correct volume in figure 5 and all associated analysis done using this future baseline volume. B-2

Please provide our office with copies of any further actions regarding this project. We would appreciate the opportunity to review and comment on any changes related to this development. B-3

If you have any question regarding these comments or require additional information, please contact Nima Kabirinassab, Intergovernmental Review Coordinator for Butte County, by phone (530) 741-5452 or via email at Nima.Kabirinassab@dot.ca.gov.

Sincerely,

KEVIN YOUNT, Branch Chief
Office of Transportation Planning
Regional Planning Branch—North

"Provide a safe, sustainable, integrated, and efficient transportation system to enhance California's economy and livability"

LETTER B: CALIFORNIA DEPARTMENT OF TRANSPORTATION (CALTRANS)

Response B-1

As requested by Caltrans staff, an intersection operations analysis was prepared for the State Route 191 (Clark Road) and Pearson Road intersection. A memorandum documenting the results of the analysis is included in Appendix A to this Final EIR. The results of the analysis show that there would be no significant impacts at the Clark Road/Pearson Road under existing plus baseline and cumulative plus project conditions.

Response B-2

The Traffic Impact Analysis (Appendix D of the Draft EIR) inadvertently duplicated the same traffic volume figures referenced by the commenter. The analysis in the study is correct. The error is editorial in nature only. The correct versions of Figure 3 (Baseline AM Peak Traffic Volumes) and Figure 5 (2040 Baseline AM Peak Traffic Volumes) are included in Appendix A to this Final EIR. These figures were not included in the Draft EIR, and no further analysis or revisions to the Draft EIR are necessary as a result of this comment.

Response B-3

As required under CEQA Guidelines Section 15088(b), the Town is required to provide responses to a public agency on comments made by that agency at least 10 days prior to certifying an EIR. The Town will provide its responses to the Caltrans letter as required.

Letter C

629 Entler Avenue, Suite 15
Chico, CA 95928

(530) 332-9400
(530) 332-9417 Fax

W. James Wagoner
Air Pollution Control Officer

Robert McLaughlin
Asst. Air Pollution Control Officer

March 27, 2018

Craig Baker, Community Development Director
Town of Paradise
5555 Skyway
Paradise, CA 95969

Re: Black Olive Village Project Draft Environmental Impact Report (DEIR)

Dear Mr. Baker,

The Butte County Air Quality Management District (District) appreciates the opportunity to comment on the DEIR for the project listed above. Based on the information reviewed, the District has the following comments:

1. Page 4.2-3 - Criteria Pollutants: The first paragraph shows both Ozone and $PM_{2.5}$ being measured at 4405 Airport Road. Ozone is measured at 4405 Airport Road in Paradise, CA. $PM_{2.5}$ is measured at 6701 Clark Road in Paradise, CA. C-1
2. Page 4.3-13 - Construction default model assumptions: The District recommends reviewing the default grams per liter (g/l) value used for architectural coatings in CALEEMOD model runs. District Rule 230, *Architectural Coatings* includes VOC content limits for flat (100 g/l) and non-flat (150 g/l) coatings. This may result in a reduced value for construction-related ROG emissions if the default value (300 g/l) was used. C-2
3. Page 4.2-16 - Impact 4.2.2: The District recognizes that the unmitigated and mitigated short-term construction-generated impacts are expected to be less than significant. The District recommends including a statement indicating that the project does not exceed the threshold of 4.5 tons per year (NOx and ROG) in addition to the threshold of 137 pounds per day. Based on data reviewed on PDF page 458 of the DEIR (CALEEMOD Emissions Summary – Overall Construction), it appears that the total unmitigated and mitigated construction emissions are below the threshold of 4.5 tons per day for NOx and ROG. C-3
4. Page 4.2-20 - Impact 4.2.3: The District recognizes that the long-term operational NOx emissions are significant and are primarily the result of mobile vehicle emissions. The District also recognizes that mobile vehicle emissions were estimated under the conservative assumption that all vehicle trips are new. The District agrees that MM 4.2.3b and MM 4.2.3c may result in a reduction of mobile vehicle emissions. If additional on-site mitigation measures are infeasible, off-site mitigation strategies may be used to reduce operational emissions. C-4

If you have any questions or comments, please contact the District at (530) 332-9400.

Sincerely,

Jason Mandly
Senior Air Quality Planner

LETTER C: BUTTE COUNTY AIR QUALITY MANAGEMENT DISTRICT (BCAQMD)

Response C-1

The Draft EIR has been revised in response to this comment to correct the description of ozone and PM2.5 measurement locations that appears on page 4.2-3 in the Draft EIR. Please see Section 4.0, Revisions to the Draft EIR.

Response C-2

Using the CalEEMod default value for VOC content for Butte County resulted in maximum daily construction ROG emissions of 92.9 pounds/day (Draft EIR, Table 4.2-6, page 4.2-16). Using Rule 230 VOC content limits, as suggested by the commenter, would result in lower emissions. However, because the estimated emissions using the default value were below the BCAQMD's 137 pounds per day threshold, no changes to the VOC content value were made. Even with the default value providing a more conservative estimate, the impact is less than significant.

Response C-3

The Draft EIR has been revised in response to this comment to include a statement on page 4.2-16 that annual emissions of ROG and NOx would also not exceed the BCAQMD's threshold of 4.5 tons per year. Please see Section 4.0, Revisions to the Draft EIR.

Response C-4

The Town recognizes on-site mitigation is the BCAQMD's preferred approach, and that if additional on-site measures are not feasible, the other option to further reduce emissions is through off-site mitigation. As described in the BCAQMD CEQA Air Quality Handbook. a project applicant may participate in an off-site mitigation program, coordinated through BCAQMD, within the region (Butte County), or through the payment of fees equal to the amount of emissions exceeding the annual threshold over the expected length of the exceedance, which is 25 years for commercial projects.

Under CEQA (CEQA Guidelines Section 15126.4), there must be an essential nexus (i.e., connection) between the mitigation measure and a legitimate governmental interest, and the mitigation measure must be "roughly proportional" to the impacts of the project. As noted in Impact 4.2.3 on page 4.2-20 in the Draft EIR, the estimate of mobile emissions reflects the assumption in the project's transportation impact study that the proposed project would result in new trips, even though the supermarket component of the project is the relocation of an existing use. This approach provides a conservative, worst-case estimate of mobile criteria air pollutant and precursor emissions at the project level because it does not discount precursor emissions associated with the existing store. Therefore, it is not possible to quantify the net difference in emissions that would, in turn, be used to determine what appropriate mitigation would be. Therefore, the use of an off-site mitigation strategy to reduce project emissions that would include emissions from some future, as-yet-undetermined commercial use at the vacated store would not meet the essential nexus and rough proportionality criteria. As such, participation in an off-site program to mitigate the proposed project's impacts is not considered feasible for the proposed project.

Letter 1

Baker, Craig

From: Dave Schott [schottprop@sbcglobal.net]
Sent: Friday, March 16, 2018 2:30 PM
To: Baker, Craig
Subject: Re: Draft EIR

Craig Baker.
Director, Community development.
Town of Paradise, Ca.

Dave Schott
Owner, Colonial Storage
Paradise,Ca.

3/16/2108

Dear Mr.Baker :

Thank you for the notification and opportunity to review the draft EIR for the upcoming Safeway project. Being the long and very complex document that the draft EIR is, I will keep my concerns as brief and specific as possible. As you know I own the property immediately to the north of the Safeway project and our contiguous property line is close to 600 feet in length. On the Skyway End of my property is my office along with Colonial Ministorage , to the rear of the property there are three homes that are very close to the Safeway side of property line.The construction and operation of the proposed Safeway is going to have a very large impact on these homes, and there in lies my concerns. 1-1

Prior to the scoping meeting held at the town of Paradise offices I forwarded a letter voicing concerns regarding this common property line. It appears several of my concerns have been addressed , specifically the "sound wall " buffering the parking lot driveway area from the existing homes referenced above. Although The sound wall is shown in the vicinity of the homes it is not clear as to its finish elevation, and materials of construction. Further details will be presented by Safeway I'm sure and I hope to have a look at those prior to their approval. 1-2

My other main concern is trees along our common property line. Although several trees are shown for removal that appear to be on or near the property line or perhaps even on my property, there appears to be no change from the plans presented at the scoping meeting and the current plan in The draft EIR. Therefore I am simply repeating what I stated in my prior letter. I will limit my comments to a single tree at this point. Please reference sheet T 1.0.. On this sheet, A beautiful 48 inch mature black oak is shown for removal. I believe this tree is on our property line, or perhaps even on my property. I most certainly do not want it damaged or removed. The elevation sheet C 2.0 shows that the finish grade of the parking area is going to be very close to the existing grade at the base of this tree. Obviously if the retaining wall/ sound wall is run through this area the tree Will be killed. The current plan shows a planter area is planned for the vicinity in which the tree now resides ,Rerouting the retaining wall and it's above ground sound wall out and around this tree into the Safeway area would give this tree is best chance of survival. This would require a minor expansion of the planter and yet appear not to affect the adjacent parking areas. Please keep my simple recommendation above along with my other concerns in my prior letter in mind as you review Safeway's plans. Should you need any further information please contact me. 1-3

Sincerely. Dave Schott

Sent from my iPad

On Feb 13, 2018, at 1:50 PM, Baker, Craig <cbaker@townofparadise.com> wrote:

> https://www.townofparadise.com/index.php/17-news-events/279-environmental-impact-report-for-the-black-olive-village-project-safeway
>
> <image001.jpg>
> Craig Baker
> Community Development Director
> Town of Paradise

1

LETTER 1: DAVE SCHOTT, BUSINESS OWNER

Response 1-1

The presence of residential units on the commenter's commercial property and the potential for the project to impact those units was considered during preparation of the Draft EIR. For example, the Draft EIR (Figure 4.1-1 on page 4.1-5 in Section 4.1, Aesthetics) shows the location of residential areas adjoining the site. The residential units on the commenter's property are within that area. The Draft EIR (page 4.1-4) stated that the project site is readily visible from residences on the commenter's property. Impacts 4.1.2 and 4.1.3 (pages 4.1-12 through 4.1-19) evaluated potential visual quality and light/glare impacts at those residences. Mitigation measures were identified to reduce impacts (mitigation measures MM 4.1.2a through MM 4.1.2d), which address retaining wall design, vegetative screening for retaining walls and noise barriers, and protection of large trees). The Draft EIR also evaluated potential air emissions impacts associated with the fueling center operation (Impact 4.2.5 on page 4.2-25 in Section 4.2, Air Quality), and the analysis examined potential effects at the closest sensitive receptor, which is one of the units on the commenter's property. Potential noise impacts were also evaluated (Impact 4.4.2 on page 4.4-19 in Section 4.4, Noise). Impact 4.4.2 included mitigation measures (MM 4.4.2a, MM 4.2.2b, and MM 4.4.2c) to reduce noise impacts at the closest residences. Responses 1-2 and 1-3, below, address specific issues of concern raised in the comment letter.

Response 1-2

The final design of the noise barrier along the north side of the site adjoining the commenter's property line (Figure 4.4-3 on page 4.4-23 in Section 4.4, Noise, in the Draft EIR) has not yet been determined. The Town recognizes the commenter's concern regarding its design relative to adjacent residential properties and will provide the commenter an opportunity to review the design when it is available.

Response 1-3

The commenter's concern regarding the 48-inch black oak tree on the north side of the site was specifically considered during preparation of the Draft EIR, based on the commenter's input during the scoping meeting on August 16, 2017 and in his comment letter. The location of the tree is noted on page 4.1-2 in Section 4.1, Aesthetics, in the Draft EIR. It is also described in the impact analysis (Impact 4.1.2 on page 4.1-14), which states "based on comments received from the public during the scoping process, there may be some uncertainty as to whether some of the large-diameter trees along the project boundaries are on the applicant's property or on property owned by others. An official survey would be required to determine whether the trees to be removed are on property under the applicant's control."

Mitigation Measures MM 4.1.2c and MM 4.1.2d on page 4.1-15 in the Draft EIR require that the boundaries of the project site be certified by a California-licensed surveyor and reconciled with the tree removal plan. Trees that are not on the applicant's property may not be removed without permission from the property owner. MM 4.1.2d requires that large-diameter trees along the project's north boundaries be incorporated into the landscape plan, where practicable and feasible, before the Town approves the tree removal and landscape plans. It also requires that specific efforts be made to retain the 48-inch black oak (tree number T-1424) and that trees on site boundaries shall be protected during site grading and construction to protect root systems.

The final site plan and tree removal plan have not been prepared pending completion of the EIR process to ensure that concerns and suggested mitigations, such as those offered by the commenter concerning the 48-inch black oak tree, are considered. The site plans have not yet been updated. The location of retaining wall, planter, and noise barrier can be shifted and/or modified to ensure the tree is protected. The only requirement for the noise barrier is that it remain 6 feet tall and constructed with no gaps.

The Town and the applicant intend to protect the 48-inch black oak tree, as established in mitigation measures MM 4.1.2c and MM 4.1.2d. The Town will provide the commenter an opportunity to review the survey report and final grading, tree removal, and landscape plans before the Town approves such plans.

4.0 Revisions to the Draft EIR

4.1 INTRODUCTION

This section presents minor corrections and revisions made to the Draft EIR initiated by Town of Paradise staff based on their ongoing review and/or in response to comments on the Draft EIR. Revisions herein do not result in new significant environmental impacts, do not constitute significant new information, and do not alter the conclusions of the environmental analysis. New text is indicated in underline, and text to be deleted is reflected by a strikethrough unless otherwise noted in the introduction preceding the text change. Text changes are presented in the page order in which they appear in the Draft EIR.

4.2 REVISIONS TO THE DRAFT EIR

EXECUTIVE SUMMARY

Table ES-1, page ES-14, Mitigation Measure MM 4.4.2b revised as follows:

> MM 4.4.2b To ensure noise from delivery trucks traveling along the truck entry lane or unloading does not exceed the Town of Paradise's nighttime limit, the speed limit on the truck entry lane shall be limited to 5 miles per hour. This requirement shall be included as a condition of approval. The applicant shall post signage that specifies the maximum speed limit (5 mph) restriction; the signage shall be posted at the northern driveway entrance to the truck delivery lane and along the lane on the west side leading to the delivery area. The Town shall establish a mechanism for adjacent residents to report concerns with truck delivery and loading dock noise and/or violations of the speed limit restrictions, and to require the applicant to remedy the situation, as necessary. Mitigation measure MM 4.2.3~~e~~d shall also be implemented, which requires electrical hookups at the loading dock for truck refrigeration units.

Table ES-1, pages ES-17 through ES-22 revised as follows:

Table ES-1 is revised to include the level of significance before and after mitigation for the following topics evaluated in the Initial Study (Appendix B in the Draft EIR): Biological Resources, Cultural Resources, Geology and Soils, and Hazards and Hazardous Materials. The significance conclusions were stated in the Initial Study but were inadvertently omitted from Table ES-1. This revision is editorial only and does not affect the analysis or conclusions for these topics. The portion of Table ES-1 showing the changes for these topics is included at the end of this section.

SECTION 4.1 (AESTHETICS)

Page 4.1-17, footnote 3 revised as follows:

> [3] Mitigation measure MM 4.2.3~~e~~a identified in Section 4.2, Air Quality, to help reduce biogenic reactive organic gas (ROG) emissions would replace the California sycamore trees that would be planted in the parking lot with lower ROG-emitting varieties such as zelkova. These species have lower root damage potential than California sycamore.

SECTION 4.2 (AIR QUALITY)

Page 4.2-3, first paragraph and Table 4.2-2, revised as follows:

Ambient air quality in the county can be inferred from ambient air quality measurements conducted at air quality monitoring stations. Existing levels of ambient air quality and historical trends and projections in the region are documented by measurements made by the Butte County Air Quality Management District, the air pollution regulatory agency in the air basin that maintains air quality monitoring stations. There are two air quality monitoring sites in Paradise: 4405 Airport Road, approximately 2.6 miles southeast, and 6701 Clark Road, approximately 2.8 miles northeast. ~~The nearest air quality monitoring site to the project site is located at 4405 Airport Road in Paradise, approximately 3 miles south of the project site. This~~ The 4405 Airport Road monitoring station measures ambient concentrations of ozone. The 6701 Clark Road Station measures ~~and~~ airborne fine particulate matter ($PM_{2.5}$). The closest monitoring station that measures airborne coarse particulate matter (PM_{10}) is the Chico – East Avenue station, approximately 11 miles to the west. Ozone, PM_{10}, and $PM_{2.5}$ are the primary pollutants affecting the air basin. **Table 4.2-2** shows historical occurrences of ozone, PM_{10}, and $PM_{2.5}$ pollutant levels exceeding state and federal ambient air quality standards for the three-year period from 2014 through 2016.

TABLE 4.2-2
AMBIENT AIR QUALITY MONITORING DATA

Pollutant Standards	2014	2015	2016
Paradise – 4405 Airport Road Monitoring Station			
Ozone (O_3)			
Max 1-hour concentration (ppm)	0.116	0.086	0.088
Max 8-hour concentration (ppm)	0.085	0.078	0.078
Number of days above state 1-hour standard	1	0	0
Number of days above 8-hour standard	11	8	13
Paradise – 6701 Clark Road Monitoring Station			
Fine Particulate Matter ($PM_{2.5}$)			
Maximum 24-hour concentration ($\mu g/m^3$) (state/federal)	56.5 / *	58.3 / *	27.2 / *
Number of days above federal standard	*	*	*
Chico – East Avenue Monitoring Station			
Coarse Particulate Matter (PM_{10})			
Max 24-hour concentration ($\mu g/m^3$) (state/federal)	47.6 / 40.1	66.4 / 67.8	57.0 / 58.1
Number of days above state/federal standard	0 / 0	8 / 0	8 / 0

Source: CARB 2017a
Notes: $\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million
** = No data is currently available from CARB to determine the value*

Page 4.2-16, Impact 4.2.2, second paragraph and Table 4.2-6, revised as follows:

As shown in **Table 4.2-6**, during construction, short-term daily emissions associated with the development of the proposed project would not exceed the applicable BCAQMD significance daily or annual thresholds, and the impact would be **less than significant**.

TABLE 4.2-6
CONSTRUCTION-RELATED CRITERIA POLLUTANT AND PRECURSOR EMISSIONS – UNMITIGATED
(MAXIMUM POUNDS PER DAY)

Construction Activities	ROG	NO_X	Total PM_{10}	Total $PM_{2.5}$
2018 maximum daily emissions	4.7	75.0	20.8	12.3
2019 maximum daily emissions	92.9	29.1	2.8	1.6
Maximum Daily Emissions of All Years of Construction	*92.9*	*75.0*	*20.8*	*12.3*
Annual Maximum Emissions (tons per year)	*1.06*	*4.08*	*0.49*	*0.29*
BCAQMD Significant Impact Threshold	137 pounds per day not to exceed 4.5 tons per year	137 pounds per day not to exceed 4.5 tons per year	PM_{10} + $PM_{2.5}$ < 80	PM_{10} + $PM_{2.5}$ < 80
Exceed BCAQMD Threshold?	**No**	**No**	**No**	**No**

*Source: CalEEMod version 2016.3.1. See **Appendix C** for emission model outputs.*
Notes: Project construction activities are assumed to occur over a 15-month period.

Page 4.2-24, second full paragraph, second sentence revised as follows:

> Mitigation measure **MM 4.2.3d** requires the implementation of a "no idling" program for heavy-duty diesel vehicles in the loading dock area, including the installation of electrical connections at loading docks for the connection of trucks equipped with electrical hookups~~. This would~~ , which would otherwise be a source of emissions. Signage advising vehicle drivers of the idling restrictions and electrical hookup is required to be placed at the loading dock and near truck entrances to the loading area. This mitigation measure would provide a reduction of operational emissions that is not quantifiable in the CalEEMod software and a reduction in noise generated in the loading dock area.

SECTION 4.4 (NOISE)

Page 4.4-20, first paragraph, first sentence under "Supermarket Loading Dock and Other Delivery Operations" subheading revised as follows:

> The project would result in truck deliveries to the Safeway store, the retail shops, and the fueling center. The proposed site plan includes a two-truck depressed loading dock at the south~~east~~west corner of the Safeway store and an at-grade loading zone for small to medium-sized trucks near the center of the south side of the Safeway store.

Page 4.4-21, Mitigation Measure 4.4.2c revised as follows:

> MM 4.4.2b To ensure noise from delivery trucks traveling along the truck entry lane or unloading does not exceed the Town of Paradise's nighttime limit, the speed limit on the truck entry lane shall be limited to 5 miles per hour. This

requirement shall be included as a condition of approval. The applicant shall post signage that specifies the maximum speed limit (5 mph) restriction; the signage shall be posted at the northern driveway entrance to the truck delivery lane and along the lane on the west side leading to the delivery area. The Town shall establish a mechanism for adjacent residents to report concerns with truck delivery and loading dock noise and/or violations of the speed limit restrictions, and to require the applicant to remedy the situation, as necessary. Mitigation measure MM 4.2.3~~e~~d shall also be implemented, which requires electrical hookups at the loading dock for truck refrigeration units.

SECTION 6.0, ALTERNATIVES

Page 6.0-6, last paragraph, fifth sentence revised as follows:

> … As shown, although the delay would decrease at intersections under Existing plus Reduced Project conditions, the LOS for each study intersection would be the same as the proposed project. All intersections would operate acceptably, and the impact would be less than significant, identical to the proposed project. Under cumulative conditions, even though this alternative would have fewer trips, the Skyway/Elliott Road intersection would operate at LOS ~~[TBD]~~ E during PM peak-hour conditions under this alternative, which would be a significant impact (Traffic Works 2017b).

APPENDIX E (TRANSPORTATION IMPACT STUDY)

The Traffic Impact Analysis (Appendix D of the Draft EIR) inadvertently duplicated the two traffic volume figures: Figure 3 (Baseline AM Peak Traffic Volumes) and Figure 5 (2040 Baseline AM Peak Traffic Volumes). The location of study intersection 6 was also shown incorrectly on Figures 3 through 12. All revised figures are included in Appendix A to this Final EIR. These figures were not included in the Draft EIR. This revision is editorial only and does not affect the analysis or conclusions in the Draft EIR.

TABLE ES-1: SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES [PAGES ES-17 THROUGH ES-22]

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance After Mitigation
Mitigation Measures Included in Initial Study (Appendix B)			
Biological Resources			
Potential disturbance of nesting/breeding birds during construction.	Potentially significant	**MM 2.4.1** If clearing and/or construction activities would occur during the bird breeding season (typically January through July for raptors and February 15 through August 15 for other birds), preconstruction surveys to identify active nests shall be conducted within 3 days of construction initiation, particularly vegetation clearing and ground-disturbing activities. Surveys must be performed by a qualified biologist for the purposes of determining presence/absence of active nest sites within the proposed impact area, including construction access routes and a 500-foot buffer (if feasible). If no active nests are found, no further mitigation is required. Surveys shall be repeated if relevant construction activities are delayed or postponed. **MM 2.4.2** If an active nest is located during preconstruction surveys, construction activities shall be restricted as necessary to avoid disturbance of the nest until it is deemed inactive by a qualified biologist. Restrictions shall include establishment of exclusion zones (no ingress of personnel or equipment) at a minimum radius of 300 feet around an active raptor nest and 100 feet around other active bird nest(s). Activities permitted within exclusion zones and the size may be adjusted through consultation with the CDFW. **MM 2.4.3** Vegetation containing active nests that must be removed as part of the project shall be removed during the non-breeding season (August 16 through December 31), but only provided that the nest(s) are confirmed no longer active.	Less than significant
Potential disturbance of roosting bats during demolition and site preparation activities	Potentially significant	**MM 2.4.4** Construction-related activities shall occur only during daylight hours. **MM 2.4.5** Prior to the removal of any trees or buildings, a bat survey shall be performed by a qualified biologist between March 1 and July 31. If bat roosts are identified, the Town shall require that the bats be safely flushed from the sites where	Less than significant

TABLE ES-1: SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES [PAGES ES-17 THROUGH ES-22]

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance After Mitigation
		roosting habitat is planned to be removed prior to roosting season (typically May to August) and prior to the onset of construction activities. If maternity roosts are identified during the maternity roosting season (typically May to September), they must remain undisturbed until a qualified biologist has determined the young bats are no longer roosting. If roosting is found to occur on-site, replacement roost habitat (e.g., bat boxes) shall be provided to offset roosting sites removed. If no bat roosts are detected, no further action is required if the trees are removed or the vacant building are demolished prior to the next breeding season. If removal/demolition is delayed, an additional survey shall be conducted 30 days prior to removal/demolition to ensure that a new colony has not established itself. **MM 2.4.6** If a female or maternity colony of bats are found in trees on the project site, and the project can be constructed without the elimination or disturbance of the roosting colony (e.g., if the colony roosts in a large tree not planned for removal), a qualified biologist shall determine what buffer zones will be employed to ensure the continued success of the colony. Such buffer zones may include a construction-free barrier of 200 feet from the roost and/or the timing of the construction activities outside of the maternity roosting season (after July 31 and before March 1). **MM 2.4.7** If an active nursery roost is documented on-site and demolition and/or tree removal cannot be performed outside of the maternity roosting season, bats shall be excluded from the site after July 31 and before March 1 to prevent the formation of maternity colonies. Nonbreeding bats shall be safely evicted, under the direction of a bat specialist in coordination with the CDFW.	
Cultural Resources			
Potential discovery of previously unidentified cultural resources, tribal cultural resources, paleontological resources, and/or human remains	Potentially significant	**MM 2.5.1** Treatment of previously unidentified archaeological and paleontological deposits. Construction personnel involved in excavation and grading activities shall be	Less than significant

TABLE ES-1: SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES [PAGES ES-17 THROUGH ES-22]

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance After Mitigation
		informed of the possibility of discovering archaeological or paleontological resources at any location and the protocol to be followed if resources are found. The Town shall ensure the grading plan notes include specific reference to the potential discovery of such resources. If prehistoric or historical archaeological deposits are discovered during construction, the project applicant and/or contractor shall stop all work within 25 feet of the discovery and an archaeologist shall assess the situation, consult with agencies as appropriate, and make recommendations regarding the treatment of the discovery. The project applicant and/or contractor shall avoid impacts to archaeological deposits to the extent feasible, but if such impacts cannot be avoided, the deposits shall be evaluated for their California Register eligibility. If the deposit is not eligible for the California Register, no further protection of the finds is necessary. If the deposits are California Register eligible, they shall be protected from project-related impacts, or such impacts shall be mitigated. Mitigation may consist of but is not necessarily limited to systematic recovery and analysis of archaeological deposits, recording the resource, preparation of a report of findings, and accessioning recovered archaeological materials at an appropriate curation facility. Public educational outreach may also be appropriate. If potentially unique paleontological resources (fossils) are discovered during project construction, work shall be halted immediately within 25 feet of the discovery, the Town shall be notified, and a professional paleontologist shall be retained to determine the significance of the discovery. The paleontologist shall establish procedures for paleontological resource surveillance throughout project construction and for temporarily halting or redirecting work to permit sampling, identification, and evaluation of fossils. These procedures shall be implemented throughout project construction. Excavated finds shall be offered to a State-designated repository such as the Museum of Paleontology at the University of California, Berkeley or the California Academy of Sciences, or to California State	

TABLE ES-1: SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES [PAGES ES-17 THROUGH ES-22]

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance After Mitigation
		University, Chico. **MM 2.5.2** Treatment of previously unidentified human remains. The project applicant and/or contractor shall treat any human remains encountered during ground-disturbing activities in accordance with California Health and Safety Code Section 7050.5. There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the Butte County coroner has determined the manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation or to his or her authorized representative. At the same time, an archaeologist shall be contacted to assess the situation and consult with agencies as appropriate. Project personnel/construction workers shall not collect or move any human remains and associated materials. If the human remains are of Native American origin, the coroner must notify the Native American Heritage Commission within 24 hours of this identification. The Native American Heritage Commission will identify a Native American most likely descendant to inspect the site and provide recommendations for the proper treatment of the remains and associated grave goods.	
Geology and Soils			
Seismic and soils hazards	Potentially significant	**MM 2.6.1** The project applicant shall prepare and submit a final, design-level geotechnical report to the Town of Paradise. The project's grading and building plans shall demonstrate that they incorporate all applicable recommendations of the design-level geotechnical study and comply with all applicable requirements of the latest adopted version of the California Building Standards Code. A licensed professional engineer shall prepare the plans, including those that pertain to seismic safety, soil engineering, cut/fill, structural foundations, pipeline excavation, and installation. All on-site soil engineer activities shall be conducted under the supervision of a licensed	Less than significant

TABLE ES-1: SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES [PAGES ES-17 THROUGH ES-22]

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance After Mitigation
		geotechnical engineer or certified engineering geologist.	
Hazards and Hazardous Materials			
Potential to encounter contaminated soils	Potentially significant	**MM 2.8.1** In accordance with the recommendations of the Phase I ESA prepared for the project site, the project applicant shall have a qualified environmental professional perform a limited subsurface investigation of all RECs and significant data gaps identified in the Phase I ESA. The limited subsurface investigation shall include, at a minimum, soil sampling and laboratory testing to determine the presence of contaminants, a determination of whether contaminant levels exceed any applicable public standards, and recommendations to address contaminants of concern. Should the limited subsurface investigation identify contamination or contamination be discovered during site development, a Risk Management Plan shall be prepared and implemented that (1) identifies the contaminants of concern and the potential risk each contaminant would pose to human health and the environment during construction and post-development and (2) describes measures to be taken to protect workers and the public from exposure to potential site hazards. Measures could include options such as physical site controls during construction, remediation, long-term monitoring, post-development maintenance or access limitations, or some combination thereof. Depending on the nature of contamination, if any, appropriate agencies shall be notified (e.g., Town of Paradise Fire Department). If needed, a Site Health and Safety Plan that meets Occupational Safety and Health Administration (OSHA) requirements shall be prepared and in place prior to commencement of work in any contaminated area.	Less than significant

TABLE ES-1: SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES [PAGES ES-17 THROUGH ES-22]

Impact	Level of Significance Without Mitigation	Mitigation Measures	Level of Significance After Mitigation
Wildland fire hazards	Potentially significant	**MM 2.8.2** Prior to issuance of a building permit, the project applicant shall submit documentation from the Paradise Irrigation District verifying that the project's water system is capable of meeting the minimum fire flows required by the Town of Paradise Fire Marshal. If the system is not capable of meeting the required fire flows, the project applicant shall submit documentation showing the approved water system improvement plans to upgrade the existing system and detailing the financial arrangements to fund the necessary improvements.	Less than significant

APPENDIX A

SUPPLEMENTAL TRANSPORTATION IMPACT STUDY (MAY 2018)
AND
TRANSPORTATION IMPACT STUDY (SEPTEMBER 2017) REVISED FIGURES

TRAFFIC WORKS LLC

Traffic Engineering, Transportation Planning & Forensic Services

May 16, 2018

To: Alice Tackett, Michael Baker International

From: Loren Chilson, PE, Traffic Works

Transportation Impact Study Supplement
Black Olive Village - Pearson Road / Clark Road (SR 191) Intersection

This letter serves as a supplement to the Transportation Impact Study titled "*Transportation Impact Study for Black Olive Village*" dated September 18, 2017. This letter summarizes additional traffic operations analysis and impact evaluation conducted specifically for the Pearson Road/Clark Road (SR 191) intersection.

Please refer to the "*Transportation Impact Study for Black Olive Village*" dated September 18, 2017 for a complete discussion of the "proposed project" description related to traffic elements, analysis methods used, significance criteria and thresholds, the roadway network, and all other background transportation items, as this supplement is limited to an examination of only the Pearson Road/Clark Road intersection.

BASELINE CONDITIONS

Intersection Configuration

The current configuration of the Pearson Road/Clark Road intersection is shown in attached **Figure 1**. The intersection is controlled by a traffic signal with protected left-turn phasing on all approaches. Traffic signal phasing and splits were observed in the field and found to be consistent with the current signal timing schemes provided by Caltrans for this evaluation. The south leg of the intersection (Clark Road) is part of SR 191, with the Caltrans facility terminating at Pearson Road. It is important to note that the outside (right-most) lane on the southbound approach is striped as a through/right-turn lane. However, the lane is 20 feet wide and clearly functions as two lanes, a through and separate right turn. For the purposes of this analysis, a separate right-turn lane was used in the computations and analysis.

Traffic Volumes

New AM and PM peak hour traffic volumes were collected on an average mid-week day in April 2018 with local schools in regular session. The existing peak hour intersection traffic volumes are shown in attached **Figure 1**.

Intersection Level of Service

Level of service calculations were performed using the current traffic volumes, Peak Hour Factors (PHF), lane configurations, and existing signal timing. The results are presented in **Table 1** and the calculation sheets are provided in **Appendix A**.

Table 1: Baseline Conditions Intersection Level of Service Summary

Intersection	Control	Existing AM		Existing PM	
		Delay[1]	LOS	Delay[1]	LOS
Pearson Road / Clark Road	Signal	49.6	D	47.1	D

Notes: 1. Delay is reported in seconds per vehicle for the overall intersection for signalized intersections.
Source: Traffic Works, 2018

As shown in **Table 1**, the subject intersection currently operates at acceptable levels of service (LOS "D") during both the AM and PM peak hours.

BASELINE PLUS PROJECT CONDITIONS

Traffic Volumes

Baseline Plus Project traffic volumes were developed by adding the project generated trips assigned to Pearson Road in the *Black Olive Village Transportation Impact Study* (Traffic Works, 2017) to the baseline traffic volumes. The project trips assigned to/from Pearson Road east of Skyway were distributed to the intersection approaches and departures based on the following trip distribution percentages:

- 40% travelling to/from the north on Clark Road (12% of the total external project trips)
- 40% travelling to/from the east on Pearson Rd (12% of the total external project trips)
- 20% travelling to/from the South on Clark Road (6% of the total external project trips)

The Baseline Plus Project condition Peak Hour Factors, travel patterns, signal timings, and lane configurations were assumed to remain the same as under current conditions. Trips generated by the project and assigned to the intersection are shown in **Figure 2** and the Baseline Plus Project scenario traffic volumes and controls are shown in **Figure 3**.

Intersection Level of Service

Table 2 presents the level of service analysis summary for the Baseline Plus Project scenario. Detailed calculation sheets are provided in **Appendix B**.

Table 2: Baseline Plus Project Intersection Level of Service Summary

Intersection	Control	Plus Project AM		Plus Project PM	
		Delay[1]	LOS	Delay[1]	LOS
Pearson Road / Clark Road (Overall)	Signal	51.3	D	50.5	D

Notes: 1. Delay is reported in seconds per vehicle for the overall intersection for signalized intersections.
Source: Traffic Works, 2018

With the addition of the project traffic, the study intersection is anticipated to operate at acceptable levels of service (LOS "D") during both the AM and PM peak hours.

2040 CUMULATIVE CONDITIONS

Intersection Configuration

Based on the Caltrans *SR 191 Transportation Concept Report, June 2017 (SR 191 TCR)*, no vehicular capacity improvements are planned at the Pearson Road/Clark Road intersection in the 20 year horizon. There is a conceptual project for the addition of Class II bicycle lanes on SR 191 from Pearson Road to the Town limits. Therefore, the only adjustment anticipated at the intersection is the re-optimization of traffic signal timings, as a maintenance task, as traffic volumes change over the next 20 years.

Traffic Volumes

2040 Cumulative Condition traffic volumes were developed by increasing the current traffic volumes by 35% over an approximately 20 year period consistent with the projections outlined in the SR 191 TCR. It should be noted that a 1.75% annual growth rate is very aggressive and provides a conservative analysis for the Town of Paradise and neighboring communities. The 35% growth was applied to every turning movement at the intersection to again provide a conservative analysis. The resulting 2040 Cumulative Condition traffic volumes are shown in **Figure 1**, attached.

Intersection Level of Service

2040 Cumulative Conditions level of service was calculated using the 2040 Cumulative traffic volumes and traffic signal timing parameters consistent with what is in place today, but with re-optimized green times. **Table 3** summarizes the 2040 Cumulative Conditions level of service analysis. Detailed calculation sheets are provided in **Appendix C**, attached.

Table 3: 2040 Cumulative Conditions Intersection Level of Service Summary

Intersection	Control	2040 AM		2040 PM	
		Delay[1]	LOS	Delay[1]	LOS
Pearson Road / Clark Road (Overall)	Signal	D	50.2	D	51.4

Notes: 1. Delay is reported in seconds per vehicle for the overall intersection for signalized intersections.
Source: Traffic Works, 2018

As shown in **Table 3**, under the 2040 Cumulative Conditions, the Pearson Road/Clark Road intersection is anticipated to operate at acceptable levels of service for the 20 year horizon.

2040 CUMULATIVE PLUS PROJECT CONDITIONS

Traffic Volumes

2040 Cumulative Plus Project traffic volumes were developed by adding the project generated trips, shown in **Figure 2**, to the 2040 Cumulative Condition traffic volumes.

Intersection Level of Service

The 2040 Cumulative Plus Project condition lane configurations, controls, and analysis parameters were assumed to remain the same as under 2040 Cumulative Conditions.

Table 4 presents the level of service analysis summary for the 2040 Cumulative Plus Project scenario. Detailed calculation sheets are provided in **Appendix D**.

Table 4: 2040 Cumulative Plus Project Conditions Intersection Level of Service Summary

Intersection	Control	2040 Plus Project AM		2040 Plus Project PM	
		Delay[1]	LOS	Delay[1]	LOS
Pearson Road / Clark Road (Overall)	Signal	D	52.5	D	53.1

Notes: 1. Delay is reported in seconds per vehicle for the overall intersection for signalized intersections.
Source: Traffic Works, 2018

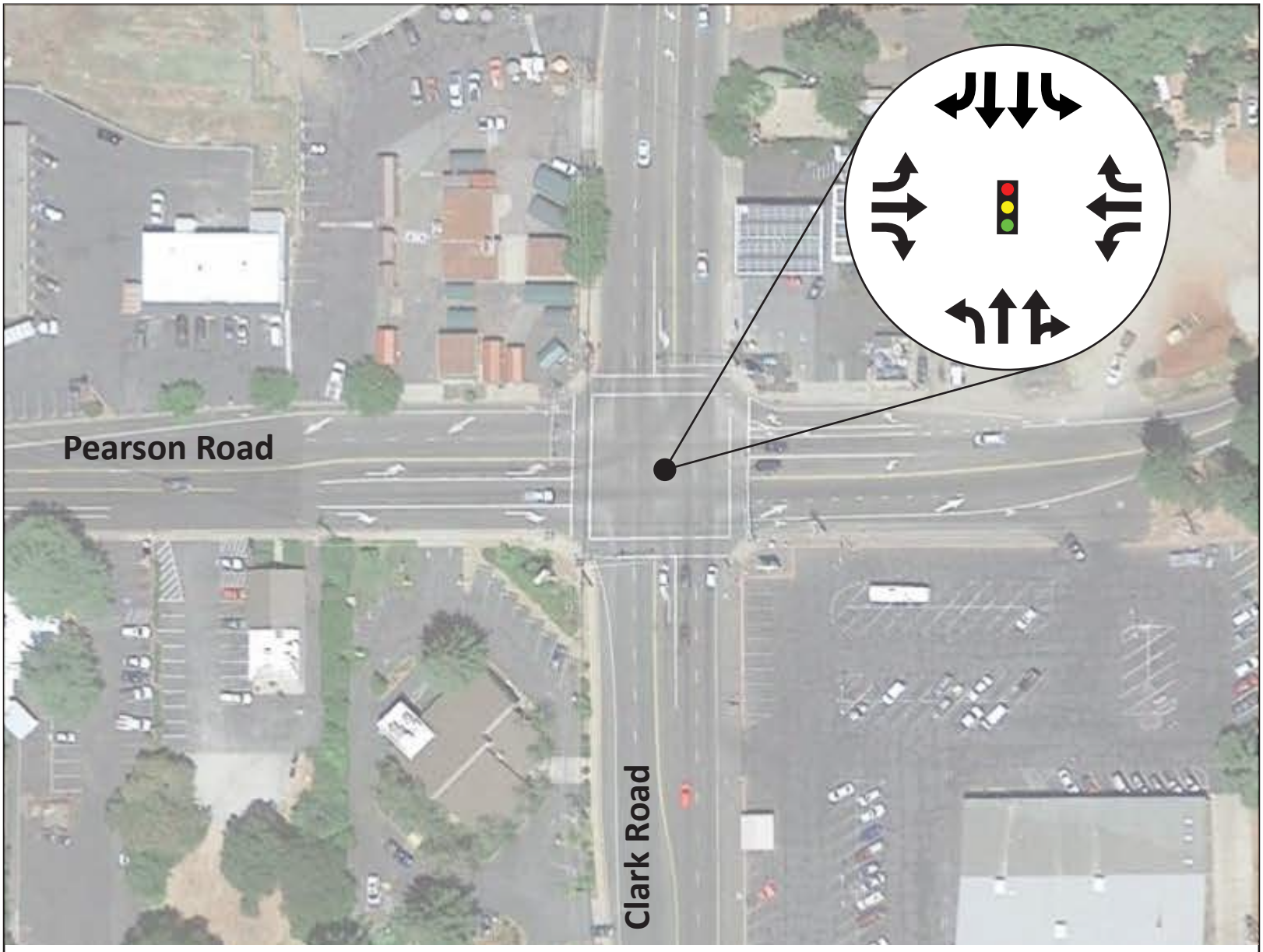
The subject intersection is anticipated to operate at acceptable LOS "D" through the 20 year horizon with the project traffic.

IMPACT EVALUATION

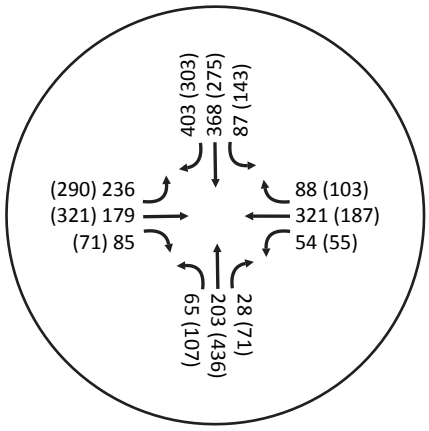
As described in detail within the *Transportation Impact Study for Black Olive Village,* the Town of Paradise strives to maintain Level of Service "D" at Town managed intersections.

As stated in the SR 191 TCR, Caltrans District 3 accepts concept LOS "E" for route segments in urban areas. Since SR 191 is anticipated to operate within LOS "E" over the 20 year horizon, no improvements are planned by Caltrans.

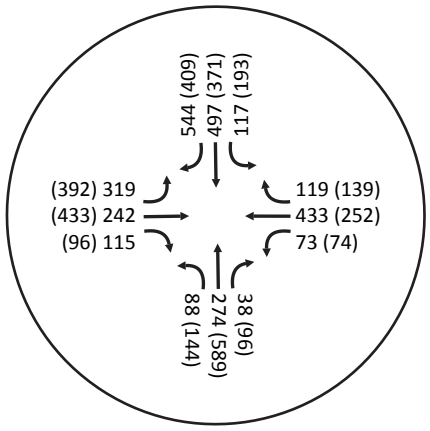
The Pearson Road/Clark Road intersection is anticipated to operate within Town of Paradise and Caltrans operational policies in each study scenario, therefore the project impact at this intersection is considered less-than-significant.



Baseline



2040 Cumulative



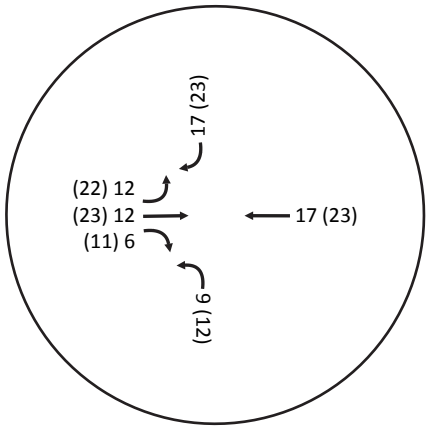
AM Peak Hour Volume (PM Peak Hour Volume)

TRAFFIC WORKS LLC

NO SCALE

Figure 1

Pearson Road & Clark Road
TRANSPORTATION IMPACT STUDY SUPPLEMENT
Traffic Volumes and Controls



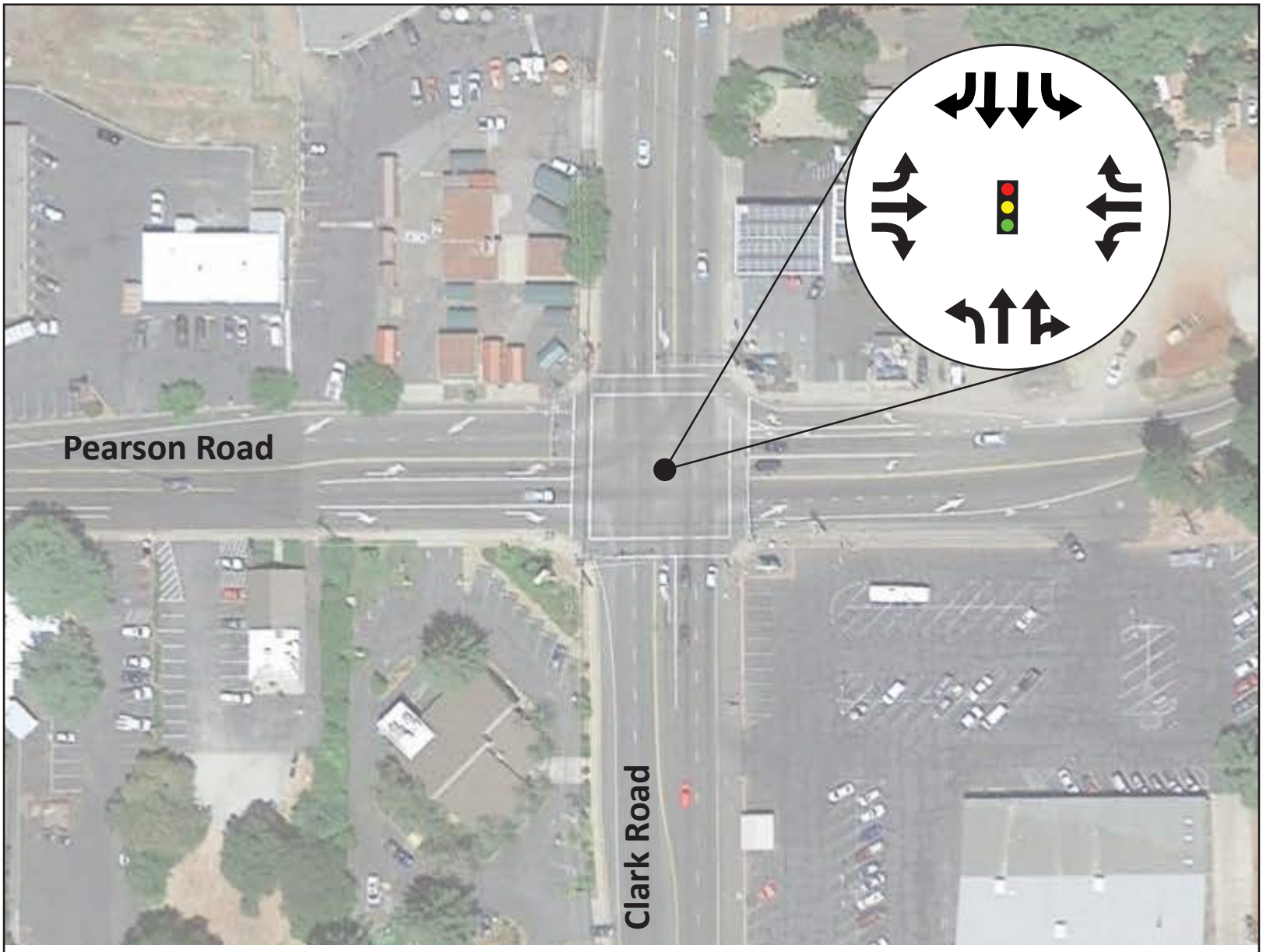
AM Peak Hour Volume (PM Peak Hour Volume)

TRAFFIC WORKS LLC

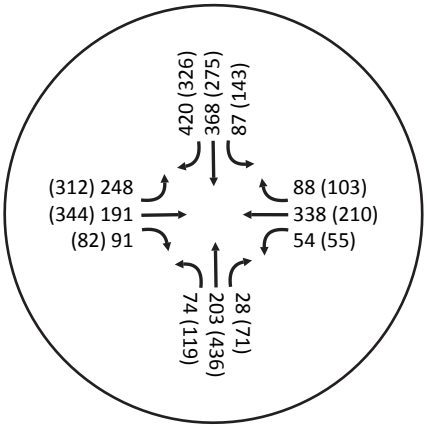
NO SCALE

Figure 2

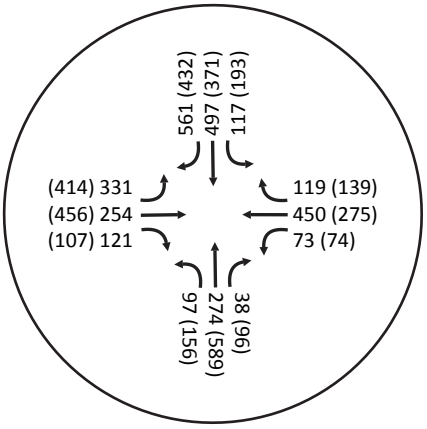
Pearson Road & Clark Road
TRANSPORTATION IMPACT STUDY SUPPLEMENT
Project Trips



Baseline Plus Project



2040 Cumulative Plus Project



AM Peak Hour Volume (PM Peak Hour Volume)

TRAFFIC WORKS LLC

NO SCALE

Figure 3

Pearson Road & Clark Road
TRANSPORTATION IMPACT STUDY SUPPLEMENT
Plus Project Traffic Volumes and Controls

Appendix A
Baseline LOS Calculations

Intersection Level Of Service Report
Intersection 1: Pearson Rd / Clark Rd

Control Type:	Signalized	Delay (sec / veh):	49.6
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.534

Intersection Setup

Name	Clark Rd			Clark Rd			Pearson Rd			Pearson Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	90.00	100.00	100.00	75.00	100.00	50.00	150.00	100.00	150.00	95.00	100.00	95.00
Speed [mph]	35.00			35.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Clark Rd			Clark Rd			Pearson Rd			Pearson Rd		
Base Volume Input [veh/h]	65	203	28	87	368	403	236	179	85	54	321	88
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	14	0	0	209	0	0	44	0	0	46
Total Hourly Volume [veh/h]	65	203	14	87	368	194	236	179	41	54	321	42
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	18	58	4	25	105	55	67	51	12	15	91	12
Total Analysis Volume [veh/h]	74	231	16	99	418	220	268	203	47	61	365	48
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	2			3			3			3		
v_di, Inbound Pedestrian Volume crossing m	3			3			2			3		
v_co, Outbound Pedestrian Volume crossing	5			0			0			2		
v_ci, Inbound Pedestrian Volume crossing mi	2			0			0			5		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			1			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	137
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	8	6	0	8	6	0	8	4	0	8	4	0
Maximum Green [s]	25	35	0	25	35	0	25	30	0	25	30	0
Amber [s]	3.7	4.4	0.0	3.7	4.4	0.0	3.6	4.4	0.0	3.6	4.4	0.0
All red [s]	1.3	1.6	0.0	1.3	1.6	0.0	1.4	1.6	0.0	1.4	1.6	0.0
Split [s]	30	41	0	30	41	0	30	36	0	30	36	0
Vehicle Extension [s]	2.5	1.5	0.0	2.5	1.5	0.0	2.5	1.0	0.0	2.5	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	22	0	0	22	0	0	22	0	0	22	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	3.0	4.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	137	137	137	137	137	137	137	137	137	137	137	137
L, Total Lost Time per Cycle [s]	5.00	6.00	6.00	5.00	6.00	6.00	5.00	6.00	6.00	5.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	4.00	4.00	3.00	4.00	4.00	3.00	4.00	4.00	3.00	4.00	4.00
g_i, Effective Green Time [s]	8	54	54	10	56	56	23	44	44	7	29	29
g / C, Green / Cycle	0.06	0.39	0.39	0.07	0.41	0.41	0.17	0.32	0.32	0.05	0.21	0.21
(v / s)_i Volume / Saturation Flow Rate	0.04	0.07	0.07	0.06	0.12	0.14	0.15	0.11	0.03	0.03	0.20	0.03
s, saturation flow rate [veh/h]	1752	1840	1796	1752	3503	1564	1752	1840	1537	1752	1840	1551
c, Capacity [veh/h]	98	723	706	123	1426	637	291	594	496	94	387	326
d1, Uniform Delay [s]	63.75	27.08	27.10	62.79	27.35	28.03	56.24	35.31	32.38	63.56	53.27	44.05
k, delay calibration	0.08	0.50	0.50	0.08	0.50	0.50	0.29	0.04	0.04	0.08	0.27	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.45	0.52	0.54	8.91	0.52	1.49	24.61	0.13	0.03	5.47	22.17	0.08
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.76	0.17	0.17	0.81	0.29	0.35	0.92	0.34	0.09	0.65	0.94	0.15
d, Delay for Lane Group [s/veh]	72.20	27.59	27.64	71.70	27.87	29.52	80.85	35.43	32.42	69.03	75.44	44.13
Lane Group LOS	E	C	C	E	C	C	F	D	C	E	E	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	2.77	2.77	2.74	3.69	4.72	5.24	11.05	5.19	1.10	2.22	14.65	1.34
50th-Percentile Queue Length [ft]	69.18	69.17	68.42	92.30	117.90	130.96	276.15	129.67	27.53	55.59	366.25	33.52
95th-Percentile Queue Length [veh]	4.98	4.98	4.93	6.65	8.28	8.99	16.50	8.92	1.98	4.00	20.93	2.41
95th-Percentile Queue Length [ft]	124.52	124.50	123.16	166.14	206.93	224.80	412.41	223.05	49.56	100.06	523.18	60.34

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	72.20	27.61	27.64	71.70	27.87	29.52	80.85	35.43	32.42	69.03	75.44	44.13
Movement LOS	E	C	C	E	C	C	F	D	C	E	E	D
d_A, Approach Delay [s/veh]	37.89			34.25			58.66			71.45		
Approach LOS	D			C			E			E		
d_I, Intersection Delay [s/veh]	49.59											
Intersection LOS	D											
Intersection V/C	0.534											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	-42.25	-36.21	-43.46	-27.86
M_CW, Crosswalk Circulation Area [ft²/ped]	-932.84	-792.97	0.00	-225.81
d_p, Pedestrian Delay [s]	57.94	57.94	57.94	57.94
l_p,int, Pedestrian LOS Score for Intersection	2.546	3.062	2.620	2.459
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	511	511	438	438
d_b, Bicycle Delay [s]	37.97	37.97	41.81	41.78
l_b,int, Bicycle LOS Score for Intersection	1.836	2.340	2.487	2.418
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 1: Pearson Rd / Clark Rd

Control Type:	Signalized	Delay (sec / veh):	47.1
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.490

Intersection Setup

Name	Clark Rd			Clark Rd			Pearson Rd			Pearson Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	90.00	100.00	100.00	75.00	100.00	50.00	150.00	100.00	150.00	95.00	100.00	95.00
Speed [mph]	35.00			35.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Clark Rd			Clark Rd			Pearson Rd			Pearson Rd		
Base Volume Input [veh/h]	107	436	71	143	275	303	290	321	71	55	187	103
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	37	0	0	157	0	0	37	0	0	53
Total Hourly Volume [veh/h]	107	436	34	143	275	146	290	321	34	55	187	50
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	28	114	9	37	72	38	76	84	9	14	49	13
Total Analysis Volume [veh/h]	111	454	35	149	286	152	302	334	35	57	195	52
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	1			3			0			4		
v_di, Inbound Pedestrian Volume crossing m	0			4			1			3		
v_co, Outbound Pedestrian Volume crossing	2			1			1			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			1			1			2		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	137
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	8	6	0	8	6	0	8	4	0	8	4	0
Maximum Green [s]	25	35	0	25	35	0	25	30	0	25	30	0
Amber [s]	3.7	4.4	0.0	3.7	4.4	0.0	3.6	4.4	0.0	3.6	4.4	0.0
All red [s]	1.3	1.6	0.0	1.3	1.6	0.0	1.4	1.6	0.0	1.4	1.6	0.0
Split [s]	30	41	0	30	41	0	30	36	0	30	36	0
Vehicle Extension [s]	2.5	1.5	0.0	2.5	1.5	0.0	2.5	1.0	0.0	2.5	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	22	0	0	22	0	0	22	0	0	22	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	3.0	4.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	137	137	137	137	137	137	137	137	137	137	137	137
L, Total Lost Time per Cycle [s]	5.00	6.00	6.00	5.00	6.00	6.00	5.00	6.00	6.00	5.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	4.00	4.00	3.00	4.00	4.00	3.00	4.00	4.00	3.00	4.00	4.00
g_i, Effective Green Time [s]	10	59	59	13	62	62	25	35	35	7	18	18
g / C, Green / Cycle	0.08	0.43	0.43	0.10	0.45	0.45	0.18	0.26	0.26	0.05	0.13	0.13
(v / s)_i Volume / Saturation Flow Rate	0.06	0.13	0.13	0.08	0.08	0.10	0.17	0.18	0.02	0.03	0.10	0.03
s, saturation flow rate [veh/h]	1781	1870	1823	1781	3560	1586	1781	1870	1588	1781	1870	1564
c, Capacity [veh/h]	136	806	785	175	1611	718	324	482	409	94	241	201
d1, Uniform Delay [s]	62.33	25.58	25.59	60.80	22.32	22.70	55.23	45.94	38.58	63.50	58.04	53.75
k, delay calibration	0.08	0.50	0.50	0.08	0.50	0.50	0.36	0.04	0.04	0.08	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.59	0.99	1.02	8.48	0.24	0.67	28.46	0.67	0.03	4.62	2.47	0.25
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.82	0.31	0.31	0.85	0.18	0.21	0.93	0.69	0.09	0.61	0.81	0.26
d, Delay for Lane Group [s/veh]	70.92	26.56	26.61	69.28	22.56	23.37	83.69	46.61	38.62	68.12	60.52	54.00
Lane Group LOS	E	C	C	E	C	C	F	D	D	E	E	D
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	4.12	5.50	5.39	5.49	2.81	3.11	12.75	10.31	0.90	2.06	6.71	1.63
50th-Percentile Queue Length [ft]	102.96	137.49	134.79	137.19	70.17	77.74	318.79	257.63	22.57	51.53	167.69	40.73
95th-Percentile Queue Length [veh]	7.41	9.35	9.20	9.33	5.05	5.60	18.61	15.57	1.63	3.71	10.95	2.93
95th-Percentile Queue Length [ft]	185.33	233.64	229.99	233.23	126.30	139.93	465.20	389.25	40.63	92.76	273.87	73.32

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.92	26.58	26.61	69.28	22.56	23.37	83.69	46.61	38.62	68.12	60.52	54.00
Movement LOS	E	C	C	E	C	C	F	D	D	E	E	D
d_A, Approach Delay [s/veh]	34.79			34.63			62.88			60.83		
Approach LOS	C			C			E			E		
d_I, Intersection Delay [s/veh]	47.12											
Intersection LOS	D											
Intersection V/C	0.490											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	-72.43	-32.19	-24.14	-32.19
M_CW, Crosswalk Circulation Area [ft²/ped]	-3489.69	-735.10	-7577.62	-1739.72
d_p, Pedestrian Delay [s]	57.94	57.94	57.94	57.94
l_p,int, Pedestrian LOS Score for Intersection	2.612	3.001	2.580	2.486
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	511	511	438	438
d_b, Bicycle Delay [s]	37.97	37.97	41.78	41.78
l_b,int, Bicycle LOS Score for Intersection	2.085	2.173	2.728	2.149
Bicycle LOS	B	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix B

Baseline Plus Project
LOS Calculations

Intersection Level Of Service Report
Intersection 1: Pearson Rd / Clark Rd

Control Type:	Signalized	Delay (sec / veh):	51.3
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.565

Intersection Setup

Name	Clark Rd			Clark Rd			Pearson Rd			Pearson Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	90.00	100.00	100.00	75.00	100.00	50.00	150.00	100.00	150.00	95.00	100.00	95.00
Speed [mph]	35.00			35.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Clark Rd			Clark Rd			Pearson Rd			Pearson Rd		
Base Volume Input [veh/h]	65	203	28	87	368	403	236	179	85	54	321	88
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	9	0	0	0	0	17	12	12	6	0	17	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	14	0	0	218	0	0	47	0	0	46
Total Hourly Volume [veh/h]	74	203	14	87	368	202	248	191	44	54	338	42
Peak Hour Factor	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800	0.8800
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	21	58	4	25	105	57	70	54	13	15	96	12
Total Analysis Volume [veh/h]	84	231	16	99	418	230	282	217	50	61	384	48
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	2			3			3			3		
v_di, Inbound Pedestrian Volume crossing m	3			3			2			3		
v_co, Outbound Pedestrian Volume crossing	5			0			0			2		
v_ci, Inbound Pedestrian Volume crossing mi	2			0			0			5		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			1			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	137
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	8	6	0	8	6	0	8	4	0	8	4	0
Maximum Green [s]	25	35	0	25	35	0	25	30	0	25	30	0
Amber [s]	3.7	4.4	0.0	3.7	4.4	0.0	3.6	4.4	0.0	3.6	4.4	0.0
All red [s]	1.3	1.6	0.0	1.3	1.6	0.0	1.4	1.6	0.0	1.4	1.6	0.0
Split [s]	30	41	0	30	41	0	30	36	0	30	36	0
Vehicle Extension [s]	2.5	1.5	0.0	2.5	1.5	0.0	2.5	1.0	0.0	2.5	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	22	0	0	22	0	0	22	0	0	22	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	3.0	4.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	137	137	137	137	137	137	137	137	137	137	137	137
L, Total Lost Time per Cycle [s]	5.00	6.00	6.00	5.00	6.00	6.00	5.00	6.00	6.00	5.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	4.00	4.00	3.00	4.00	4.00	3.00	4.00	4.00	3.00	4.00	4.00
g_i, Effective Green Time [s]	8	51	51	10	53	53	24	47	47	7	30	30
g / C, Green / Cycle	0.06	0.38	0.38	0.07	0.39	0.39	0.17	0.34	0.34	0.05	0.22	0.22
(v / s)_i Volume / Saturation Flow Rate	0.05	0.07	0.07	0.06	0.12	0.15	0.16	0.12	0.03	0.03	0.21	0.03
s, saturation flow rate [veh/h]	1752	1840	1796	1752	3503	1564	1752	1840	1537	1752	1840	1551
c, Capacity [veh/h]	106	691	674	123	1348	602	304	626	523	94	405	342
d1, Uniform Delay [s]	63.48	28.66	28.68	62.79	29.44	30.40	55.75	33.80	30.79	63.56	52.62	42.96
k, delay calibration	0.08	0.50	0.50	0.08	0.50	0.50	0.32	0.04	0.04	0.08	0.33	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	9.29	0.57	0.59	8.91	0.60	1.84	26.63	0.12	0.03	5.47	25.25	0.07
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.79	0.18	0.18	0.81	0.31	0.38	0.93	0.35	0.10	0.65	0.95	0.14
d, Delay for Lane Group [s/veh]	72.77	29.23	29.28	71.70	30.04	32.24	82.38	33.92	30.82	69.03	77.87	43.03
Lane Group LOS	E	C	C	E	C	C	F	C	C	E	E	D
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	3.15	2.86	2.83	3.69	4.93	5.78	11.77	5.43	1.14	2.22	15.73	1.32
50th-Percentile Queue Length [ft]	78.87	71.54	70.76	92.30	123.18	144.46	294.36	135.68	28.48	55.59	393.30	33.04
95th-Percentile Queue Length [veh]	5.68	5.15	5.09	6.65	8.57	9.72	17.40	9.25	2.05	4.00	22.24	2.38
95th-Percentile Queue Length [ft]	141.97	128.78	127.36	166.14	214.19	243.02	435.04	231.20	51.27	100.06	555.92	59.48

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	72.77	29.25	29.28	71.70	30.04	32.24	82.38	33.92	30.82	69.03	77.87	43.03
Movement LOS	E	C	C	E	C	C	F	C	C	E	E	D
d_A, Approach Delay [s/veh]	40.30			36.24			58.53			73.38		
Approach LOS	D			D			E			E		
d_I, Intersection Delay [s/veh]	51.28											
Intersection LOS	D											
Intersection V/C	0.565											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	-42.25	-36.21	-43.46	-27.86
M_CW, Crosswalk Circulation Area [ft²/ped]	-992.38	-792.97	0.00	-225.81
d_p, Pedestrian Delay [s]	57.94	57.94	57.94	57.94
l_p,int, Pedestrian LOS Score for Intersection	2.549	3.081	2.648	2.468
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	511	511	438	438
d_b, Bicycle Delay [s]	37.97	37.97	41.81	41.78
l_b,int, Bicycle LOS Score for Intersection	1.844	2.356	2.543	2.449
Bicycle LOS	A	B	B	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Intersection Level Of Service Report
Intersection 1: Pearson Rd / Clark Rd

Control Type:	Signalized	Delay (sec / veh):	50.5
Analysis Method:	HCM 6th Edition	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.516

Intersection Setup

Name	Clark Rd			Clark Rd			Pearson Rd			Pearson Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	0	1	0	1	1	0	1	1	0	1
Pocket Length [ft]	90.00	100.00	100.00	75.00	100.00	50.00	150.00	100.00	150.00	95.00	100.00	95.00
Speed [mph]	35.00			35.00			35.00			35.00		
Grade [%]	0.00			0.00			0.00			0.00		
Curb Present	No			No			No			No		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name	Clark Rd			Clark Rd			Pearson Rd			Pearson Rd		
Base Volume Input [veh/h]	107	436	71	143	275	303	290	321	71	55	187	103
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Rate	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	12	0	0	0	0	23	22	23	11	0	23	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Right-Turn on Red Volume [veh/h]	0	0	37	0	0	170	0	0	43	0	0	53
Total Hourly Volume [veh/h]	119	436	34	143	275	156	312	344	39	55	210	50
Peak Hour Factor	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600	0.9600
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	114	9	37	72	41	81	90	10	14	55	13
Total Analysis Volume [veh/h]	124	454	35	149	286	163	325	358	41	57	219	52
Presence of On-Street Parking	No		No	No		No	No		No	No		No
On-Street Parking Maneuver Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
Local Bus Stopping Rate [/h]	0	0	0	0	0	0	0	0	0	0	0	0
v_do, Outbound Pedestrian Volume crossing	1			3			0			4		
v_di, Inbound Pedestrian Volume crossing m	0			4			1			3		
v_co, Outbound Pedestrian Volume crossing	2			1			1			0		
v_ci, Inbound Pedestrian Volume crossing mi	0			1			1			2		
v_ab, Corner Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Located in CBD	No
Signal Coordination Group	-
Cycle Length [s]	137
Coordination Type	Time of Day Pattern Isolated
Actuation Type	Fully actuated
Offset [s]	0.0
Offset Reference	LeadGreen
Permissive Mode	SingleBand
Lost time [s]	0.00

Phasing & Timing

Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	8	6	0	8	6	0	8	4	0	8	4	0
Maximum Green [s]	25	35	0	25	35	0	25	30	0	25	30	0
Amber [s]	3.7	4.4	0.0	3.7	4.4	0.0	3.6	4.4	0.0	3.6	4.4	0.0
All red [s]	1.3	1.6	0.0	1.3	1.6	0.0	1.4	1.6	0.0	1.4	1.6	0.0
Split [s]	30	41	0	30	41	0	30	36	0	30	36	0
Vehicle Extension [s]	2.5	1.5	0.0	2.5	1.5	0.0	2.5	1.0	0.0	2.5	1.0	0.0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	22	0	0	22	0	0	22	0	0	22	0
Rest In Walk		No			No			No			No	
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
I2, Clearance Lost Time [s]	3.0	4.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0	3.0	4.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Detector Location [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector Length [ft]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Exclusive Pedestrian Phase

Pedestrian Signal Group	0
Pedestrian Walk [s]	0
Pedestrian Clearance [s]	0

Lane Group Calculations

Lane Group	L	C	C	L	C	R	L	C	R	L	C	R
C, Cycle Length [s]	137	137	137	137	137	137	137	137	137	137	137	137
L, Total Lost Time per Cycle [s]	5.00	6.00	6.00	5.00	6.00	6.00	5.00	6.00	6.00	5.00	6.00	6.00
l1_p, Permitted Start-Up Lost Time [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
l2, Clearance Lost Time [s]	3.00	4.00	4.00	3.00	4.00	4.00	3.00	4.00	4.00	3.00	4.00	4.00
g_i, Effective Green Time [s]	11	57	57	13	59	59	25	37	37	7	19	19
g / C, Green / Cycle	0.08	0.42	0.42	0.10	0.43	0.43	0.18	0.27	0.27	0.05	0.14	0.14
(v / s)_i Volume / Saturation Flow Rate	0.07	0.13	0.13	0.08	0.08	0.10	0.18	0.19	0.03	0.03	0.12	0.03
s, saturation flow rate [veh/h]	1781	1870	1823	1781	3560	1586	1781	1870	1588	1781	1870	1566
c, Capacity [veh/h]	149	784	764	175	1543	687	325	504	428	94	261	219
d1, Uniform Delay [s]	61.80	26.64	26.66	60.80	23.92	24.51	56.00	45.20	37.52	63.50	57.41	52.40
k, delay calibration	0.08	0.50	0.50	0.08	0.50	0.50	0.41	0.05	0.04	0.08	0.04	0.04
I, Upstream Filtering Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
d2, Incremental Delay [s]	8.51	1.05	1.09	8.48	0.27	0.81	45.22	0.82	0.04	4.62	2.74	0.20
d3, Initial Queue Delay [s]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Rp, platoon ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
PF, progression factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Lane Group Results

X, volume / capacity	0.83	0.32	0.32	0.85	0.19	0.24	1.00	0.71	0.10	0.61	0.84	0.24
d, Delay for Lane Group [s/veh]	70.30	27.70	27.75	69.28	24.19	25.33	101.22	46.03	37.55	68.12	60.15	52.60
Lane Group LOS	E	C	C	E	C	C	F	D	D	E	E	D
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No
50th-Percentile Queue Length [veh]	4.59	5.64	5.52	5.49	2.92	3.50	15.21	11.04	1.04	2.06	7.55	1.61
50th-Percentile Queue Length [ft]	114.66	140.93	138.12	137.19	73.11	87.61	380.33	276.00	26.07	51.53	188.72	40.13
95th-Percentile Queue Length [veh]	8.10	9.53	9.38	9.33	5.26	6.31	21.61	16.49	1.88	3.71	12.05	2.89
95th-Percentile Queue Length [ft]	202.46	238.27	234.49	233.23	131.59	157.71	540.26	412.22	46.92	92.76	301.37	72.24

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.30	27.72	27.75	69.28	24.19	25.33	101.22	46.03	37.55	68.12	60.15	52.60
Movement LOS	E	C	C	E	C	C	F	D	D	E	E	D
d_A, Approach Delay [s/veh]	36.34			35.73			70.32			60.34		
Approach LOS	D			D			E			E		
d_I, Intersection Delay [s/veh]	50.53											
Intersection LOS	D											
Intersection V/C	0.516											

Other Modes

g_Walk,mi, Effective Walk Time [s]	11.0	11.0	11.0	11.0
M_corner, Corner Circulation Area [ft²/ped]	-72.43	-32.19	-24.14	-32.19
M_CW, Crosswalk Circulation Area [ft²/ped]	-4087.93	-735.10	-8126.00	-1739.72
d_p, Pedestrian Delay [s]	57.94	57.94	57.94	57.94
l_p,int, Pedestrian LOS Score for Intersection	2.618	3.028	2.623	2.500
Crosswalk LOS	B	C	B	B
s_b, Saturation Flow Rate of the bicycle lane	2000	2000	2000	2000
c_b, Capacity of the bicycle lane [bicycles/h]	511	511	438	438
d_b, Bicycle Delay [s]	37.97	37.97	41.78	41.78
l_b,int, Bicycle LOS Score for Intersection	2.096	2.193	2.825	2.188
Bicycle LOS	B	B	C	B

Sequence

Ring 1	1	2	3	4	-	-	-	-	-	-	-	-	-	-	-	-
Ring 2	5	6	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Ring 3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ring 4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix C
2040 Cumulative
LOS Calculations

Option 1: Optimized Signal Timing

Number	1											
Intersection	Pearson Rd / Clark Rd											
Control Type	Signalized											
Analysis Method	HCM 6th Edition											
Name	Clark Rd			Clark Rd			Pearson Rd			Pearson Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Base Volume Input [veh/h]	65	203	28	87	368	403	236	179	85	54	321	88
Total Analysis Volume [veh/h]	96	298	20	127	540	284	347	263	60	79	471	62

Intersection Settings

Cycle Length [s]	120											
Coordination Type	Time of Day Pattern Isolated											
Actuation Type	Fully actuated											
Lost time [s]	0.00											
Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	8	6	0	8	6	0	8	4	0	8	4	0
Maximum Green [s]	25	35	0	25	35	0	25	30	0	25	30	0
Amber [s]	3.7	4.4	0.0	3.7	4.4	0.0	3.6	4.4	0.0	3.6	4.4	0.0
All red [s]	1.3	1.6	0.0	1.3	1.6	0.0	1.4	1.6	0.0	1.4	1.6	0.0
Split [s]	13	35	0	15	37	0	31	51	0	19	39	0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	22	0	0	22	0	0	22	0	0	22	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

g / C, Green / Cycle	0.07	0.25	0.25	0.08	0.27	0.27	0.21	0.42	0.42	0.06	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.05	0.09	0.09	0.07	0.15	0.18	0.20	0.14	0.04	0.05	0.26	0.04
so, Base Saturation Flow per Lane [veh/h/ln]	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Arrival type	3			3			3			3		
s, saturation flow rate [veh/h]	1752	1840	1796	1752	3503	1564	1752	1840	1539	1752	1840	1554
c, Capacity [veh/h]	119	462	451	148	938	419	372	770	644	110	495	418
X, volume / capacity	0.81	0.35	0.35	0.86	0.58	0.68	0.93	0.34	0.09	0.72	0.95	0.15
d, Delay for Lane Group [s/veh]	64.54	38.95	39.06	64.67	40.65	47.92	71.94	23.80	21.15	61.48	66.23	33.46
Lane Group LOS	E	D	D	E	D	D	E	C	C	E	E	C
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No

50th-Percentile Queue Length [veh]	3.15	4.09	4.05	4.18	7.13	8.38	12.66	5.02	1.02	2.52	16.65	1.38
50th-Percentile Queue Length [ft]	78.76	102.36	101.13	104.57	178.20	209.52	316.39	125.44	25.50	63.04	416.17	34.51
95th-Percentile Queue Length [veh]	5.67	7.37	7.28	7.53	11.51	13.13	18.49	8.69	1.84	4.54	23.34	2.48
95th-Percentile Queue Length [ft]	141.78	184.25	182.03	188.22	287.66	328.21	462.25	217.28	45.90	113.46	583.45	62.11

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	64.54	39.00	39.06	64.67	40.65	47.92	71.94	23.80	21.15	61.48	66.23	33.46
Movement LOS	E	D	D	E	D	D	E	C	C	E	E	C
Critical Movement	No	No	No	No	No	No	Yes	No	No	No	No	No
d_A, Approach Delay [s/veh]	44.92			46.03			48.49			62.30		
Approach LOS	D			D			D			E		
d_I, Intersection Delay [s/veh]	50.24											
Intersection LOS	D											
Intersection V/C	0.690											

Option 1: Optimized Signal Timing

Number	1											
Intersection	Pearson Rd / Clark Rd											
Control Type	Signalized											
Analysis Method	HCM 6th Edition											
Name	Clark Rd			Clark Rd			Pearson Rd			Pearson Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Base Volume Input [veh/h]	107	436	71	143	275	303	290	321	71	55	187	103
Total Analysis Volume [veh/h]	150	614	48	201	386	204	408	451	48	77	263	70

Intersection Settings

Cycle Length [s]	140											
Coordination Type	Time of Day Pattern Isolated											
Actuation Type	Fully actuated											
Lost time [s]	0.00											
Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	8	6	0	8	6	0	8	4	0	8	4	0
Maximum Green [s]	25	35	0	25	35	0	25	30	0	25	30	0
Amber [s]	3.7	4.4	0.0	3.7	4.4	0.0	3.6	4.4	0.0	3.6	4.4	0.0
All red [s]	1.3	1.6	0.0	1.3	1.6	0.0	1.4	1.6	0.0	1.4	1.6	0.0
Split [s]	22	35	0	22	35	0	48	40	0	43	35	0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	22	0	0	22	0	0	22	0	0	22	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

g / C, Green / Cycle	0.10	0.32	0.32	0.12	0.34	0.34	0.24	0.35	0.35	0.05	0.16	0.16
(v / s)_i Volume / Saturation Flow Rate	0.08	0.18	0.18	0.11	0.11	0.13	0.23	0.24	0.03	0.04	0.14	0.04
so, Base Saturation Flow per Lane [veh/h/ln]	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Arrival type	3			3			3			3		
s, saturation flow rate [veh/h]	1781	1870	1822	1781	3560	1585	1781	1870	1588	1781	1870	1569
c, Capacity [veh/h]	174	597	581	217	1222	544	432	649	551	98	298	250
X, volume / capacity	0.86	0.56	0.56	0.93	0.32	0.38	0.94	0.70	0.09	0.78	0.88	0.28
d, Delay for Lane Group [s/veh]	71.35	43.34	43.46	79.17	34.56	36.63	71.49	39.84	30.80	74.97	60.96	51.96
Lane Group LOS	E	D	D	E	C	D	E	D	C	E	E	D
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No

50th-Percentile Queue Length [veh]	5.68	10.17	9.94	8.14	4.97	5.55	16.27	13.33	1.11	2.97	9.33	2.18
50th-Percentile Queue Length [ft]	141.97	254.27	248.50	203.41	124.30	138.73	406.69	333.18	27.65	74.28	233.36	54.54
95th-Percentile Queue Length [veh]	9.59	15.40	15.11	12.81	8.63	9.41	22.88	19.31	1.99	5.35	14.34	3.93
95th-Percentile Queue Length [ft]	239.67	385.03	377.77	320.36	215.73	235.31	572.05	482.86	49.77	133.70	358.62	98.16

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	71.35	43.39	43.46	79.17	34.56	36.63	71.49	39.84	30.80	74.97	60.96	51.96
Movement LOS	E	D	D	E	C	D	E	D	C	E	E	D
Critical Movement	No	No	No	Yes	No	No	No	No	No	No	No	No
d_A, Approach Delay [s/veh]	48.56			46.43			53.60			62.05		
Approach LOS	D			D			D			E		
d_I, Intersection Delay [s/veh]	51.44											
Intersection LOS	D											
Intersection V/C	0.662											

Appendix D
2040 Cumulative Plus Project
LOS Calculations

Option 1: Optimized Signal Timing

Number	1											
Intersection	Pearson Rd / Clark Rd											
Control Type	Signalized											
Analysis Method	HCM 6th Edition											
Name	Clark Rd			Clark Rd			Pearson Rd			Pearson Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Base Volume Input [veh/h]	65	203	28	87	368	403	236	179	85	54	321	88
Total Analysis Volume [veh/h]	105	298	20	127	540	292	360	276	63	79	489	62

Intersection Settings

Cycle Length [s]	120											
Coordination Type	Time of Day Pattern Isolated											
Actuation Type	Fully actuated											
Lost time [s]	0.00											
Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	8	6	0	8	6	0	8	4	0	8	4	0
Maximum Green [s]	25	35	0	25	35	0	25	30	0	25	30	0
Amber [s]	3.7	4.4	0.0	3.7	4.4	0.0	3.6	4.4	0.0	3.6	4.4	0.0
All red [s]	1.3	1.6	0.0	1.3	1.6	0.0	1.4	1.6	0.0	1.4	1.6	0.0
Split [s]	13	35	0	15	37	0	33	51	0	19	37	0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	22	0	0	22	0	0	22	0	0	22	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

g / C, Green / Cycle	0.07	0.24	0.24	0.08	0.26	0.26	0.22	0.43	0.43	0.06	0.27	0.27
(v / s)_i Volume / Saturation Flow Rate	0.06	0.09	0.09	0.07	0.15	0.19	0.21	0.15	0.04	0.05	0.27	0.04
so, Base Saturation Flow per Lane [veh/h/ln]	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Arrival type	3			3			3			3		
s, saturation flow rate [veh/h]	1752	1840	1796	1752	3503	1564	1752	1840	1539	1752	1840	1554
c, Capacity [veh/h]	118	447	436	147	908	406	385	787	658	109	497	420
X, volume / capacity	0.89	0.36	0.36	0.87	0.59	0.72	0.93	0.35	0.10	0.72	0.98	0.15
d, Delay for Lane Group [s/veh]	70.93	39.95	40.07	65.05	41.80	51.04	69.99	23.22	20.50	61.76	74.94	33.34
Lane Group LOS	E	D	D	E	D	D	E	C	C	E	E	C
Critical Lane Group	Yes	No	No	No	No	Yes	Yes	No	No	No	Yes	No

50th-Percentile Queue Length [veh]	3.63	4.16	4.11	4.19	7.25	8.94	12.95	5.20	1.05	2.53	18.46	1.38
50th-Percentile Queue Length [ft]	90.75	104.11	102.84	104.87	181.35	223.51	323.70	129.95	26.27	63.18	461.45	34.38
95th-Percentile Queue Length [veh]	6.53	7.50	7.40	7.55	11.67	13.84	18.85	8.94	1.89	4.55	25.50	2.48
95th-Percentile Queue Length [ft]	163.35	187.40	185.10	188.77	291.78	346.10	471.23	223.42	47.28	113.73	637.60	61.89

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.93	40.01	40.07	65.05	41.80	51.04	69.99	23.22	20.50	61.76	74.94	33.34
Movement LOS	E	D	D	E	D	D	E	C	C	E	E	C
Critical Movement	No	No	No	No	No	No	No	No	No	No	Yes	No
d_A, Approach Delay [s/veh]	47.69			47.69			47.06			69.20		
Approach LOS	D			D			D			E		
d_I, Intersection Delay [s/veh]	52.53											
Intersection LOS	D											
Intersection V/C	0.718											

Option 1: Optimized Signal Timing

Number	1											
Intersection	Pearson Rd / Clark Rd											
Control Type	Signalized											
Analysis Method	HCM 6th Edition											
Name	Clark Rd			Clark Rd			Pearson Rd			Pearson Rd		
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Base Volume Input [veh/h]	107	436	71	143	275	303	290	321	71	55	187	103
Total Analysis Volume [veh/h]	163	614	48	201	386	216	431	475	53	77	286	70

Intersection Settings

Cycle Length [s]	140											
Coordination Type	Time of Day Pattern Isolated											
Actuation Type	Fully actuated											
Lost time [s]	0.00											
Control Type	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss	Protecte	Permiss	Permiss
Signal group	5	2	0	1	6	0	7	4	0	3	8	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-
Minimum Green [s]	8	6	0	8	6	0	8	4	0	8	4	0
Maximum Green [s]	25	35	0	25	35	0	25	30	0	25	30	0
Amber [s]	3.7	4.4	0.0	3.7	4.4	0.0	3.6	4.4	0.0	3.6	4.4	0.0
All red [s]	1.3	1.6	0.0	1.3	1.6	0.0	1.4	1.6	0.0	1.4	1.6	0.0
Split [s]	22	35	0	22	35	0	48	35	0	48	35	0
Walk [s]	0	7	0	0	7	0	0	7	0	0	7	0
Pedestrian Clearance [s]	0	22	0	0	22	0	0	22	0	0	22	0
I1, Start-Up Lost Time [s]	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0	2.0	2.0	0.0
Minimum Recall	No	No		No	No		No	No		No	No	
Maximum Recall	No	No		No	No		No	No		No	No	
Pedestrian Recall	No	No		No	No		No	No		No	No	
Pedestrian Signal Group	0											
Pedestrian Walk [s]	0											
Pedestrian Clearance [s]	0											

Lane Group Calculations

g / C, Green / Cycle	0.10	0.30	0.30	0.12	0.31	0.31	0.26	0.37	0.37	0.06	0.17	0.17
(v / s)_i Volume / Saturation Flow Rate	0.09	0.18	0.18	0.11	0.11	0.14	0.24	0.25	0.03	0.04	0.15	0.04
so, Base Saturation Flow per Lane [veh/h/ln]	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Arrival type	3			3			3			3		
s, saturation flow rate [veh/h]	1781	1870	1822	1781	3560	1584	1781	1870	1588	1781	1870	1570
c, Capacity [veh/h]	187	553	539	217	1114	496	454	692	588	98	318	267
X, volume / capacity	0.87	0.61	0.61	0.93	0.35	0.44	0.95	0.69	0.09	0.78	0.90	0.26
d, Delay for Lane Group [s/veh]	70.93	47.14	47.29	79.17	37.93	41.03	72.42	37.91	28.76	74.94	62.95	50.62
Lane Group LOS	E	D	D	E	D	D	E	D	C	E	E	D
Critical Lane Group	No	No	Yes	Yes	No	No	Yes	No	No	No	Yes	No

50th-Percentile Queue Length [veh]	6.16	10.66	10.42	8.14	5.25	6.29	17.37	13.74	1.18	2.97	10.38	2.15
50th-Percentile Queue Length [ft]	154.11	266.48	260.46	203.41	131.14	157.17	434.25	343.39	29.39	74.26	259.50	53.74
95th-Percentile Queue Length [veh]	10.24	16.01	15.71	12.81	9.00	10.40	24.21	19.81	2.12	5.35	15.66	3.87
95th-Percentile Queue Length [ft]	255.91	400.34	392.80	320.36	225.04	259.97	605.13	495.35	52.90	133.67	391.60	96.74

Movement, Approach, & Intersection Results

d_M, Delay for Movement [s/veh]	70.93	47.20	47.29	79.17	37.93	41.03	72.42	37.91	28.76	74.94	62.95	50.62
Movement LOS	E	D	D	E	D	D	E	D	C	E	E	D
Critical Movement	No	No	No	Yes	No	No	No	No	No	No	No	No
d_A, Approach Delay [s/veh]	51.90			49.09			52.92			63.09		
Approach LOS	D			D			D			E		
d_I, Intersection Delay [s/veh]	53.08											
Intersection LOS	D											
Intersection V/C	0.687											

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Transportation Impact Study (September 2017) Revised Figures

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Elliott Rd

Skyway

Pearson Rd

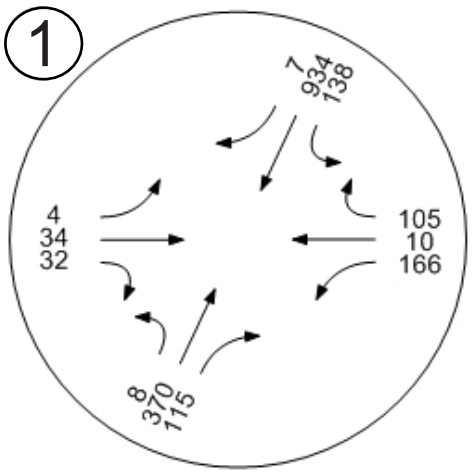
Black Olive Dr

Foster Rd

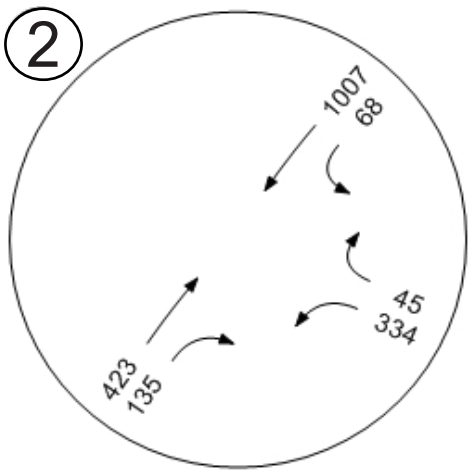
Schmale Ln

Neal Rd

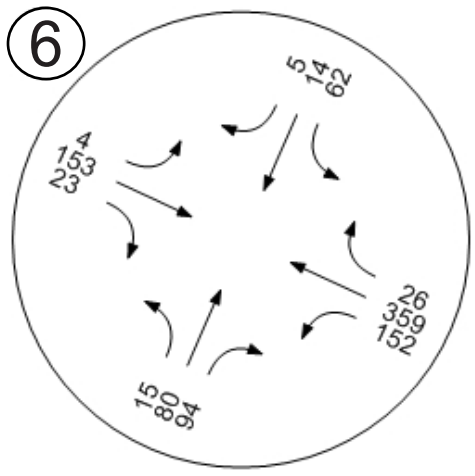
Skyway / Elliott Rd



Skyway / Pearson Rd



Pearson Rd / Black Olive Dr



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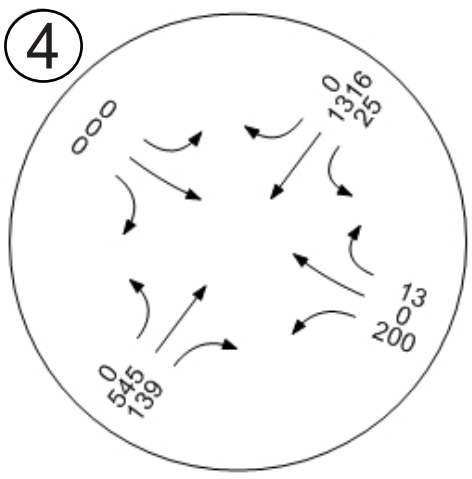
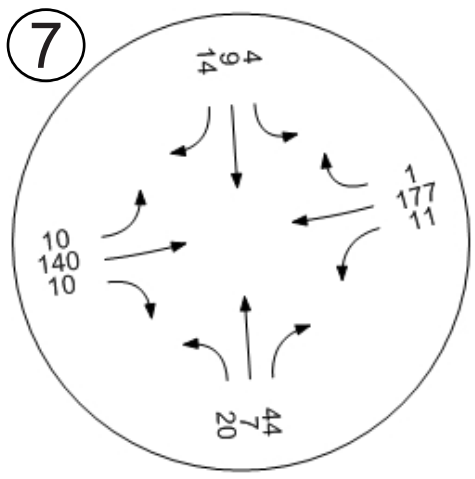
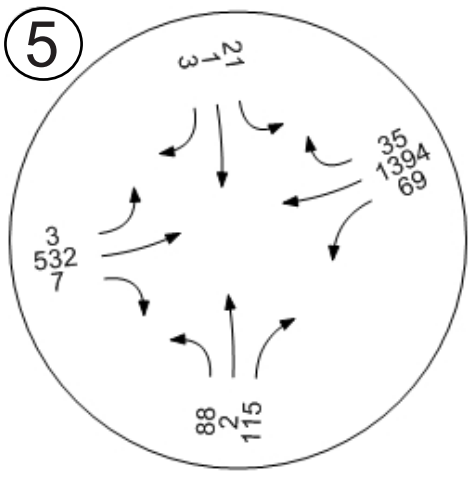


Black Olive Dr / Foster Rd



Skyway / Neal Rd / Schmale Ln

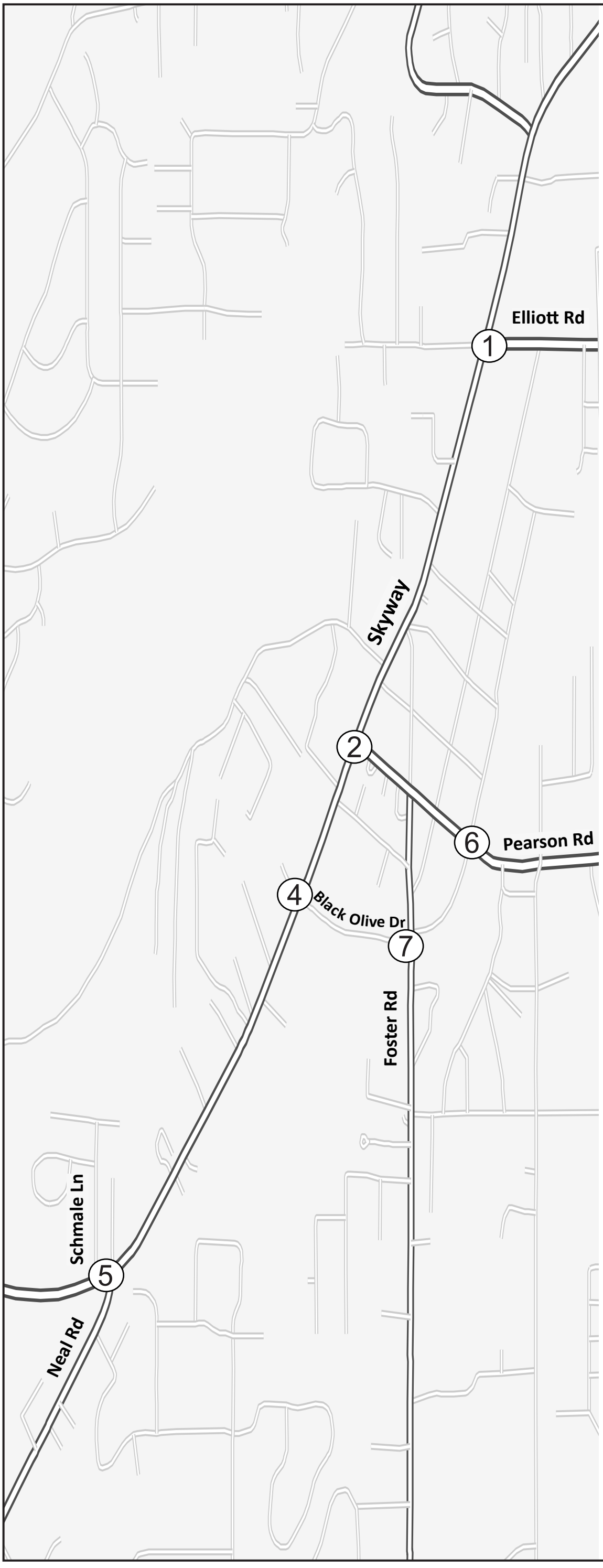


TRAFFIC WORKS LLC

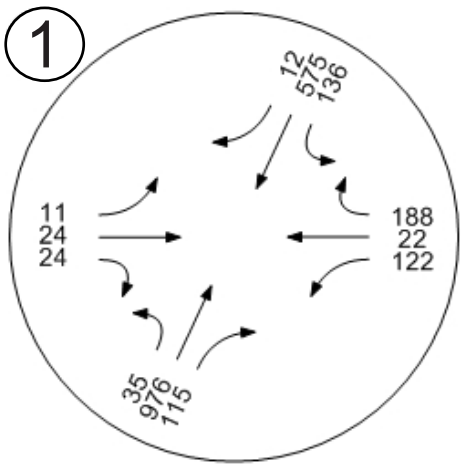
NO SCALE

Figure 3

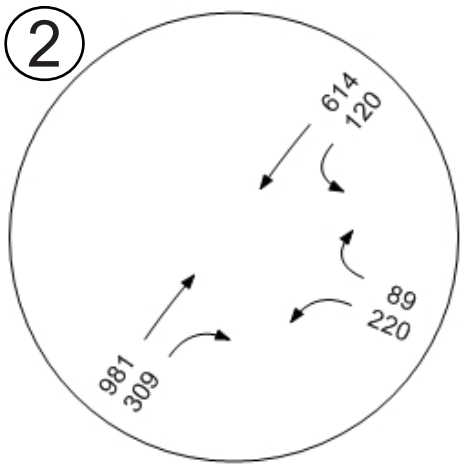
Black Olive Village
Transportation Impact Study
Baseline AM Peak Traffic Volumes



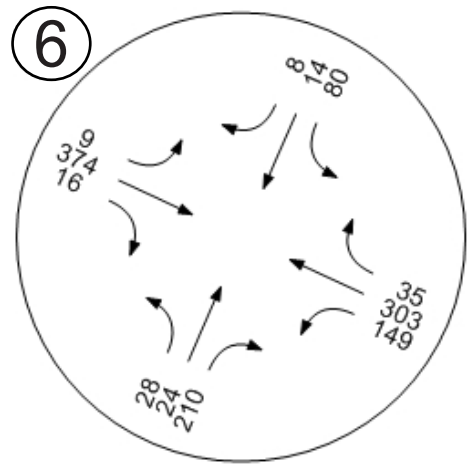
Skyway / Elliott Rd



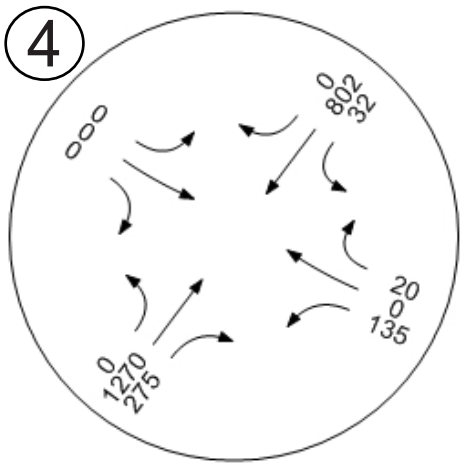
Skyway / Pearson Rd



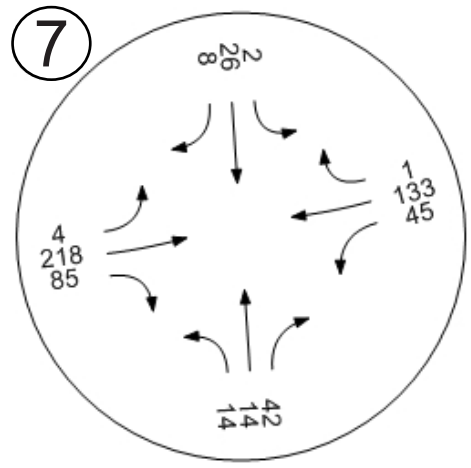
Pearson Rd / Black Olive Dr



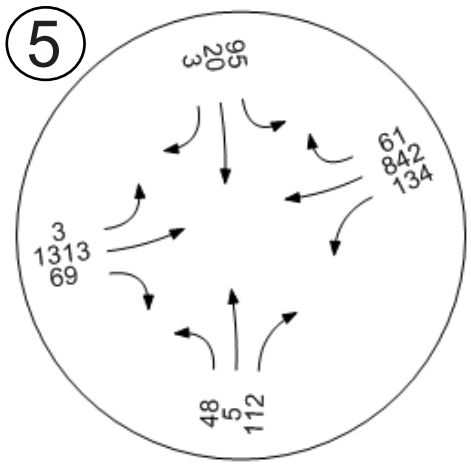
Skyway / Black Olive Dr



Black Olive Dr / Foster Rd



Skyway / Neal Rd / Schmale Ln



TRAFFIC WORKS LLC

NO SCALE

Figure 4

Black Olive Village
Transportation Impact Study
Baseline PM Peak Traffic Volume

Elliott Rd

Skyway

Pearson Rd

Black Olive Dr

Foster Rd

Schmale Ln

Neal Rd

1

2

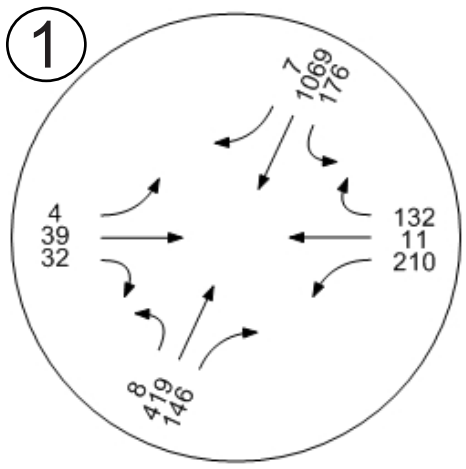
4

5

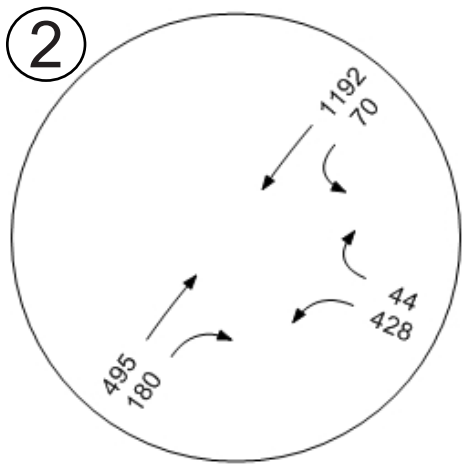
6

7

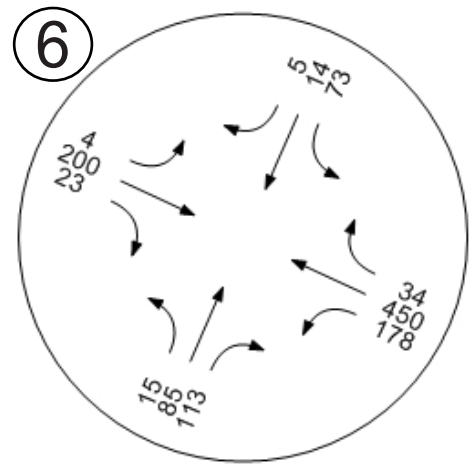
Skyway / Elliott Rd



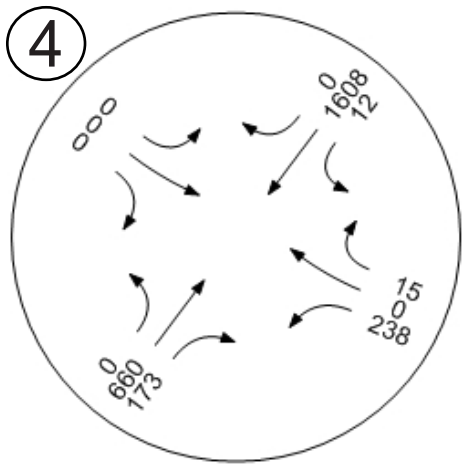
Skyway / Pearson Rd



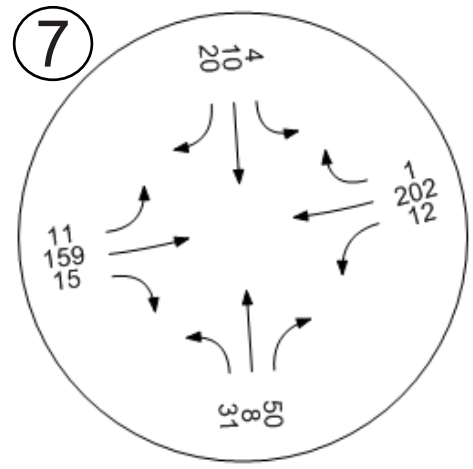
Pearson Rd / Black Olive Dr



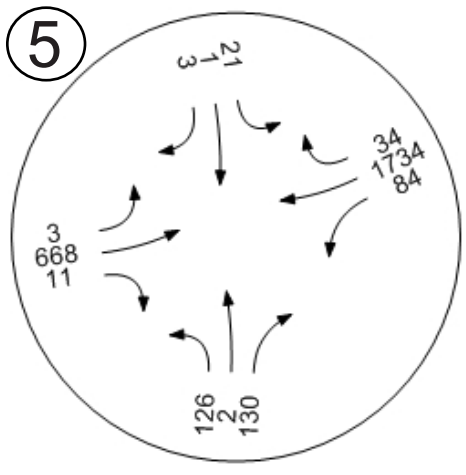
Skyway / Black Olive Dr



Black Olive Dr / Foster Rd



Skyway / Neal Rd /
Schmale Ln



TRAFFIC WORKS LLC

NO SCALE

Figure 5

Black Olive Village
Transportation Impact Study

2040 Baseline AM Peak Traffic Volumes

Elliott Rd

Skyway

Pearson Rd

Black Olive Dr

Foster Rd

Schmale Ln

Neal Rd

1

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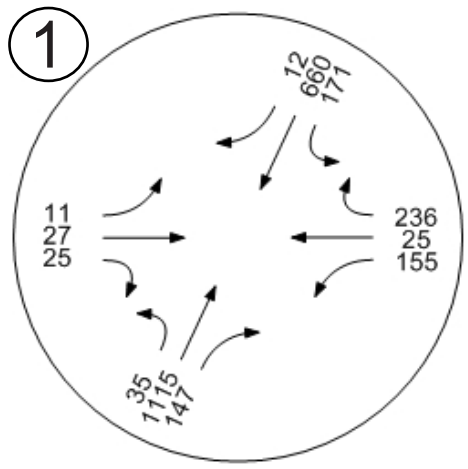
6

7

Skyway / Elliott Rd



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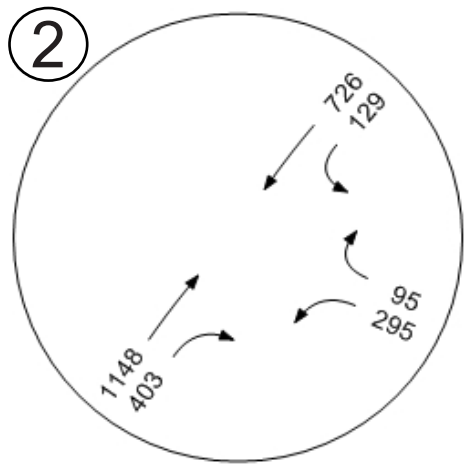
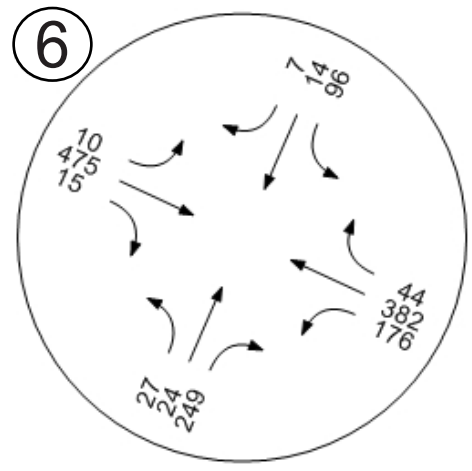
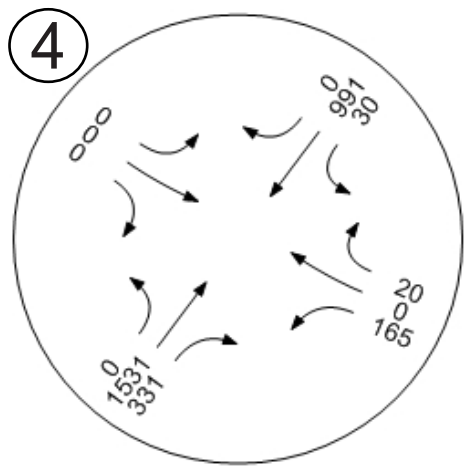


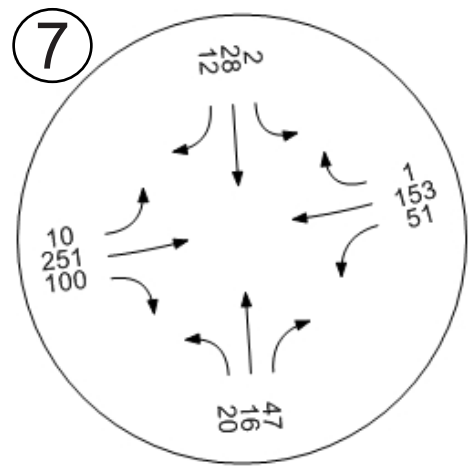
Pearson Rd / Black Olive Dr



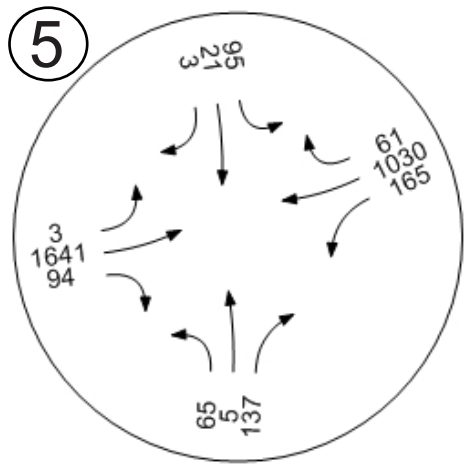
Skyway / Black Olive Dr



Black Olive Dr / Foster Rd



Skyway / Neal Rd / Schmale Ln



TRAFFIC WORKS LLC

NO SCALE

Figure 6

Black Olive Village
Transportation Impact Study

2040 Baseline PM Peak Traffic Volumes

Elliott Rd

Skyway

Pearson Rd

Black Olive Dr

Foster Rd

Schmale Ln

Neal Rd

1

2

3

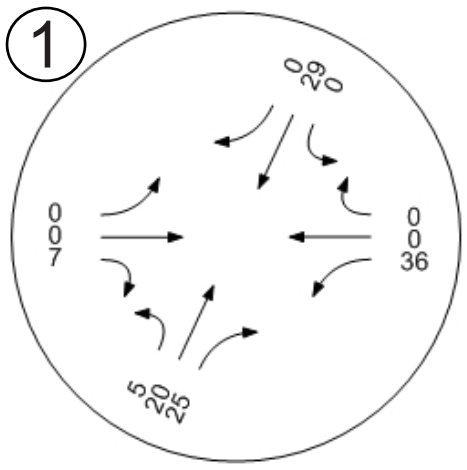
4

5

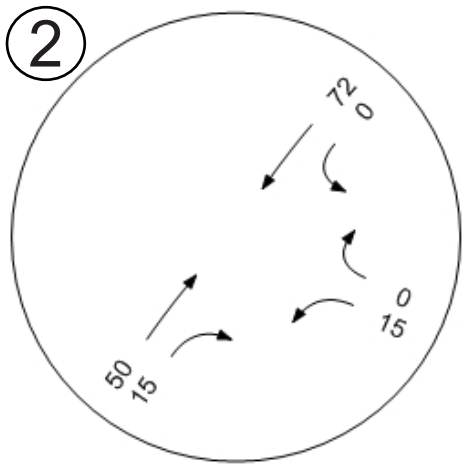
6

7

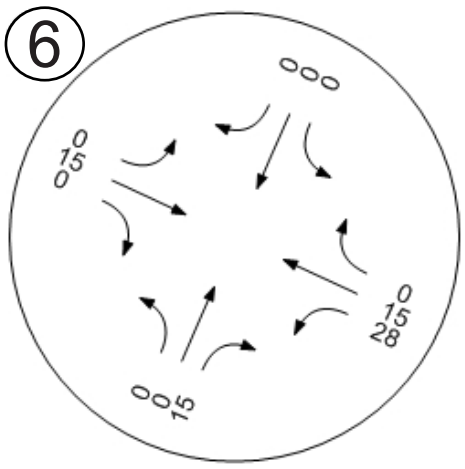
Skyway / Elliott Rd



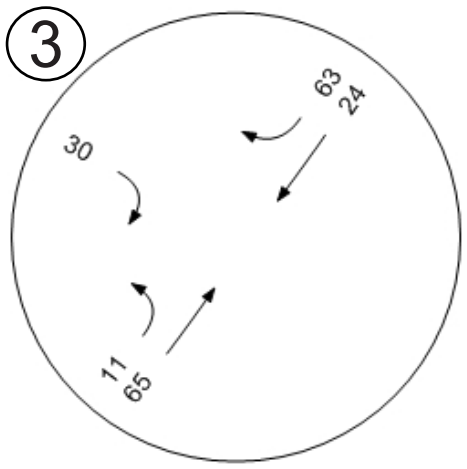
Skyway / Pearson Rd



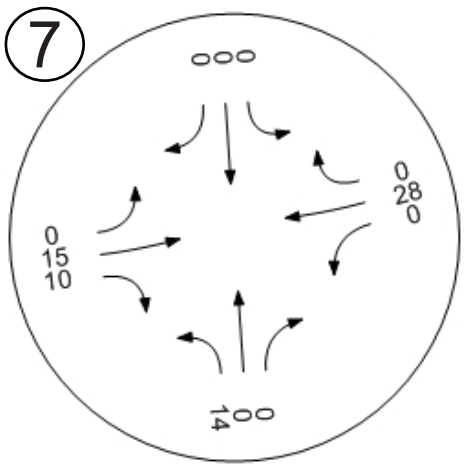
Pearson Rd / Black Olive Dr



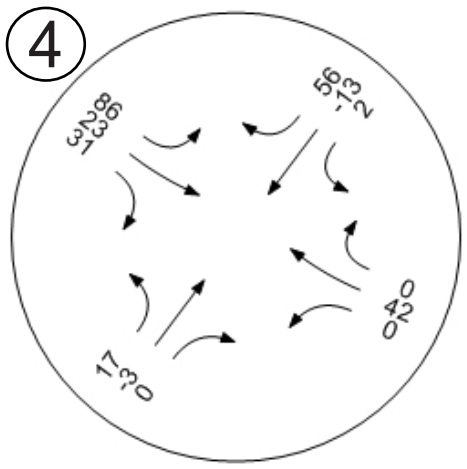
Skyway / Project Dwy



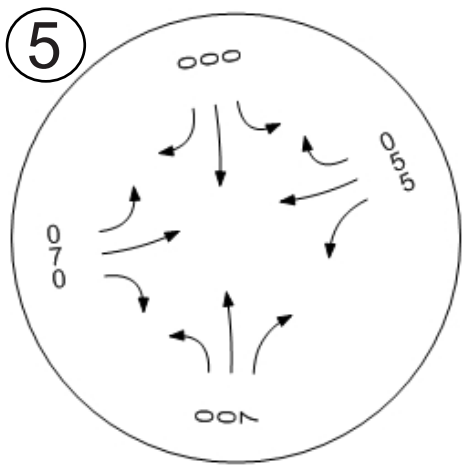
Black Olive Dr / Foster Rd



Skyway / Black Olive Dr



Skyway / Neal Rd / Schmale Ln



NO SCALE

Figure 7
Black Olive Village
Transportation Impact Study
AM Peak Project Trips

Elliott Rd

Skyway

Pearson Rd

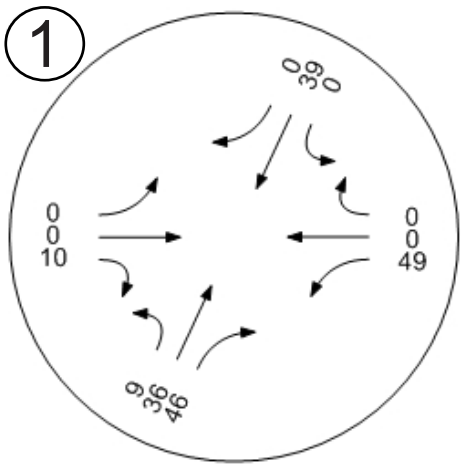
Black Olive Dr

Foster Rd

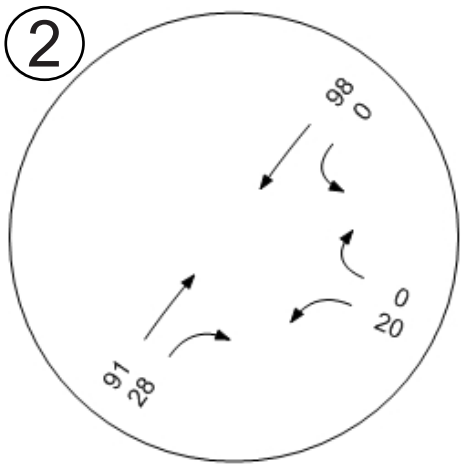
Schmale Ln

Neal Rd

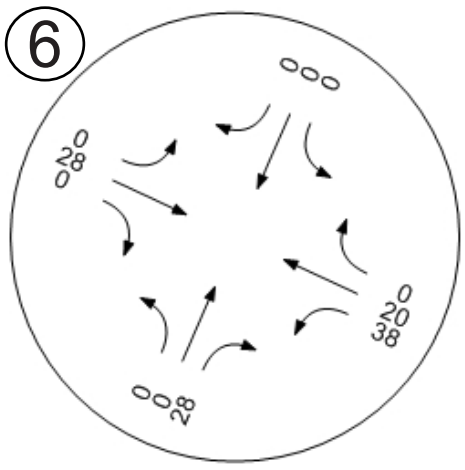
Skyway / Elliott Rd



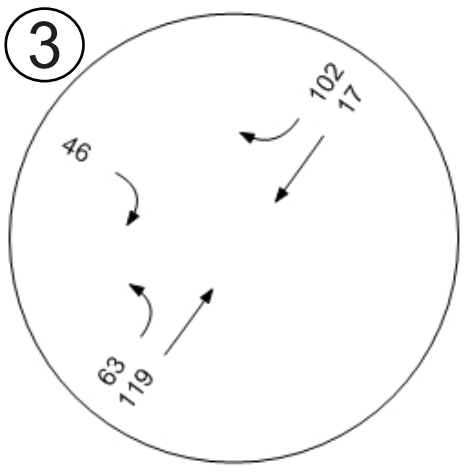
Skyway / Pearson Rd



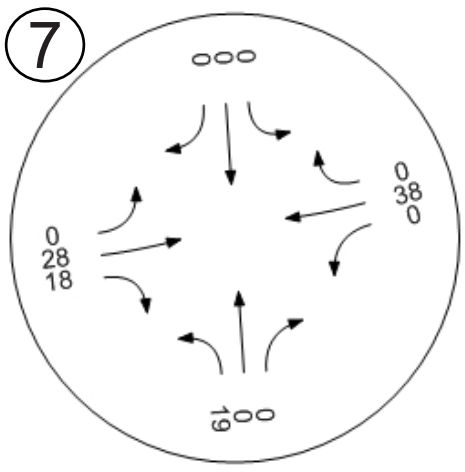
Pearson Rd / Black Olive Dr



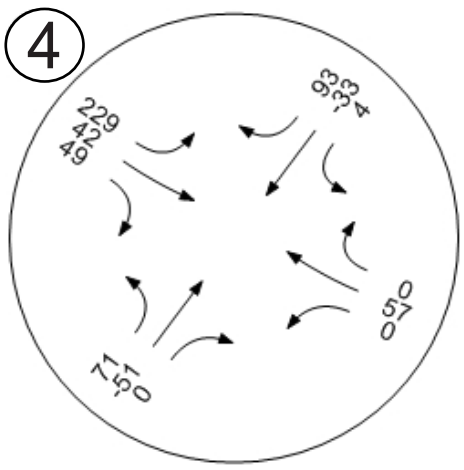
Skyway / Project Dwy



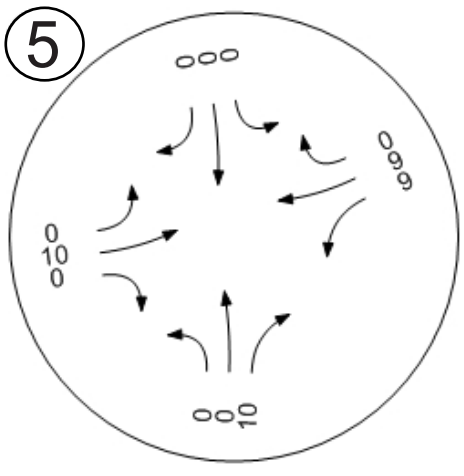
Black Olive Dr / Foster Rd



Skyway / Black Olive Dr



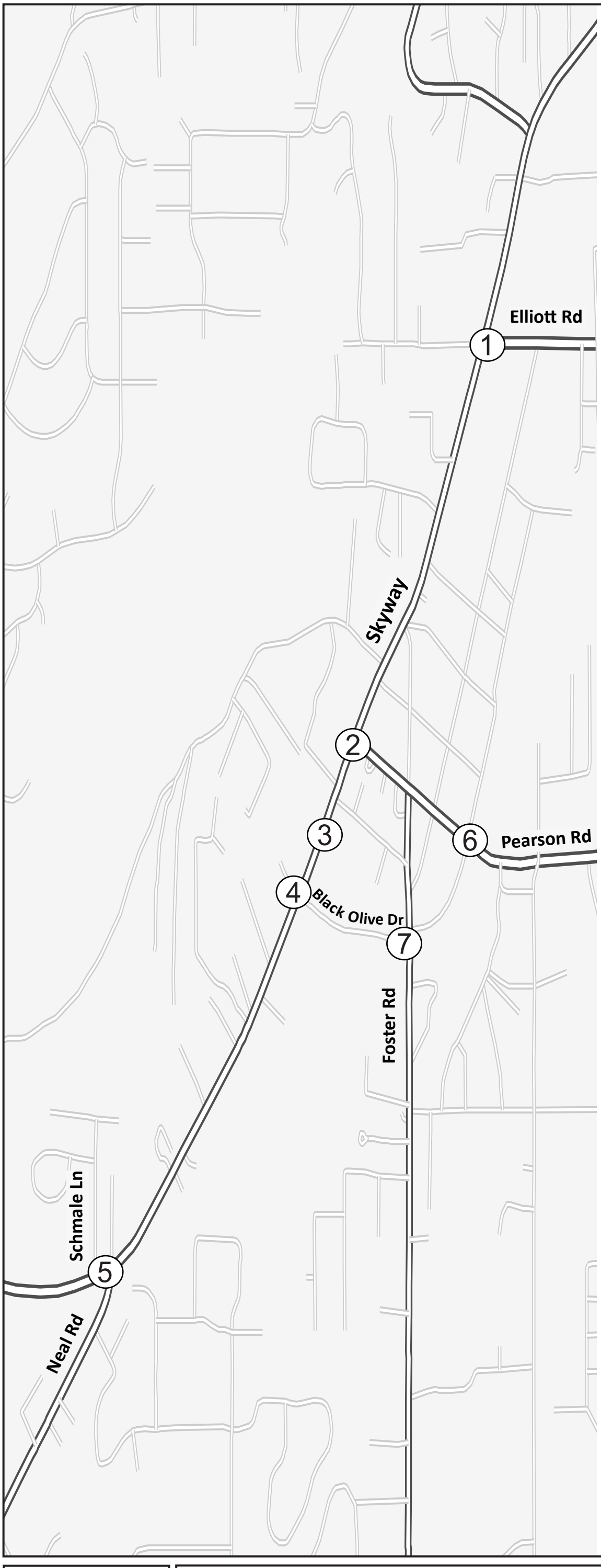
Skyway / Neal Rd /
Schmale Ln



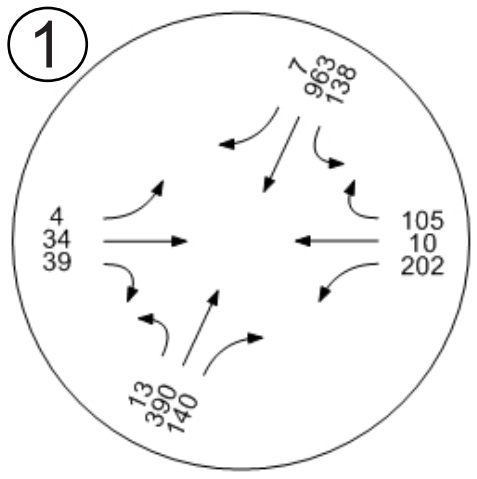
TRAFFIC WORKS LLC

NO SCALE

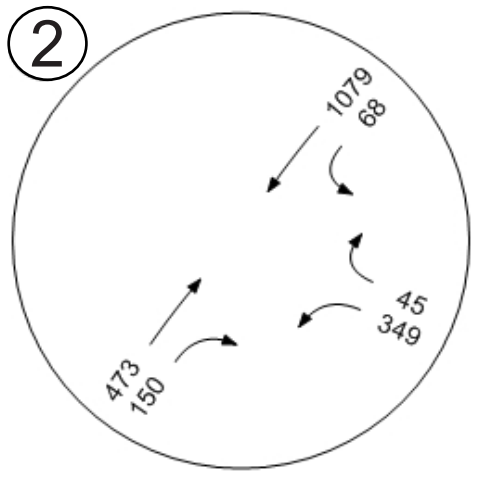
Figure 8
Black Olive Village
Transportation Impact Study
PM Peak Project Trips



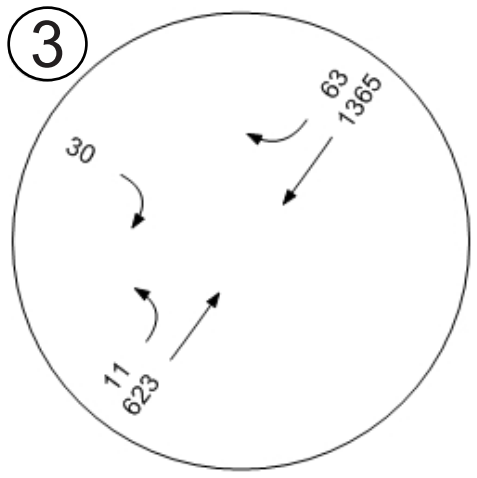
Skyway / Elliott Rd



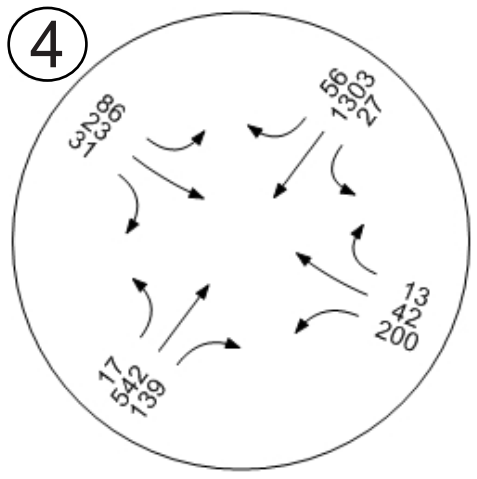
Skyway / Pearson Rd



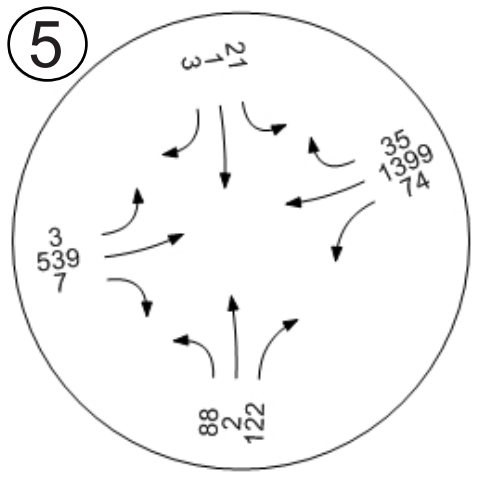
Skyway / Project Dwy



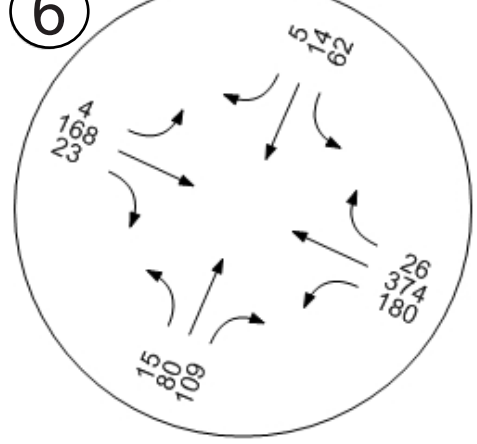
Skyway / Black Olive Dr



Skyway / Neal Rd / Schmale Ln



Pearson Rd / Black Olive Dr



Black Olive Dr / Foster Rd

TRAFFIC WORKS LLC

NO SCALE

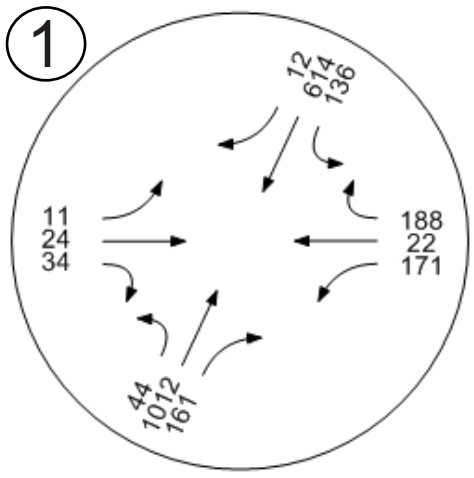
Figure 9

Black Olive Village
Transportation Impact Study

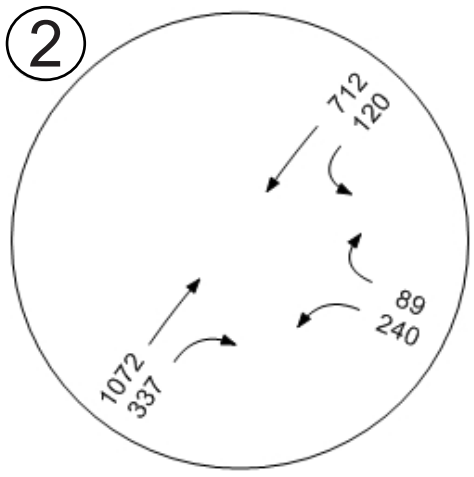
Baseline Plus Project AM Peak Traffic Volumes

Elliott Rd
Skyway
Pearson Rd
Black Olive Dr
Foster Rd
Schmale Ln
Neal Rd

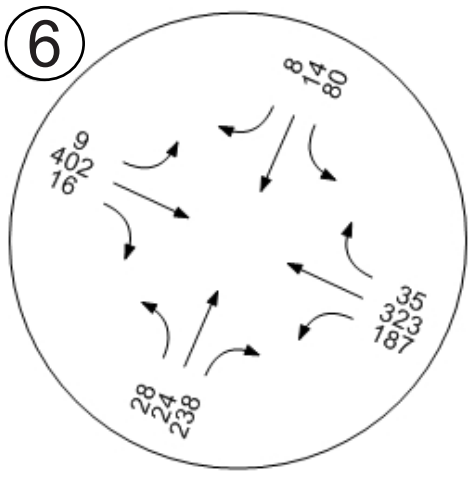
Skyway / Elliott Rd



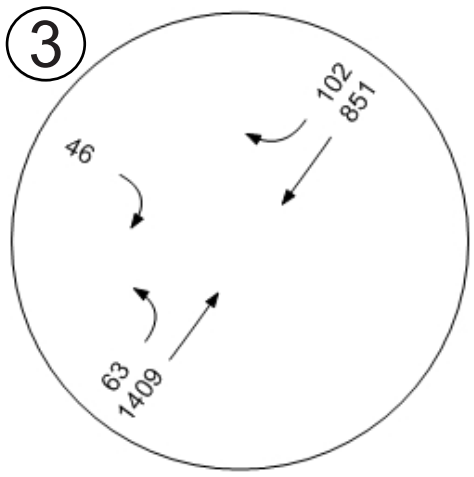
Skyway / Pearson Rd



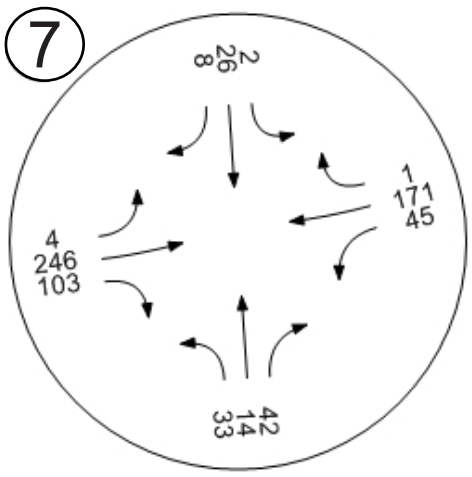
Pearson Rd / Black Olive Dr



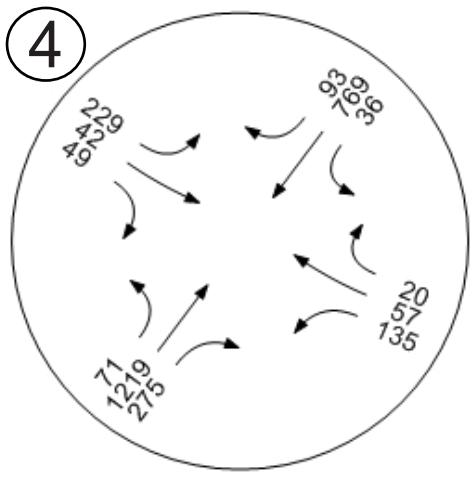
Skyway / Project Dwy



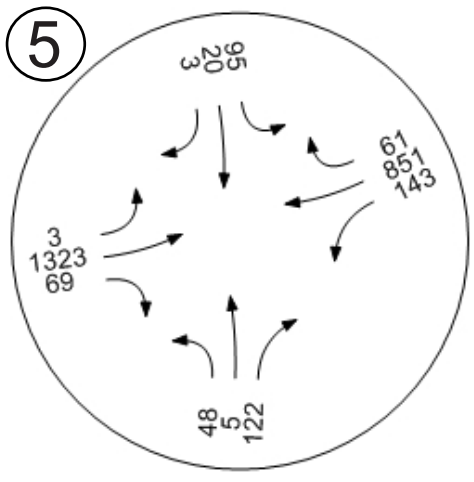
Black Olive Dr / Foster Rd



Skyway / Black Olive Dr



Skyway / Neal Rd / Schmale Ln



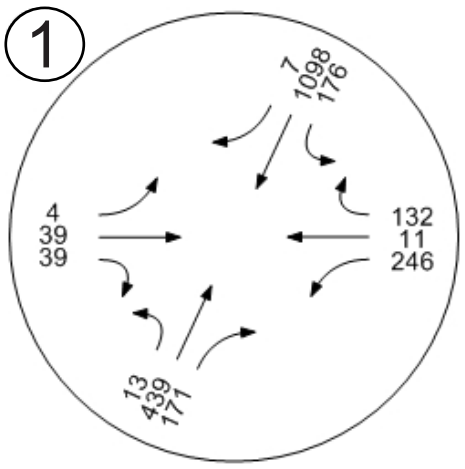
TRAFFIC WORKS LLC

NO SCALE

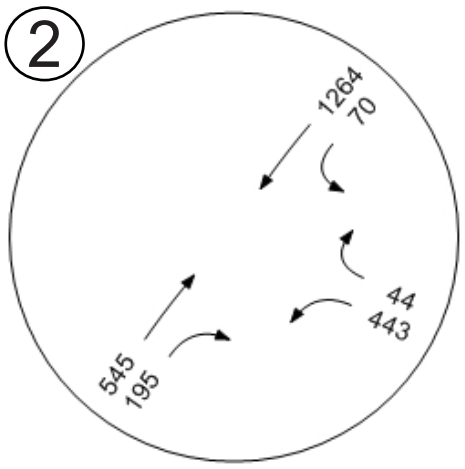
Figure 10
Black Olive Village
Transportation Impact Study
Baseline Plus Project PM Peak Traffic Volumes

Elliott Rd
Skyway
Pearson Rd
Black Olive Dr
Foster Rd
Schmale Ln
Neal Rd

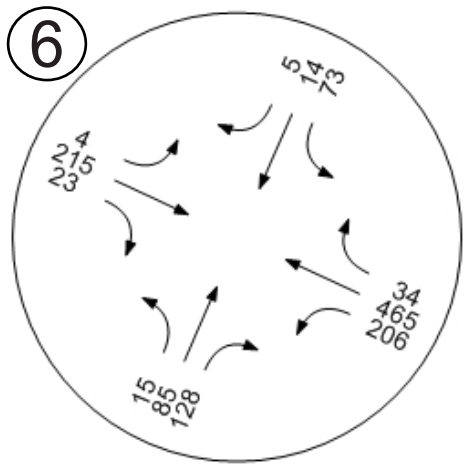
Skyway / Elliott Rd



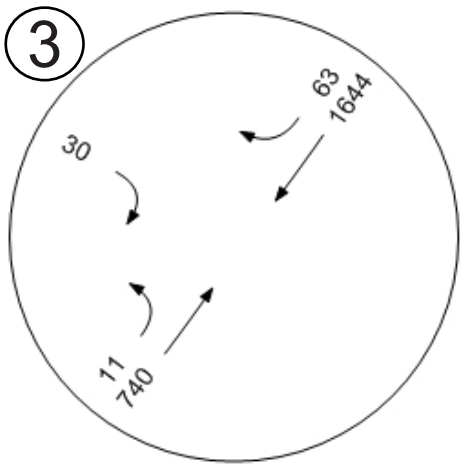
Skyway / Pearson Rd



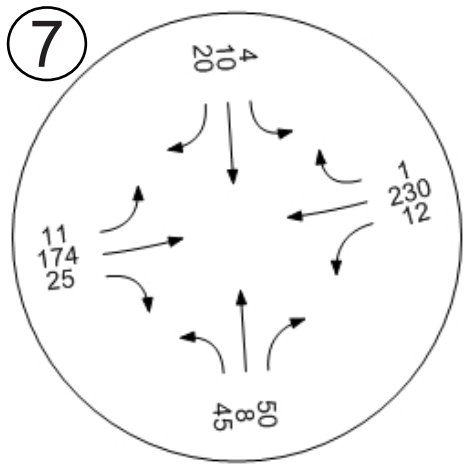
Pearson Rd / Black Olive Dr



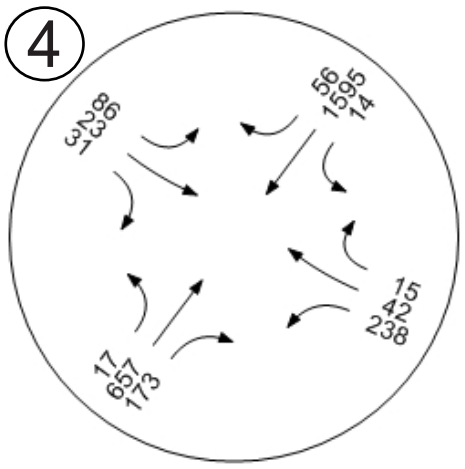
Skyway / Project Dwy



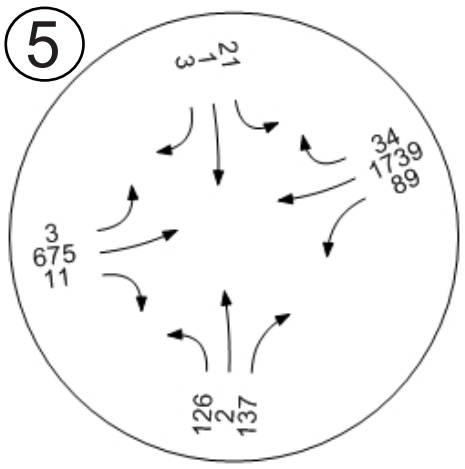
Black Olive Dr / Foster Rd



Skyway / Black Olive Dr



Skyway / Neal Rd / Schmale Ln



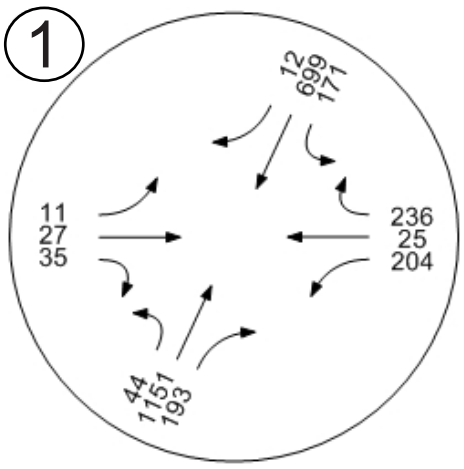
TRAFFIC WORKS LLC

NO SCALE

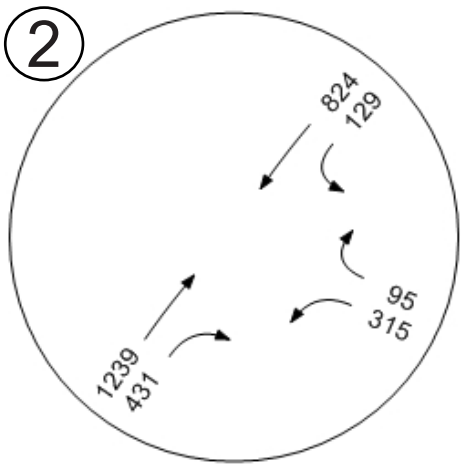
Figure 11
Black Olive Village
Transportation Impact Study
2040 Plus Project AM Peak Traffic Volumes

Elliott Rd
Skyway
Pearson Rd
Black Olive Dr
Foster Rd
Schmale Ln
Neal Rd

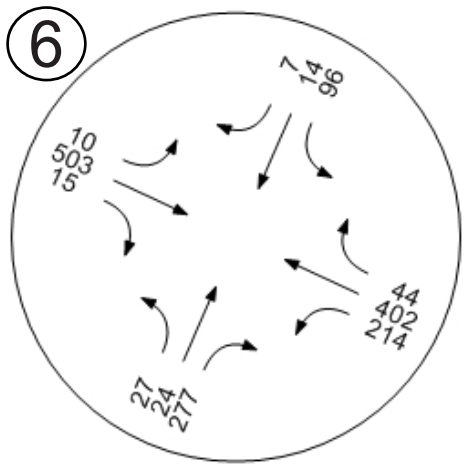
Skyway / Elliott Rd



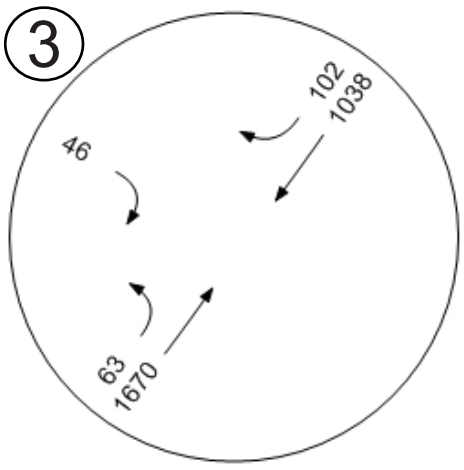
Skyway / Pearson Rd



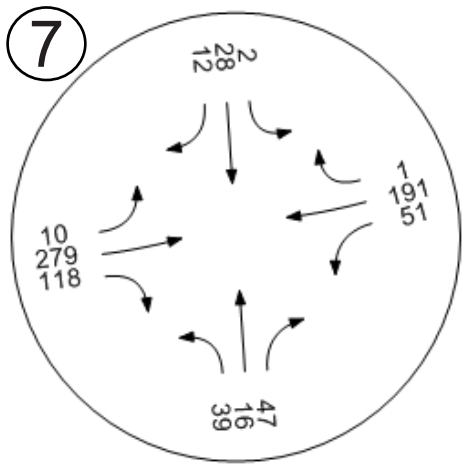
Pearson Rd / Black Olive Dr



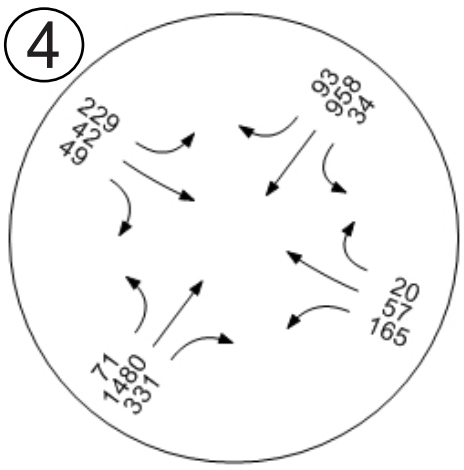
Skyway / Project Dwy



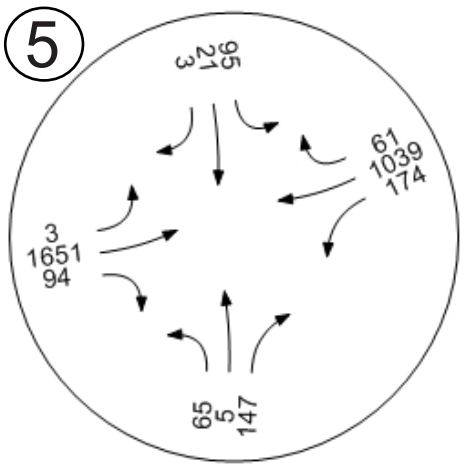
Black Olive Dr / Foster Rd



Skyway / Black Olive Dr



Skyway / Neal Rd / Schmale Ln



TRAFFIC WORKS LLC

NO SCALE

Figure 12
Black Olive Village
Transportation Impact Study
2040 Plus Project PM Peak Traffic Volumes