AGENDA
CITY OF KENTWOOD PLANNING COMMISSION
TUESDAY, DECEMBER 13, 2022
KENTWOOD COMMISSION CHAMBERS
4900 BRETON AVENUE
7:00 P.M.

A. Call to Order

B. Pledge of Allegiance (Doug VanderMeer)

C. Roll Call

D. Approval of the Minutes of November 22, 2022 and Findings of Fact for: **Case#25-22** – Kum & Go – Special Land Use and Site Plan Review for a Vehicle Fuel Station – Located at the southeast corner of 52nd Street SE & Eastern Avenue 802 52nd Street plus adjoining properties (5202 Eastern Ave SE, 846 52nd Street, 860 52nd Street, 5244 Eastern Ave SE); **Case#26-22** – Zoning Ordinance Text Amendments Relating to Short Term Rentals

E. Approval of the Agenda for December 13, 2022

F. Acknowledge visitors and those wishing to speak to non- agenda items.

G. Old Business

There is no Old Business

H. Public Hearing

There are no Public Hearings

I. Work Session

Case# 1-23 – Steelcase– Major PUD Change and Preliminary Site Plan – Located at 4308 52nd Street SE

J. New Business

Set public hearing date of January 24, 2023, for: **Case# 2-23** – Zoning Ordinance Text Amendments Relating to: Childcare provisions; sign provisions; PUD procedures

K. Other Business

1. Updated Draft Zoning Ordinance Amendments Architectural Design Standards Discussion
2. Commissioners' Comments
3. Staff's Comments

L. Adjournment

*Public Hearing Format:

1. Staff Presentation – Introduction of project, Staff Report and Recommendation Introduction of project representative
2. Project Presentation – By project representative
3. Open Public Hearing (please state name, address and speak at podium. Comments are limited to five minutes per speaker; exceptions may be granted by the chair for representative speakers and applicants.)
4. Close Public Hearing
5. Commission Discussion – Requests for clarification to project representative, public or staff
6. Commission decision – Options

a. postpone decision – table to date certain
b. reject proposal
c. accept proposal
d. accept proposal with conditions.

PROPOSED MINUTES OF THE REGULAR MEETING
OF THE KENTWOOD PLANNING COMMISSION
NOVEMBER 22, 2022, 7:00 P.M.
COMMISSION CHAMBERS

A. Chair Jones called the meeting to order at 7:00 p.m.

B. The Pledge of Allegiance was led by Commissioner Benoit.

C. Roll Call:
Members Present: Bill Benoit, Dan Holtrop, Sandra Jones, Ed Kape, Ray Poyner, Mike Pemberton, Darius Quinn, Doug VanderMeer, Sarah Weir
Members Absent: None
Others Present: Community Development Director Terry Schweitzer, Economic Development Planner Lisa Golder, Senior Planner Joe Pung, and the applicants.

D. Sarah Weir and Doug VanderMeer were sworn in as Planning Commissioners

E. Approval of the Minutes and Findings of Fact

Motion by Commissioner Holtrop, supported by Commissioner Pemberton, to approve the Minutes of November 9, 2022 and the Findings of Fact for: <u>Case #8-22</u> Grand Mere Development – Conditional Rezoning from C3- Regional Commercial to C2 Community Commercial located at 3277, 3311, 3343 Woodland Dr. SE; <u>Case #23-22</u> – Blue Pearl Specialty and Emergency Pet Hospital – Conditional Rezoning from C4 Office to C2 Community Commercial located at 2500 East Paris Avenue SE

- Motion Carried (9-0) –

F. Approval of the Agenda

Add under New Business set a public hearing date of January 10, 2023 for: **<u>Case#1-23</u>** - Steelcase – Major Change to a PUD and Preliminary Site Plan Review – Located at 4308 52nd Street SE

Motion by Commissioner Benoit, supported by Commissioner Kape, to approve the agenda for the November 22, 2022 meeting adding the change noted.

- Motion Carried (9-0) –

G. Acknowledge visitors wishing to speak to non-agenda items.

There was no public comment

H. Old Business

There was no Old Business

I. Public Hearing

Case#25-22 – Kum & Go – Special Land Use and Site Plan Review for a Vehicle Fuel Station – Located at the southeast corner of 52nd Street SE & Eastern Avenue 802 52nd Street plus adjoining properties (5202 Eastern Ave SE, 846 52nd Street, 860 52nd Street, 5244 Eastern Ave SE) **(Tabled from November 9, 2022 meeting)**

Golder stated the request is for a vehicle fuel station and a 5,620 square foot C- Store on 1.63 acres. She stated the vehivle fuel station have 6 pumps and 12 fueling stations located at the corner of 52nd Street and Eastern.

She stated 52nd Street and Eastern Avenue are both five-lane roadways at the intersection with single dedicated left turn lanes in all quadrants. She stated the speed limit on 52nd Street is 35 miles per hour. She stated on Eastern Avenue the dedicated left turn lane goes close to the driveway for Kentucky Fried Chicken, which is south of the proposed development. She stated Speedway is on the northeast corner and CVS is on the west side of Eastern.

Golder stated the two proposed driveways for Kum & Go are on 52nd Street and Eastern Avenue. She stated there is a third driveway that is on the private drive that goes to the Planet Fitness facility that is in the shopping mall.

Golder stated traffic has been the issue. The applicant is asking for right in and right out as well as left turns on to the 52nd Street location and on Eastern Avenue, right in, right out as well as left turns out. The staff recommendation is for right in right out for both of those driveways. She stated the concern is those driveways are too close to the intersection for left turns in and out.

Golder stated the City has access management standards that can be found in Section 17.11 of the Zoning Ordinance that addresses the alignment of driveways. She stated when we look at a new project on a street, you look across the street to see if there is a driveway you can align it with. She stated in this case it doesn't work to align the driveways. She stated if you can't align the driveways, our ordinance states that you move it 250 feet away. She stated MDOT also looks at the separation. She stated the standards she is looking at is the distance between a signalized intersection and a driveway. She stated the MDOT standards states that it should be 230 feet between a signalized intersection and a driveway. She stated the 52nd Street is 190 feet from the intersection to the driveway and the Eastern Avenue is 110 feet. She stated this is the basis for the recommendation coming from staff. Golder stated that the City did have our traffic consultant take a look and they are in agreement that those are the standards and that there may be issues with those left turns in and out.
Golder stated the traffic consultant also mentioned that she felt that there would be conflict between left turns into Family Dollar and noted that left turns aren't really

allowed at Family Dollar, however, people turn left anyway and the left turns going into the Kum & Go if it were allowed. She listed that as a further reason to prohibit left turns in to the 52nd Street driveway.

Golder stated on Eastern Avenue the City's Traffic Consultant notes that Kum & Go's information says that the Eastern Avenue driveway during the peak hour is blocked 25% of the time. The City's traffic consultant felt that would lead to conflicts with people trying to "courtesy" let someone in and then they get hit by the oncoming traffic. She stated that has happened at the Speedway driveway. Golder stated these are all the reasons staff is recommending right in, right out.

Golder stated because we are looking for right in and right out, we would like the Traffic Engineer to give us some advice and design standards for how to structure the intersection so that it will prevent people from trying to turn left in and left out.

Golder stated she is recommending conditional approval of the special land use and site plan review as as described in her memo's dated November 16, 2022

Mike McPherson, with Atwell was present. He stated they don't have any issue with the conditions that Golder mentioned. He stated regarding the driveway, they had their traffic consultant present to go through things. However, to staffs point they would like some consideration of the right out right in and then left in at the 52nd Street intersection, right out right in and left out at Eastern. He stated the concern of the Family Dollar driveway were the conflicting lefts, Family Dollars driveway is a ¾ inch driveway and those turns are not allowed. He stated they have proposed to add additional signage to make sure that is clear that the turns are not allowed. He stated if they don't have anyone turning left there it should be a free center turn lane for people to make the left turn in. He stated the driveway for the left outs there is some additional signage that will prohibit left outs during the peak hour. He stated there is 15 minutes of a 24 hour day that is potentially conflict.

Greg Hickey, Traffic Operations Engineer with Fleis and VanderBrink was present. He stated the left in for the Family Dollar is "pork chopped" and should be right in only. Drivers have established a pattern of turning left into the site using what should be the egress drive. He stated their memo recommended additional signage to alleviate that issue. He stated that will help free up the westbound traffic as they are attempting to turn left at the signalized intersection.

Hickey explained the operations summary for the proposed driveways in question.

Hickey stated under the future conditions, if you look at Eastern Avenue site drive and site drive for 52nd Street, again everything is within what they would consider acceptable parameters. You usually want to keep the level of service C or greater however, D can also be acceptable which is what they have out at Eastern and 52nd Street.

Hickey stated under the Eastern Avenue site driveway this is where they were concerned about drivers having delay in and out of the site onto Eastern Avenue. He stated there is approximately 5 minutes of blockage during the AM peak and only 15 minutes during the PM peak. He stated they used comparable site crash analysis. Speedway to the north, the crashes that occurred were all driver error. A lot of them reported to the officer the driver was at fault. He stated no discernable patterns were attributed to the actual development itself.

Hickey stated in the summary they mention additional signage. Left turns are restricted into Family Dollar from your eastbound 52nd Street traffic. If motorists no longer make the left into the egress drive this would accomodate westbound lefts into the Kum & Go site.

Jones re-opened the public hearing.

Mary Bouche resident off Southglow was present. She had concerns about the traffic. She also had concerns whether the traffic study takes in to account pedestrian accidents. She stated the neighbors are against the gas station due to the traffic issues.

Motion by Kape, supported by Pemberton, to close the public hearing.

- Motion Carried (9-0) -

Kape stated he supports staff's recommendation and in his opinion, people don't adhere to signs. He doesn't think signage will be enough to stop the mishaps.

Quinn stated that there are other potential conflicts that were not mentioned and that is the unrestricted in and out from the CVS driveway and the conflict that exist with the unrestricted in and out of the KFC that exist. He stated he isn't opposed to the project but adding constraints is the responsible thing to do.

VanderMeer stated with respect to the concerns about accidents he isn't seeing any real increase in accidents. But to Kapes viewpoint, coming out of the proposed Kum & Go onto 52nd Street he questioned what is keeping someone from turning left there. He stated he appreciates the signs but you can't change stupidity. He would propose some type of median or curvature there and the same thing on Eastern Avenue.

Weir concurred that some sort of restrictions for turning would be helpful. She stated she is also concerned about the number of students that are walking across this area, there are two schools in close proximity.

Holtrop stated he agrees. We need to have properly designed driveways to support the turn restrictions.

Poyner stated he concurs with the other commissioners.

Benoit stated he has concerns regarding left turn into Family Dollar, however just because people are being idiots when they are driving we are putting restrictions on the applicants and he has a concern with that. He stated people don't follow the rules. Nobody else has a restriction on which way they can go, but we have to put the restriction on the applicant to make sure everyone is as safe as possible. He stated he will listen to the traffic experts and that is what we will do.

Pemberton stated at first he was thinking maybe he can be swayed at looking at a left out onto 52nd Street. However, listening to the concerns how traffic backs up during portions of the day and how people try to use the left turn lane to get into the 52nd Street Family Dollar driveways he thinks the right in right out makes sense and make it more than difficult to turn left in. He stated the connection with the shopping center drive to the east will be an advantage and once people learn how it works and how it flows they will use is. Pemberton questioned if there has been any discussion regarding lane diets. Golder stated 52nd Street is generally already three lanes, Eastern Avenue is in our Master Plan to look at it but she isn't sure. Golder stated at the driveway aligned with Southglow left turn in and outs are allowed, and it is connected to the gas station.

Jones stated she is surprised with the peak times that have been identified. She stated right near that intersection is a high school which means a lot of inexperienced drivers. She stated enforcement is a concern for her as well as site navigation. She questioned if we have right in right out at both of the driveways what will be the site navigation. How will they ensure the safety for the people that are leaving the gas pumps. McPhearson stated trial and error, they will figure it out but there will be a little bit of wayfinding. Mc Phearson stated right in, right out they will have pork chops so people cannot physically turn left. He stated the site layout includes pedestrian crosswalks and they have ADA parking in front of the store. The driveways are wide, there will be arrow striping on the pavement itself it should be self-evident. He stated they will consider the recommendation for right in, right out, that will be acceptable. He stated they will work out the geometry with staff and Engineering Department.

Holtrop questioned if they could get an access easement to the south edge of the property south of the pumps. He stated maybe they can funnel some traffic there and then they can turn left onto Eastern. McPhearson stated that has been thought about he doesn't know if it is feasible. McPhearson stated it has been considered but is not preferable.

Vandermeer questioned how may electric charging stations they are proposing. McPhearson stated there are no charging stations proposed with the initial construction, but all their infrastructure is prebuilt into these so when the need to switch over to EV comes this will be an easy fit. McPheason stated Kum & Go on all their stations has pre planned it. Discussion ensued. VanderMeer stated he is concerned with the bus stop right there with all the students. He questioned if it is feasible to move the bus stop and has Rapid done a traffic study. Golder stated the Rapid hasn't looked at it. She stated she thinks the bus stop is located in a place where it isn't going to be a problem.

Motion by Benoit, supported by Pemberton, grant conditional Approval for a Special Land Use Vehicle Fuel Station as for Kum and Go as described in Case No. 25-22. Approval is conditioned on conditions 1 –6 and basis points 1 –5 as described in Golder memo dated November 16, 2022.

- Motion Carried (9-0) -

Motion by Benoit, supported by Pemberton, to grant conditional Approval of the site plan dated November 15, 2022 as described in Case No 25-22. Approval is conditioned on conditions 1 –7 and basis points 1 –8 as described in Golder memo dated November 16, 2022.

- Motion Carried (9-0) -

<u>**Case#26-22**</u> – Zoning Ordinance Text Amendments Relating to Short Term Rentals

Schweitzer stated there has been conversation at the City Commission level regarding short term rentals/Airbnb's. The commissioners discussed the safety, traffic and speeding concerns expressed by homeowners associated with short-term rentals already within the community.

Schweitzer stated we are seeking alignment between our the regulatory ordinance and zoning ordinance that deals more with land use. He stated City Commission took the first step in amending our regulatory ordinance to put restrictions on short term rentals within the community.

Schweitzer stated the regulatory changes were the need based upon to protect general health safety and welfare of the community, the desire to retain the existing long-term housing stock and to preserve the unique nature of the diverse residential neighborhoods within the community. He stated the long term housing stock relates to housing available to residents for full time use throughout the year He stated there is concern that if short term rentals were left to the market to happen within the community it would deter some people from living within the community due to diminished sense of safety.

Schweitzer stated there was discussion about the enforcement process and that has also been a concern of the City Commission during the work session. If we are going to have an ordinance, we want to have a sense that it is going to be enforced upon and what that enforcement might entail.

Schweitzer provided to the commissioners an overview of what has been discussed at the staff level and the City Commission.

Schweitzer stated back in 1987 the City enacted a regulatory ordinance dealing with rental housing within the community. There was concern as the community would age and housing stock would age that there may not be the same level of safe and comfortable living for people within the communities. Therefore, the City enacted a program back in

1987 that called for periodic inspection of all rental properties given the nature of short term rentals, it makes sense that it be covered under that. He stated we have a full time rental inspector devoted to this program.

Schweitzer stated under the proposed language rentals of 27 days or less will be considered short term rentals. Short term rentals would be prohibited. He stated staff did check with the rental property owners association and amongst their members they already have leases that go as little as a 30 day period in one month. This will still allow Airbnb to operate in the community. Discussion ensued.

Jones opened the public hearing.

There was no public comment.

Motion by Benoit, supported by Poyner to close the public hearing.

- Motion Carried (9-0) –

Pemberton stated he doesn't really have a comment. He stated if the State comes up with something different it is going to preempt us anyway and questioned if all this is potentially a moot point. Schweitzer stated there has been legislation introduced over the last several years and this year it passed the house and got to the senate committee and there has been some discussion that this might be taken up lame duck session. He stated from what we heard it won't likely be taken up at lame duck this year. It will perhaps go back through the process again. He stated MML has been working with the legislature in order to come up with a compromise to have something that all people could live with. Some of the compromises can still limit what the local unit of government can do. Pemberton stated he sees this as something that will be looked at again to tweak and mold it into something that works. He is in favor of what is being proposed it is at least a start.

Benoit requested verification that this is just to align some language in the zoning ordinance with the regulatory ordinance that has already been passed. Schweitzer stated that is correct. Schweitzer stated there are 3 components a new definition for short term rental, a revision of our definition of family and a new section in the ordinance that says there is no allowance for short term rentals. Schweitzer stated the way that the regulatory ordinance has been crafted and working with the City Attorney's office is so that the enforcement is centered in the Department of Engineering and Inspections and they will be the ones handling the enforcement. Discussion ensued.

Poyner questioned if we have the authority to reach out to Airbnb and Vrbo to let them know airbnbs aren't allowed in Kentwood and to restrict the Kentwood search. Schweitzer stated they have changed some of their policies in the past year to respond to issues that have been encountered in a number of communities. Airbnb has tightened up their policy to be responsive to the ones where parties have gotten out of control. He stated we hope Airbnb will be respectful that they will expect the people that are participating in their program are observing the local regulations. Discussion ensued.

Holtrop stated if you put Kentwood in the search for Airbnb it does list surrounding areas as well. When you search Kentwood you have adjoining communities. Holtrop questioned if there was any discussion about loss of revenue to the community members. Holtrop stated if he as an Airbnb he can rent every weekend he stated he would not be very happy with the City or the Planning Commission and wondered if that came up at all in any of the discussions. Schweitzer stated not that specific argument has not been discussed. Holtrop questioned how did we came up with 27 days versus 14 days. Schweitzer stated the shortest month is February.

Weir stated she is not opposed; however, she thinks Airbnb's are a dream for families with young children. She also stated we should consider this may represent lost revenue to some. She stated she wouldn't go anywhere where she can't get an Airbnb due to having small children.

VanderMeer stated he struggles with telling someone if you buy a house, you can't rent it out. He stated to him we need to figure out a way to manage that process. He stated he would be in favor of trying to open it back up. He questioned if there was a way to find out from Airbnb what is the true number of short-term rentals in Kentwood. Schweitzer stated just to clarify the city isn't saying if they buy a house they can't rent it.. Discussion ensued.

Jones stated she checked with the County Treasurer and he said the money all goes in one bucket and it is not broken out by municipalities. She stated she also reached out to the County lobbyist to ask about whether this legislation might move in lame duck but it doesn't sound like there is enough traction to move it out of committee to a full vote.

Motion by Holtrop, supported by Benoit, to recommend to the City Commission amendment of the Zoning Ordinance to: Define the term "Short Term Rentals" , re-define the term "family" and adding "Section 3-32 prohibiting short term rentals".

- Motion Carried (9-0) -

J. Work Session

There were no work sessions.

K. New Business

Motion by Benoit, supported by Holtrop, to set a public hearing date of January 10, 2022 for: <u>Case#1-23</u> - Steelcase – Major Change to a PUD and Preliminary Site Plan Review – Located at 4308 52nd Street SE

- Motion Carried (9-0) -

L. Other Business

1. Commissioners' Comments

Commissioners wished everyone a Happy Holiday.

Commissioners let Pemberton know that it has been a pleasure working with him on the committee and wished him the best of luck

Holtrop stated there was an indoor car fire at GR Auto Gallery. He was questioning if it was because of the amount of cars they have in the building.

Holtrop stated he likes to be up to date on the airport study and what is happening there. Schweitzer stated a presentation will be made to the City Commission Committee of the Whole during their Dec 6 meeting.

2. Staff's Comments

Staff offered no additional comment.

M. Adjournment

Motion by Commissioner Benoit, supported by Commissioner Kape, to adjourn the meeting.

- Motion Carried (9-0) –

Meeting adjourned at 8:40pm

Respectfully submitted,

Ed Kape, Secretary

CITY OF KENTWOOD
PLANNING COMMISSION
PROPOSED
FINDINGS OF FACT
DECEMBER 13, 2022

Golder 11/16/22

PROJECT:	Kum and Go Special Land Use for a Vehicle Fuel Station
APPLICATION:	25-22
REQUEST:	Special Land Use for a Vehicle Fuel Station
LOCATION:	SE corner of 52nd Street and Eastern Avenue SE (5202 Eastern Avenue, 5244 Eastern Avenue (part), 846 52nd Street and 860 52nd Street SE
HEARING DATE:	October 25, 2022
MOTION:	**Motion by Benoit, supported by Pemberton, grant conditional Approval for a Special Land Use Vehicle Fuel Station as for Kum and Go as described in Case No. 25-22. Approval is conditioned on conditions 1 –6 and basis points 1 –5 as described in Golder memo dated November 16, 2022.**

- Motion Carried (9-0) -

CONDITIONS:

1. Compliance with the operations statement dated November 15, 2022 by Atwell Group regarding the proposed vehicle fuel operation, with the following amendments:

    a. The statement shall indicate that the extent and nature of exterior sales shall be approved by Planning staff.

    b. The statement shall indicate that the Kentwood Engineering Department shall approve the width and design for both the 52nd Street and Eastern Avenue driveways.

2. Both the Eastern Avenue driveway and the 52nd Street driveway shall be right-in, right-out only.

3. Compliance with the City Engineer's memo dated October 5, 2022 and the Kentwood Fire Marshal memo dated October 5, 2022.

4. Staff approval of the final landscape plan.

5. Final staff approval of the proposed building materials.

6. Staff approval of the lighting plan.

BASIS:

1. Kentwood Planning staff must review and approve the type and extent of exterior sales on the site in order to ensure that it is consistent with similar uses and product will not be placed in front of windows. In addition, the Special Land Use operations statement must be amended to indicate that Kentwood Engineering must approve the final width of the 52nd Street and Eastern Avenue driveway curb cuts; the developer is proposing widths that exceed city standards.

2. The 52nd Street and Eastern Avenue driveway curb cuts do not meet city standards. Reduced curb cut widths will improve pedestrian safety on 52nd Street and on Eastern Avenue. The Kentwood Engineering Department, upon recommendation of the City's traffic consultant will also determine the design of the curb cut and deceleration tapers.

3. The applicant has proposed two curb cuts that meet neither City of Kentwood nor MDOT access management standards. The Michigan Department of Transportation Access Management Guidelines recommend a 230' corner clearance between a signalized intersection on an arterial street and a driveway (assuming 30-35 mile per hour posted speed). The 52nd Street driveway is 190 feet from the 52nd/Eastern intersection. The Eastern Avenue driveway is only 110 feet from the 52nd Street/Eastern Avenue intersection. The speed limit on Eastern Avenue is 40 miles per hour.

   Similarly, Section 17.11 of the Kentwood Zoning Ordinance recommends alignment of new commercial driveways with driveways or streets on the opposite side of the roadway. If this is not possible, driveways should be offset a minimum of 250 feet. Neither driveway aligns with the driveways on the opposite side of the street. The ordinance further calls for greater spacing of driveways at signalized intersections.

   The recommendation for both driveways to be right-in, right-out only allows for access both on 52nd Street and Eastern Avenue. Left turns in and out of the site can still occur at the driveway that aligns with Southglow Court. The applicant could also determine whether it is possible to establish an easement west of the Kum and Go building to connect to the property to the south.

4. The lighting plan will provide information on lighting levels on the site as well as the type of fixtures proposed for the development. Canopy lighting should be recessed to minimize glare to the public streets and adjacent properties. The proposed lighting plan does not appear to meet the requirements of Chapter 20.

5. Discussion at the work session and public hearing.

CITY OF KENTWOOD
PLANNING COMMISSION
PROPOSED
FINDINGS OF FACT
DECEMBER 13, 2022

Golder 11/16/22

PROJECT:	Kum and Go Site Plan Review
APPLICATION:	25-22
REQUEST:	Site Plan Review of a Vehicle Fuel Station
LOCATION:	SE Corner of Eastern Avenue and 52nd Street
HEARING DATE:	October 25, 2022
MOTION	**Motion by Benoit, supported by Pemberton, to grant conditional Approval of the site plan dated November 15, 2022 as described in Case No 25-22. Approval is conditioned on conditions 1 –7 and basis points 1 –8 as described in Golder memo dated November 16, 2022.**

- Motion Carried (9-0) -

CONDITIONS:

1. Compliance with the operations statement dated November 15, 2022 by Atwell Group regarding the proposed vehicle fuel operation, with the following amendments:

    a. The statement shall indicate that the extent and nature of exterior sales shall be approved by Planning staff.

    b. The statement shall indicate that the Kentwood Engineering Department shall approve the width and design for both the 52nd Street and Eastern Avenue driveways.

2. The site plan shall portray the Eastern Avenue driveway and the 52nd Street driveway as right-in, right-out only.

3. Compliance with the City Engineer's memo dated October 5, 2022 and the Kentwood Fire Marshal memo dated October 5, 2022.

4. Staff approval of the final landscape plan.

5. Staff approval of the proposed building materials.

6. Staff approval of the lighting plan.

7. Planning Commission approval of the Special Land Use for Vehicle Fuel Stations.

BASIS:

1. Kentwood Planning staff must review and approve the type and extent of exterior sales on the site in order to ensure that it is consistent with similar uses and product will not be placed in front of windows. In addition, the Special Land Use operational statement must be amended to indicate that Kentwood Engineering must approve the final width of the 52nd Street and Eastern Avenue driveway curb cuts; the developer is proposing widths that exceed city standards.

2. The 52nd Street and Eastern Avenue driveway curb cuts do not meet city standards. Reduced curb cut widths will improve pedestrian safety on 52nd Street and on Eastern Avenue. The Kentwood Engineering Department, upon recommendation of the City's traffic consultant will also determine the design of the curb cut and deceleration tapers.

3. The applicant has proposed two curb cuts that meet neither City of Kentwood nor MDOT access management standards. The Michigan Department of Transportation Access Management Guidelines recommend a 230' corner clearance between a signalized intersection on an arterial street and a driveway (assuming 30-35 mile per hour posted speed). The 52nd Street driveway is 190 feet from the 52nd/Eastern intersection. The Eastern Avenue driveway is only 110 feet from the 52nd Street/Eastern Avenue intersection. The speed limit on Eastern Avenue is 40 miles per hour.

   Similarly, Section 17.11 of the Kentwood Zoning Ordinance recommends the alignment of new commercial driveways with driveways or streets on the opposite side of the roadway. If this is not possible, driveways should be offset a minimum of 250 feet. Neither driveway aligns with the driveways on the opposite side of the street. The ordinance further calls for greater spacing of driveways at signalized intersections.

   The recommendation for both driveways to be right-in, right-out still allows access both on 52nd Street and Eastern Avenue. Left turns in and out of the site can still occur at the driveway that aligns with Southglow Court. The applicant could also determine whether it is possible to establish an easement west of the Kum and Go building to connect to the property to the south.

4. The lighting plan will provide information on lighting levels on the site as well as the type of fixtures proposed for the development. Canopy lighting should be recessed to minimize glare to the public streets and adjacent properties. The proposed lighting plan does not appear to meet the requirements of Chapter 20.

5. Discussion at the work session and public hearing.

BASIS:

1. There is additional traffic information needed regarding the proposed fueling station, including crash data for both Eastern Avenue and 52nd Street that will help inform the city's traffic engineer determine the type of access for the 52nd Street and Eastern Avenue frontages.

2. The proposed driveways for the Kum and Go development do not meet the access management standards for full service driveway clearance from signalized intersections with speed limits of 35-40 miles per hour.

3. While the city's traffic engineer acknowledges that the traffic analysis shows that the site will deliver an acceptable level of service, additional information will be required in terms of crash data and safety, given the anticipated increase in traffic and the distance of the proposed driveways from the intersection.

CITY OF KENTWOOD
PLANNING COMMISSION
PROPOSED
FINDINGS OF FACT
DECEMBER 13, 2022

Schweitzer 11-17-2022

PROJECT:	Zoning Ordinance Amendments-Short Term Rentals
APPLICATION:	26-22
HEARING DATE:	November 22, 2022
REVIEW TYPE:	Zoning Ordinance Text Amendments
MOTION:	**Motion by Holtrop, supported by Benoit, to recommend to the City Commission amendment of the Zoning Ordinance to: Define the term "Short Term Rentals" , re-define the term "family" and adding "Section 3-32 prohibiting short term rentals".**

- Motion Carried (9-0) -

GENERAL BASIS:	The amendment of Zoning Ordinance regulations regarding short-term rentals aligns with the recently adopted amendment of the city's Rental Dwelling Inspection Program regulatory ordinance to protect the general health, safety, and welfare of the community, retain existing long term-housing stock, and preserve the unique character of the diverse residential neighborhoods within the City.

RECOMMENDED ORDINANCE AMENDMENT LANGUAGE:

Amendment of Section 2.02. Chapter 2 Section 2.02 of Appendix A "Zoning" of the Code of Ordinances for the City of Kentwood entitled "Definitions" is hereby amended as follows:

- The term "Short-term rental" is added as follows:
  Short-term rental is defined as the letting or subletting of an attached single-family dwelling, detached single-family dwelling, two-family dwelling, or any portion thereof for a period of twenty-seven consecutive days or less. The term does not include the following:

  1. The letting of an owner-occupied or tenant-occupied attached single-family dwelling, detached single-family dwelling, two-family dwelling, or any portion thereof to a member of the owner or tenant's family.
  2. The letting of an owner-occupied or tenant-occupied attached single-family dwelling, detached single-family dwelling, two-family dwelling, or any portion thereof to a caregiver who is providing services to the owner, tenant, or a member of the owner or tenant's family who resides at the attached single-family dwelling, detached single-family dwelling, or two-family dwelling; or

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3. The letting of an attached single-family dwelling, detached single-family dwelling, or two-family dwelling by a previous owner or owner's family after closing and prior to the transfer of possession.

For the purpose of this definition, the term tenant means an individual letting or subletting an attached single-family dwelling, detached single-family dwelling, two-family dwelling, or any portion thereof for a period greater than twenty-seven consecutive days.

- The term "Family" is amended and reads in its entirety as follows:

Family means either of the following:

1. Domestic family. One or more persons related by the bonds of blood, marriage, guardianship, or adoption who reside together as a single, domestic, housekeeping unit.

2. Functional Equivalent. One or more persons whose relationship is of a permanent, enduring, or long-term nature who reside together as a single, domestic, housekeeping unit.

[The remainder of Section 2.02 is substantively unchanged]

Article 3. Enaction of Section 3-32. Chapter 3 Section 3-32 of Appendix A "Zoning" of the Code of Ordinances for the City of Kentwood entitled "Short-term rentals" is hereby enacted and reads in its entirety as follows:

Sec. 3.32. – Short-Term Rentals.

(a) Short-term rentals are prohibited within the City.

STAFF REPORT:	December 6, 2022
PREPARED FOR:	Kentwood Planning Commission
PREPARED BY:	Lisa Golder
CASE NO.:	1-23 Steelcase PUD Major Change

GENERAL INFORMATION

APPLICANT:	Eric Calcatera Steelcase Inc. PO Box 1967 Grand Rapids MI 49501-1967
STATUS OF APPLICANT:	Property owner representative
REQUESTED ACTION:	*Applicant is requesting a major change an approved site plan for the Steelcase PUD
EXISTING ZONING OF SUBJECT PARCEL:	IPUD – Industrial Planned Unit Development
GENERAL LOCATION:	4308 52nd Street SE
PARCEL SIZE:	27.1 Acres; overall 126 acres
EXISTING LAND USE ON THE PARCEL:	Existing maintenance facilities and vehicle storage/Vacant
ADJACENT AREA LAND USE LAND USE	N: 52nd Street, Lacks Industries S: Steelcase Manufacturing plant (786,000 square feet) E: Snackcraft LLC manufacturing facility W:Swoboda, Inc.
ZONING ON ADJOINING PARCELS:	N: I-1 Light Industrial S, E, W: I-PUD Industrial Planned Unit Development

Compatibility With Master Plan
The Master Plan recommends industrial use for the site.

Relevant Zoning Ordinance Sections
General standards for Planned Unit Developments are found in Section 12.01 and 12.02 of the Zoning Ordinance. Permitted uses, development requirements, and other development guidelines for Industrial PUDs are found in Section 12.08 of the Kentwood Zoning Ordinance. Standards for PUD approval can be found in Section 12.10 and 12.12 of the Zoning Ordinance. Site plan standards are found in Chapter 14 of the Zoning Ordinance.

Zoning History
The property was zoned for agriculture and low density residential prior to 1980. In 1980 358.9 acres of land was rezoned from Agricultural and R1-B Low Density Residential to I-1 Light Industrial. At the same time, Steelcase sought an extension of the Grand Rapids Sewer Service District to serve this section. In 1982 the Light Industrial zoning was amended to an Industrial Planned Unit Development (IPUD) of 408 acres, and a development plan was adopted at that time. In 1987 four parcels totaling 99 acres were added to the IPUD to create the 507 acre development. At that time, it was envisioned that Steelcase would someday build and occupy approximately 6 million square feet of manufacturing, shipping, distribution and other operations within the campus.

In 2014 a Major Change to the approved Steelcase site plan was approved through the Planning and City Commissions. A new development agreement was approved and signed by all the property owners—Steelcase, Franklin Partners, Roskam Baking, as well as the city.

In 2017 another amendment to the Steelcase PUD was approved to allow a the construction of a credit union and to allow for the increase of square footage of several of the buildings in the southeast corner of the PUD. The PUD Agreement/Plan that incorporates these changes is attached.

Project Overview
Steelcase would like to sell a 27.1 acre parcel within the Steelcase IPUD to Transport Properties LLC. The parcel is currently part of 4308 52nd Street SE, and is located north of an existing 786,000 Steelcase manufacturing facility. The 27 acres includes 1,354 feet of frontage on 52nd Street. The approved Steelcase PUD plan portrays an existing truck maintenance and wash facility as well as a future 80,000 square foot building on this site.

Transport Properties wishes to use the site for truck parking, truck storage and maintenance and is in discussion with a variety of companies interested in leasing or acquiring all or a portion of the site. Truck parking is planned to replace the 80,000 square foot building portrayed in the approved PUD plan. In addition, 2-3 additional curb cuts onto 52nd Street are proposed.

Any amendment to the PUD Plan is reviewed as to determine whether it is a major or a minor change. A minor change can proceed directly to final PUD approval, while a major change requires re-approval of the preliminary plan by both the Planning and City Commissions. Likewise, a change in the PUD Agreement constitutes a major change. The addition of the parking area in lieu of the 80,000 square foot building is considered a major change the approved PUD Plan. The proposed additional curb cuts would also be considered a major change to the approved PUD and PUD Agreement.

TECHNICAL INFORMATION

Streets and Traffic:
The approved Steelcase PUD Plan has one access point onto 52nd Street (North Campus Drive). If additional curb cuts are proposed, the PUD Agreement requires a traffic analysis in order to determine whether the curb cut9s) will be permitted.

The applicant has contracted with Spalding DeDecker to analyze the traffic along 52nd Street and at nearby intersections, as per the PUD Agreement. The conclusions of the analysis are attached.

The Spalding DeDecker traffic report analyzes the potential future uses of the 27-acre parcel and projects the future traffic and level of service of nearby intersections. The findings of the traffic study indicate that the intersections (East Paris and Broadmoor) will continue to operate at an acceptable level of service through at least 2030. Fifty-second Street traffic was also analyzed and the traffic study determined that the proposed uses will not have a negative impact on 52nd Street traffic. Further, the study showed that the additional proposed access points will not have a negative impact on 52nd Street traffic. The summary of the traffic study findings is attached.

Internal Circulation:
The Steelcase PUD was developed with the concept of an internal roadway system for truck and employee circulation. The 52nd Street driveway is the only driveway serving the 1,354 feet of Steelcase Street frontage on 52nd Street. There is a guard shack located 210 feet from the 52nd Street frontage on North Campus Drive. Steelcase has indicated that North Campus Drive provides access to the 786,000 square foot K-4 plant. However, US Customs rules and regulations require that the access must be kept physically separate from other properties.

Access Management
The three proposed driveways on 52nd Street were found to have no significant impact on 52nd Street traffic. However, it appears that there is not adequate traffic anticipated to justify three curb cuts along the 52nd Street frontage. Kentwood and the State of Michigan access management standards recognize that while landowner has a right to reasonable access, the primary function of the arterial street is the movement of traffic. The developer has not provided justification of the need for three new access points.

The city has established standards for access management through its ordinances and policies. In Accordingly, the Steelcase PUD Agreement addresses the need for access management throughout the PUD. Section 3 of the executed Steelcase Development Agreement that states that an important feature of the PUD Agreement is to "reasonably limit access points to public rights of way when appropriate, subject to the City Commission's conditions of approval and the findings and recommendations of any traffic study set forth."

In addition, Section 12.02 F of the Zoning Ordinance lists various benefits of PUD development, including the use of "unified access and circulation that reduces the number of driveways". Similarly, Section 17.10 of the Zoning Ordinance addresses access management and driveway spacing standards for arterial streets within the city. The proposed placement of the center driveway does not meet the minimum 250' offset for driveways outlined in Section 17.10 B.2.D.

The 52nd Street frontage along the north side of the property includes a significant berm that currently screens the truck maintenance and parking uses from the public right of way. The addition of driveways, especially the eastern-most driveway, will diminish large sections of the berm that are 20' in height in some areas.

The applicant should provide additional justification for the need for three new curb cuts onto 52nd Street. Alternatively, the applicants could determine whether shared access of the existing driveway North Campus Drive is feasible. This may require the relocation of the existing guard shack on the Steelcase property but may allow for greater flexibility in the future as Steelcase considers the disposition of other land within the PUD.

Site Characteristics:
The 27 acre site has been used for Steelcase truck parking and maintenance. The western third of the property is undeveloped.

Staff Review

1. Transport Properties LLC is the contract purchaser of the 27 acres of land within the Steelcase PUD to be used for commercial vehicle maintenance as well as truck and trailer parking. Potential operators could include a large shipping/trucking tenant that requires vehicle maintenance and repair facilities, or company(s) that require off-site truck parking capacity. If the vehicle maintenance facility is integrated as part of a fleet or truck operation, then it is considered an accessory use (similar to its current use by Steelcase). If it is not integrated into the development, then it is considered a Major Vehicle Repair Establishment, requiring Special Land Use approval. If the vehicle maintenance is integrated into the development, then cross access between the parcels will be required. The PUD Statement should be updated to reflect this distinction regarding major vehicle repair.

2. In 2014 the Planning and City Commissions approved an amendment to the Steelcase PUD, and adopted a development agreements related to the future development of the PUD. Portions of the PUD are now owned by limited liability corporations related to Roskam Baking Company, as well as ETO Magnetic Corporation and Stag Industrial Holdings LLC. If a new development agreement is required, all the entities with ownership interest would need to sign off on the new agreement.

3. The applicant has proposed three potential curb cuts onto 52nd Street. The need for these curb cuts must be justified. The use of the existing building for vehicle maintenance must be integrated into the development; otherwise Special Land Use approval is required. If the development is integrated, fewer curb cuts are necessary.

4. The US customs may require physical separation between the Steelcase plan and the 27 acre Transport Properties parcel. It is unclear whether this would require fencing between the uses. If so, it should be noted on the site plan.

5. The applicant shows new curb cuts to 52nd Street. If these are approved, significant portions of the existing landscape buffer will be removed. The applicant must provide a landscaping plan as part of the final PUD approval to address these changes.

6. The current PUD Agreement is attached. A new Agreement will need to incorporate any proposed changes to the PUD.

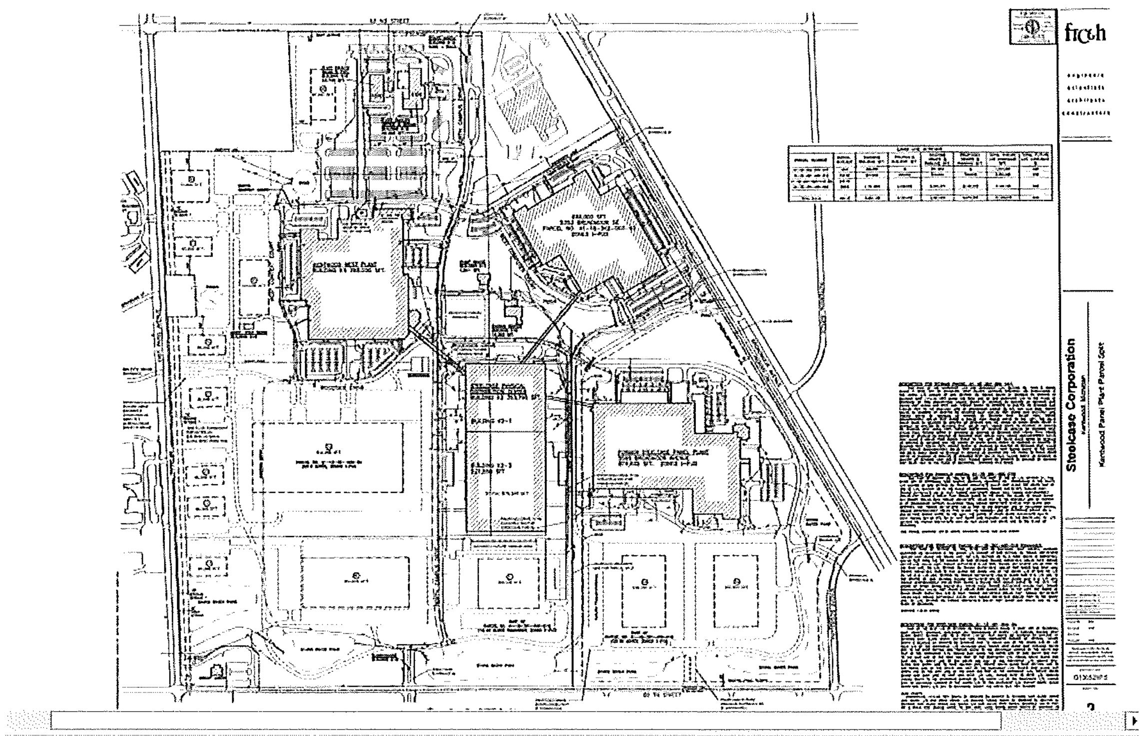
Attributes:

- Proposed use of existing maintenance facility
- Maintains needed separation of Steelcase traffic for US customs requirements

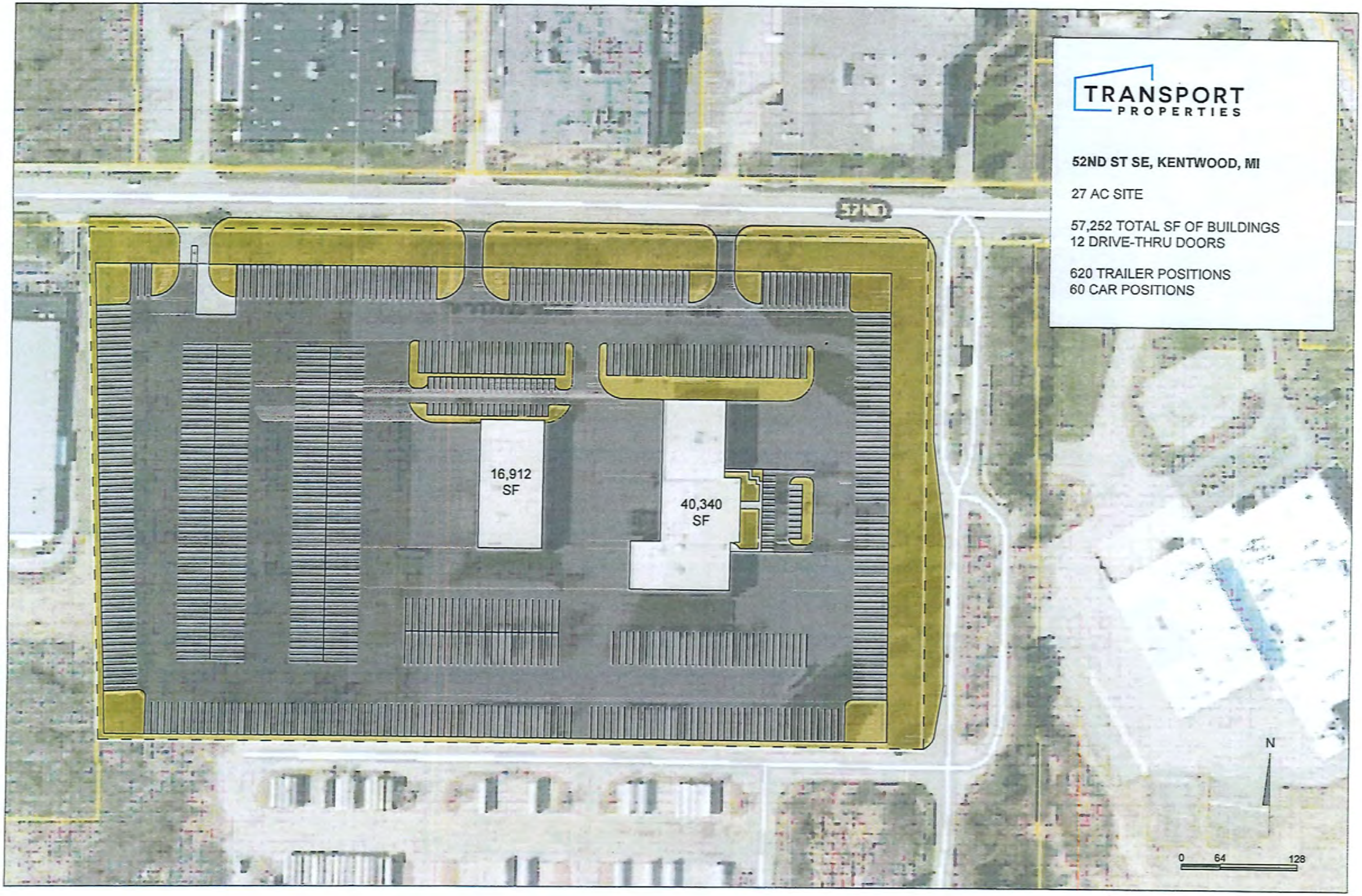
Issues:

- Need for three curb cuts
- Unclear as to whether the maintenance use is integrated into the overall development
- Detail regarding fencing to separate the Plant K-4 from the 27 acre parcels is unclear.

Proposed Transport Properties location



2017 Steelcase PUD


TRANSPORT
PROPERTIES
52ND ST SE, KENTWOOD, MI
27 AC SITE
57,252 TOTAL SF OF BUILDINGS
12 DRIVE-THRU DOORS
620 TRAILER POSITIONS
60 CAR POSITIONS
16,912
SF
40,340
SF
N
0
64
128

2014 Development Agreement

RECD KENT COUNTY, MI ROD
2014 MAY 30 PM 4:08

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20140530-0042579
Mary Hollinrake P:1/33 4:39PM
Kent Cnty MI Rgstr 05/30/2014 SEAL

PUD DEVELOPMENT AGREEMENT

This PUD Development Agreement (the "**Agreement**") is executed this 28th day of May, 2014, by and among the CITY OF KENTWOOD, a Michigan municipal corporation, the address of which is 4900 Breton Avenue, S.E., P.O. Box 8848, Kentwood, Michigan 49518-8848 (the "**City**"), STEELCASE INC., a Michigan corporation, the address of which is 901 44th St., Grand Rapids, Michigan 49508 ("**Steelcase**"), FRANKLIN 5565 BROADMOOR, LLC, a Michigan limited liability company, the address of which is 55 Shuman Blvd., Suite 178, Naperville, Illinois 60563 ("**Franklin Partners**"), ROSKAM BAKING COMPANY, a Michigan corporation, the address of which is 4880 Corporate Exchange Blvd., Grand Rapids, Michigan 49512 ("**Roskam**"), and PROCESSING SPECIALTIES, INC., a Michigan corporation, the address of which is 4880 Corporate Exchange Blvd., Grand Rapids, Michigan 49512 ("**Processing Specialties**"). Steelcase, Franklin Partners, Roskam and Processing Specialties are sometimes referred to herein individually as a "**Developer**" and collectively as the "**Developers.**"

RECITALS

A. In 1987, Steelcase owned certain real property in the City of Kentwood located south and east of 52nd Street and East Paris Avenue, which real property is more particularly described on Exhibit A attached hereto and incorporated by reference ("**Property**"). The Property consists of approximately 497.45 acres.

B. Prior to 1982, certain portions of the Property were zoned for the following classifications: I-1 Light Industrial, A-1 Agricultural, and R1-B Single Family Residential. In 1982, a portion of the Property was rezoned to Industrial Planned Unit Development ("**IPUD**"). On May 5, 1987, pursuant to Ordinance No. 14-87, the City rezoned the balance of the Property to IPUD. At that time, the City determined that the development of the Property into an industrial campus for Steelcase's manufacturing and distribution operations would be compatible with adjacent land uses and the City's Master Plan.

C. At the time the Property was rezoned by the City to IPUD, the City's Zoning Ordinance did not contain a requirement that the developer of the Property enter into a formal development agreement with the City detailing the various characteristics of the IPUD. However, in connection with the rezoning of the Property to IPUD, Steelcase did provide the City with a "Written Statement of the PUD," a copy of which is contained in Exhibit B attached hereto and incorporated by reference ("**Original IPUD Statement**"). In addition, at the time of

(9)

the rezoning of the Property to IPUD, Steelcase also submitted a site plan to the City, a copy of which is contained in Exhibit C attached hereto and incorporated by reference (**"Original IPUD Site Plan"**).

D. Since May 5, 1987, Steelcase has developed the Property as an industrial campus for its manufacturing and distribution operations, and consistent with the Original IPUD Statement and the Original IPUD Site Plan. The Property has been substantially, but not entirely, developed by Steelcase. In particular, the Property currently consists of the following structural elements: (i) three (3) large industrial manufacturing buildings ranging in size from approximately 660,000 square feet to 874,000 square feet, (ii) a shipping distribution building that is approximately 875,348 square feet, (iii) two (2) shipping fleet maintenance buildings that are approximately 23,758 square feet and 40,225 square feet, respectively, (iv) an energy center that is approximately 14,282 square feet, and (v) a fire pump house that is approximately 1,891 square feet.

E. In 2006, Steelcase sold a portion of the Property commonly known as 5353 Broadmoor Ave., SE, Kentwood, Michigan 49512 (Tax Id. No. 41-18-36-200-047), and more particularly described on Exhibit D attached hereto and incorporated by reference (**"5353 Broadmoor Property"**), to Franklin Broadmoor, L.L.C. In 2009, Franklin Broadmoor, L.L.C. sold the 5353 Broadmoor Property to Processing Specialties and Roskam. As of the date of this Agreement, Processing Specialties owns an undivided sixty-seven percent (67%) interest in the 5353 Broadmoor Property and Roskam owns an undivided thirty-three percent (33%) interest in the 5353 Broadmoor Property.

F. As of the date of this Agreement, Steelcase intends to sell a portion of the Property more particularly described on Exhibit E attached hereto and incorporated by reference (**"KWE Property"**) to Franklin Partners. The KWE Property consists of properties with the following addresses and Tax Identification Numbers: (i) 5565 Broadmoor Ave., Kentwood, Michigan 49512 (Tax Id. No. 48-18-36-400-019), (ii) 5798 Broadmoor Ave. SE, Grand Rapids, Michigan 49512 (Tax Id. No. 41-19-31-351-001), and (iii) 5824 Patterson Ave. SE, Grand Rapids, Michigan 49512 (Tax Id. No. 41-19-31-351-002).

G. As part of the sale of the KWE Property to Franklin Partners, certain traffic circulation patterns within the Property will need to be altered. In order to effectuate those alterations, the City's ordinances require that the Developers submit an updated IPUD site plan to the Kentwood City Commission for approval as an amendment to the Original IPUD Site Plan. The updated and approved IPUD site plan is set forth in Exhibit F attached hereto and incorporated by reference (**"Updated IPUD Site Plan"**). The parties acknowledge and agree that the Updated IPUD Site Plan replaces and supersedes the Original IPUD Site Plan. The parties further acknowledge and agree that this Agreement replaces and supersedes the Original IPUD Statement.

H. Also, due to new requirements in the City's zoning ordinance (**"Zoning Ordinance"**) since the time that the Property was rezoned to IPUD, the City now requires that developers enter into an agreement to confirm the nature of the existing development of the Property, guide future development of the Property, and memorialize the parties' understandings.

I. The Developers intend to utilize the Property as an industrial campus consisting of multiple shipping, manufacturing and service buildings as shown on the Updated IPUD Site Plan. The following provides a brief summary of certain existing elements of the Property, as well as future plans for certain elements of the Property:

- *Architectural and Landscaping Features* - The existing three manufacturing buildings and the distribution building have a precast concrete lower band with vertical corrugated steel siding above. Office elements are architectural brick and mortar. The Property has mature dense landscaping features screening the site from public view and screening parking areas from the perimeter road. Future development within the Property will follow similar landscaping features, depending on function, and will be developed architecturally in a manner consistent with the City's conditions of approval associated with the Updated IPUD Site Plan, except to the extent that an exception is permitted in this Agreement or authorized in the future by the City.

- *Open Space Features* - The current development of the Property incorporates large green space areas. However, these areas are not designated for shared or public use in the Original IPUD Statement or the Original IPUD Site Plan. The Updated IPUD Site Plan does not add any private or public open space features to the Original IPUD Site Plan. Depending on future needs for the Property, however, private or public open space features could be added in the future.

- *Relationship to the Master Plan.* The existing and planned development of the Property continues to serve the goals of the City Master Plan by retaining the zoning of I-PUD, and continuing use of the Property as an industrial campus.

AGREEMENT

For good and valuable consideration including, but not limited to, the covenants and pledges contained herein, and the City's agreement to forego the posting of additional performance guarantees, the sufficiency of which is acknowledged and relied upon, the parties agree as follows:

Section 1. Compliance with Laws, Ordinances, Permits. Each Developer agrees that the Developer, its successors and assigns shall only construct, install, and operate buildings and other structures (**"Improvements"**) upon the Property in accordance with approvals received from governmental entities with proper jurisdiction. No new Improvements, except as shown on the Updated IPUD Site Plan, shall be constructed or installed except with the prior approval of the City, issued in accordance with the Zoning Ordinance, which approval shall not be unreasonably withheld, delayed, or conditioned, and such construction and/or installation shall be consistent with all applicable City ordinances. In constructing Improvements upon the Property, each Developer agrees to comply with all state and local laws, ordinances, and regulations as well as the terms of this Agreement. Without limiting the preceding sentence, it is understood and agreed that except as expressly provided for herein, development of

Improvements upon the Property must comply with applicable provisions of the Zoning Ordinance.

Section 2. Compliance with Governmental Approvals. Without limiting the provisions of Section 1, each Developer agrees that the Developer, its successors and assigns shall design, develop, construct and operate the Improvements and associated developments in accordance with the terms and conditions of approval received from any governmental entity with jurisdiction over the particular Improvement or associated development including, without limitation, the terms and conditions of this Agreement and the City Commission's conditions of approval granted on April 1, 2014. Each Developer acknowledges and agrees that the Developer, its successors and assigns may not seek variances and/or deviations from the Updated IPUD Site Plan from the City's Zoning Board of Appeals; provided, however, that this prohibition shall not limit the right of a Developer to seek a variance from the Zoning Board of Appeals in order to construct or install a particular Improvement or to the extent the Zoning Ordinance requires or authorizes a variance not otherwise prohibited by this Agreement.

Section 3. Conditions. The Property shall be developed, used and maintained consistent with the following:

A. Street Access.

i. Currently, access within the Property is provided via private streets that are maintained by the Developers as set forth below. The Property currently has limited access points to public rights-of-way, and it is an important feature of this Agreement to reasonably limit access points to public rights-of-way when appropriate, subject to the City Commission's conditions of approval and the findings and recommendations of any Traffic Study as set forth herein.

ii. Currently, the 5353 Broadmoor Property has two access points to Broadmoor Avenue as shown on the Updated IPUD Site Plan. The KWE Property currently has one access point to Patterson Avenue as shown on the Updated IPUD Site Plan. As part of the sale of the KWE Property to Franklin Partners, a second means of access to Broadmoor Avenue to and from the KWE Property will be provided through the 5353 Broadmoor Property as shown on the Updated IPUD Site Plan. In particular, the private drive currently serving the KWE Property will be connected to the private drive on the 5353 Broadmoor Property which leads out to Broadmoor Avenue. An easement between Processing Specialties and Roskam, as owners of the 5353 Broadmoor Property, and Franklin Partners, as future owner of the KWE Property, will be entered into (a) to allow additional access points to Broadmoor Avenue for the KWE Property, and (b) to allocate maintenance responsibilities for the Shared Private Drive (as defined below) between the KWE Property and the 5353 Broadmoor Property. The remainder of the Property that is owned by Steelcase (**"Steelcase's Remaining Property"**), and does not include the

KWE Property or the 5353 Broadmoor Property, has one access point to 52nd Street on the north side of the Property and another access point to 60th Street on the south side of the Property. As envisioned by the Updated IPUD Site Plan, Steelcase's Remaining Property will not utilize any of the private roads located on the KWE Property or the 5353 Broadmoor; rather it will utilize only those private roads located on Steelcase's Remaining Property.

iii. The Updated IPUD Site Plan also identifies two potential future access points to public rights-of-way via new curb cuts: to wit (i) one from the KWE Property to 60th Street on the southeast side of the Property ("**60th Street Proposed Future Access Point**"), and (ii) another from Steelcase's Remaining Property to East Paris Avenue on the northwest side of the Property ("**East Paris Proposed Future Access Point**"). The 60th Street Proposed Future Access Point and the East Paris Proposed Future Access Point are individually referred to herein as a "**Proposed Future Access Point**" and collectively as the "**Proposed Future Access Points**". Construction of either Proposed Future Access Point may occur if the Proposed Future Access Point is approved by the City's Community Development Department staff ("**Staff**"). If the Staff does not approve construction of the Proposed Future Access Point, then the Staff's decision may be appealed to the City's Planning Commission. Additionally, subject to the restriction on additional proposed curb cuts onto East Paris Avenue as set forth below, if a Developer proposes future access points to public rights-of-way via curb cuts other than those shown on the Updated IPUD Site Plan ("**Other Future Access Points**" and, together with the Proposed Future Access Points, the "**Future Access Points**"), then those Other Future Access Points will only be permitted if they are approved as a major change to the Updated IPUD Site Plan, which will include the completion and consideration of a Traffic Study as set forth herein. Notwithstanding the foregoing, except as shown on the Updated IPUD Site Plan, there shall be no future Other Future Access Points from individual building sites on the Property onto East Paris Avenue unless such Other Future Access Points are permitted pursuant to an amendment to this Agreement approved by the City in accordance with this Agreement and/or the Zoning Ordinance, as applicable.

iv. A Future Access Point may only be constructed if a traffic impact study ("**Traffic Study**") consistent with the terms of this Agreement recommends that the Future Access Point should be constructed. The Traffic Study shall be conducted and prepared by a reputable, appropriately qualified, independent third-party person or entity that is mutually agreed upon by the City and the applicable Developer(s), and also in accordance with the following terms. Prior to the construction of any Future Access Point, the applicable Developer(s) shall notify the City of the request for the Future Access Point and shall arrange a meeting to discuss the Future Access Point. The meeting shall be held as promptly as possible by the parties after the notice of the request is delivered to the City. At the meeting, the City and the applicable Developer(s) shall negotiate in good faith with respect to the following items which must be considered for inclusion as part of any Traffic Study: (a) the person or entity that will conduct and prepare the Traffic Study (recognizing that such person or entity must be reputable, appropriately qualified, familiar with the City's traffic patterns and independent), (b) the precise type of Traffic Study needed under the prevailing circumstances, (c) the area limits for the Traffic Study, (d) the horizon year to be used for the Traffic Study, (e) other assumptions for background data to be included in the Traffic Study (including, without limitation, existing recent traffic counts, scheduled road improvements, other development projects in the area, trip generation, etc.), (f) any access management principles that are applicable under the prevailing circumstances, (g) any other items that are relevant to the review of the Future Access Point being considered, such as a traffic crash analysis, future traffic, trip reduction factors, directional distribution and assignment, site access and circulation, and evaluation of mitigation alternatives, and (h) the evaluation criteria and/or software to be used in connection with the Traffic Study. For purposes of subsection (h) above, the City and applicable Developer(s) may, but shall not be required to, utilize one or more of the following publications for purposes of evaluating the Traffic Study: (x) Evaluating Traffic Impact Studies – A Recommended Practice for Michigan Communities, (y) Traffic Access and Impact Studies for Site Development, and/or (z) MDOT Access Management Guidebook. All costs for the Traffic Study as well as any recommended Future Access Point shall be borne by the requesting Developer(s). For purposes of agreeing upon the aforementioned Traffic Study items, both the City and the applicable Developer(s) shall act in a reasonable manner.

v. If a Future Access Point is recommended pursuant to the Traffic Study, then the design of all curb cuts onto public rights-of-way that are associated with the Future Access Point shall be reviewed and approved by the appropriate governmental agency(ies) with proper jurisdiction. Prior to construction of any curb cuts by any Developer(s), that Developer(s) shall apply for and obtain all approvals and permits necessary for the curb cuts. Contemporaneous with the construction of such curb cuts, the applicable Developer(s) will make, at its (or their) expense, all improvements required by the Traffic Study.

B. Landscaping Plan. If a Developer intends to construct a new Improvement on the portion of the Property that it owns, then prior to constructing the Improvement, that Developer shall submit to the Staff the landscaping plans for the area surrounding the new Improvement. The Staff shall review and approve the landscaping plans if consistent with applicable City ordinances. The

Developer shall have a right to appeal a decision of the Staff with respect to the landscaping plans to the City's Planning Commission.

C. Tree Preservation. If a Developer intends to construct a new Improvement on the portion of the Property that it owns, then prior to constructing the Improvement, a tree preservation plan shall be submitted for review and approval by the Staff, which approval shall not be unreasonably withheld, delayed or conditioned. If one or more trees are damaged, removed or die during construction of a new Improvement, and such trees are required to be preserved pursuant to an approved tree preservation plan, then the applicable Developer shall replace such trees on a caliper for caliper basis.

D. Fire Department. If a Developer constructs a new Improvement on the portion of the Property that it owns, then in constructing the new Improvement, that Developer agrees to comply with City Fire Department standards.

E. Construction Traffic. If a Developer constructs a new Improvement on the portion of the Property that it owns, then, during construction of the new Improvement, vehicles and other equipment must obtain access to the portion of the Property that the Developer owns only through those roads that (i) are public roads, (ii) are private roads located on the portion of the Property that the Developer owns, or (ii) are private roads that the Developer has a right to use pursuant to agreements with the other Developers of the Property or other appropriate third-parties.

F. Specific Building and Setback Provisions for Improvements along East Paris Avenue.

i. Except as provided otherwise in this Agreement with respect to the height and setback requirements for future Improvements to be located along East Paris Avenue to the west of the proposed internal private road as shown on the Updated IPUD Site Plan, building height and setback for any future Improvements on the Property must be substantially consistent with or similar to the existing buildings on the Property, or otherwise comply with the Zoning Ordinance. Also, except as provided otherwise in this Agreement with respect to the height and setback requirements for future Improvements to be located along East Paris Avenue to the west of the proposed internal private road as shown on the Updated IPUD Site Plan, if a Developer intends to construct a new Improvement on the portion of the Property that it owns, then prior to construction of the new Improvement, the Developer shall obtain the Staff's approval for the building height and setback for the new Improvement, which approval shall not be unreasonably withheld, delayed or conditioned.

ii. Except as provided in subsection (iii) below, the aforementioned height and setback requirements for future Improvements to be located along

East Paris Avenue to the west of the proposed internal private road as shown on the Updated IPUD Site Plan shall be determined as follows:

(a) If the proposed Improvement is does not exceed forty (40) feet in height, then the applicable building setback for the proposed Improvement will be a minimum of 70 feet from East Paris Avenue.

(b) If the proposed Improvement exceeds forty (40) feet in height (up to a maximum height of sixty (60) feet), then the applicable building setback for the proposed Improvement will be a minimum of 150 feet from East Paris Avenue.

iii. Notwithstanding the foregoing, if any of the proposed Improvements shown on the Updated IPUD Site Plan as buildings A, C or E are constructed in the future, and also if any such Improvements are located on a parcel that shares a common lot line with a parcel being used for residential purposes, then (i) the Improvement shall be set back 150 feet from the common lot line between the two parcels, and (ii) any parking associated with the Improvement shall be set back at least 40 feet from the common lot line between the two parcels. It is expressly understood and agreed by the City and the Developers that, for purposes of determining the building and parking setbacks set forth this subsection (iii), a parcel or an Improvement shall not be deemed share a "common lot line" with any parcel that is located across a street or right-of-way. Stated more specifically, but not in limitation of the foregoing, in no event shall a parcel within the Property be deemed to share a "common lot line" with any parcel or property that is located across existing East Paris Avenue, 52nd Street, and/or 60th Street.

G. <u>Traffic Signals.</u> If an action is taken by one or more Developers which increases or causes an adverse impact to traffic within the Property or on public rights-of-way adjacent to the Property, then, upon a proper determination by a governmental entity with appropriate jurisdiction that a traffic signal needs to be installed within the Property or at points adjacent to the Property that provide vehicular access to public rights-of-way, the Developer(s) that caused the need for the traffic signal to be installed shall be responsible, at its (or their) sole cost and expense, for installing the required traffic signal. Nothing in this Agreement shall prevent one or more Developers from agreeing amongst themselves, or with third-parties, to an appropriate allocation of the work and/or the cost to install any required traffic signal.

H. <u>Site Lighting</u>. If a Developer intends to install additional outdoor lighting on the portion of the Property that it owns, then, prior to installing such additional outdoor lighting, the Developer shall obtain the Staff's approval of the proposed lighting and photometrics plan, which shall comply with all applicable City ordinances unless a deviation and/or a variance is sought and obtained from the City's Zoning Board of Appeals. The Staff's approval of the proposed lighting and photometrics plan shall not be unreasonably withheld, delayed or conditioned.

I. Limitations on Use. Except as provided otherwise in this Agreement, the Developers acknowledge and agree that use of the Property will be limited to those uses that are designated as "permitted uses" or "special land uses" in the City's Zoning Ordinance as it pertains to Industrial Planned Unit Development Districts. Notwithstanding the foregoing sentence, future Improvements to be located along East Paris Avenue to the west of the proposed internal private road as shown on the Updated IPUD Site Plan will be limited to the following uses: (i) corporate offices associated with industrial operations, (ii) financial institutions, (iii) office buildings or offices uses, (iv) research and development facilities, (v) trade or industrial schools, (vi) clinics, (vi) day care centers, (vii) printing and publishing, and (viii) accessory buildings and uses subject to sections 3.15 and 3.16 of the Zoning Ordinance.

Section 4. Phases. Past development of the Property by Steelcase occurred in multiple phases. The Updated IPUD Site Plan reflects the existing development of the Property to date and also a concept for future development of the Property. Future development of the Property may, but need not, occur in phases. Also, future development of the Property may, but need not, occur in accordance with the Updated IPUD Site Plan. If future development of the Property does not occur substantially in accordance with the Updated IPUD Site Plan, then the Developers, or any one of them as applicable, will comply with this Agreement and/or the City's Zoning Ordinance as it relates to the amendment process for Industrial Planned Unit Developments or rezoning, if applicable.

Section 5. Utilities. The Property is currently served with electricity, telephone, gas, public water and public sanitary sewer service ("Utilities"). If, in the future, other or different Utilities are proposed to be installed on the Property, the Developers agree that such Utilities (except streetlights) shall be installed and maintained underground if required by the City. Prior to the issuance of any building permits for future Improvements on the Property, the Developers, or any one of them as applicable, shall provide all easements reasonably necessary for Utilities to serve the new Improvement, if required, in such locations approved in advance by the relevant utility service provider.

Section 6. Deviations. The City hereby ratifies any deviations from the City's Zoning Ordinance and/or the Original IPUD Statement that were previously approved and/or exist on the Property as of the date of this Agreement, as reflected in the Updated IPUD Site Plan. In addition, the City grants the following deviations from the City's Zoning Ordinance and/or prior zoning approvals:

Section(s)	Deviation(s)
12.08(E)(2) and 10.03(B) of the Zoning Ordinance	These Sections of the Zoning Ordinance set forth the minimum required setbacks. The City hereby grants a deviation from the requirements of Sections 12.08(E)(2) and 10.03(B) to permit the following: • Overhead bridges which connect buildings located on the Property (each, an **"Overhead Connecting Bridge"**) may lie within the minimum required setbacks as measured against any existing or future property lines that are contained within the Property. • Any Overhead Connecting Bridge that is not being used by the Developers, or their employees, agents, lessees or successors, may be abandoned in place. In connection with the abandonment of any Overhead Connecting Bridge, the Developers, or any one of them, may disconnect any utilities running through the Overhead Connecting Bridge and may place fire protection bulkheads in the Overhead Connecting Bridge, which must comply with all applicable City codes and ordinances.
12.08(E)(5)	This Section of the Zoning Ordinance sets forth the requirements for finish materials on Improvements located at the Property. The City hereby grants a deviation from the requirements of Section 12.08(E)(5) for existing Improvements at the Property and certain other proposed Improvements as shown on the Updated IPUD Site Plan, as follows: • If the proposed Improvements shown on the Updated IPUD Site Plan as buildings A, D, K, L, M or N are constructed in the future, then the finish materials for the front or side walls of such Improvements which face public rights-of-way shall comply with Section 10.03(C) of the Zoning Ordinance, unless a further deviation and/or a variance is sought and obtained from the City in accordance with this Agreement and/or Zoning Ordinance, as applicable. • All Improvements which exist on the Property as of the date of this Agreement may maintain their present finished materials, and any maintenance, repairs, and/or restorations of such Improvements may also utilize the present finished materials.

Section 7. Finish Materials for Improvements along East Paris Avenue. If the proposed Improvements shown on the Updated IPUD Site Plan along East Paris Avenue as buildings B, C, E, F, H, I or J are constructed in the future, then the finish materials for those Improvements shall comply with Section 12.08(E)(5) of the Zoning Ordinance, unless a waiver is sought and obtained from the City Planning Commission in accordance with this Agreement and/or the Zoning Ordinance, as applicable.

Section 8. Internal Rights of Way. The rights-of-way that circulate within the Property are private roads. As shown on the Updated IPUD Site Plan, the private roads on Steelcase's Retained Property serve only those Improvements located on Steelcase's Retained Property, and Steelcase is responsible for maintaining said private roads. Also, as shown on the Updated IPUD Site Plan, the private roads located on the KWE Property serve only those Improvements located on the KWE Property, and Franklin Partners will be responsible for maintaining said private roads. Finally, as shown on the Updated IPUD Site Plan, except as provided herein, the private roads located on the 5353 Broadmoor Property serve only those Improvements located on the 5353 Broadmoor Property, and Processing Specialties and Roskam are responsible for maintaining said private roads. Currently, the sole exception to the foregoing is a private road that runs through the north side of the KWE Property onto the south side of the 5353 Broadmoor Property and deposits out to Broadmoor Avenue (the "**Shared Private Drive**"). Pursuant to an easement agreement between Process Specialties and Roskam, as grantor, and Franklin Partners, as grantee ("**Shared Private Drive Easement Agreement**"), Franklin Partners shall be granted the right to use the Shared Private Drive for ingress and egress to the KWE Property. The Shared Private Drive Easement Agreement also allocates responsibility for maintenance of the Shared Private Drive among Processing Specialties, Roskam and Franklin Partners. If, in the future, any one of the Developers (or their respective successors) conveys a portion of their respective properties to a third-party and, as a result of such conveyance, a private drive within the Property must be shared in order to provide access to and from the portion of the Property that is being conveyed, then the selling Developer(s) (or their respective successors) and the third-party purchaser(s) shall enter into easements similar to the Shared Private Drive Easement Agreement in order to address cross-access rights and allocation of maintenance responsibilities concerning the shared private drive. Consistent with the foregoing sentence, it is the intention of the parties to this Agreement to reasonably maintain circulation within the Property to provide individual parcels with access to public rights-of-way, subject to any legally required security, other reasonable security, or other requirements applicable to one or more of the Developers which require restriction on access through that Developer's portion of the Property. Nothing herein shall be interpreted to limit the ability of a Developer to agree with the City to improve private roads within the Property so as to dedicate those roads to the public. In such case, then, upon dedication and acceptance of such roads, the City shall take over all responsibilities and obligations of the rights-of-way as public roads by resolution and the applicable Developer(s) shall have no further obligations and responsibilities for the repair, maintenance and use of such roads.

Section 9. Sanitary Sewer Lines and Water Lines. During the initial development of the Property, Steelcase dedicated certain water lines and sanitary sewer lines within the Property to the City of Grand Rapids, and also granted easements to the City of Grand Rapids for the maintenance, repair and replacement of such lines. If, in the future, any one or more of the Developers desires to dedicate additional water lines and sanitary sewer lines within the Property to the City of Grand Rapids, then the Developer shall make appropriate application and/or petition to the City of Grand Rapids to accept the lines as public improvements. Upon dedication and acceptance of the water lines and sanitary sewer lines as public improvements, the City of Grand Rapids will take all responsibility for the maintenance and operations of the utility lines as it would for any other public water or sanitary sewer lines.

Section 10. Stormwater. As part of the initial development of the Property, the Developer installed a comprehensive system to drain stormwater via stormwater pipes, a drainage ditch, retention/detention ponds and/or wetlands (collectively, the "**Stormwater Drainage System**"), all as indicated on the Updated IPUD Site Plan. In addition, the Developers have, or will, enter into drainage easements that allow the drainage of stormwater throughout various portions of the Property via the Stormwater Drainage System. Moreover, such easements also allocate responsibility for maintenance of the various portions of the Stormwater Drainage System. If, in the future, any one of the Developers (or their respective successors) conveys all or a portion of their respective properties to a third-party, then, as necessary, such Developer(s) (or their respective successors) shall enter into similar easements with the third-parties which permit the drainage of stormwater via the Stormwater Drainage System and allocate responsibility for maintenance of the Stormwater Drainage System. Further, with respect to the control and maintenance of the Stormwater Drainage System on the Property, the Developers (and their respective successors as to affected portions of the Property) are bound by that certain Hold Harmless Agreement in favor of the City dated July 5, 1988 and recorded on July 26, 1988 at Liber 2571, Page 421, Kent County, Michigan Register of Deeds. Moreover, with respect to the control and maintenance of certain retention/detention ponds located only on Steelcase's Retained Property, Steelcase (and its successors as to affected portions of Steelcase's Retained Property) is bound by those certain Hold Harmless Agreements in favor of the City dated June 23, 1987 and recorded on November 9, 1988 at Liber 2581, Page 1249, Kent County, Michigan Register of deeds, and dated February 18, 1991 and recorded on February 22, 1991 at Liber 2832, Page 1354, Kent County, Michigan Register of Deeds.

Section 11. Open Space. Developer acknowledges and agrees that a portion of the Property will remain open space as shown on the Updated IPUD Site Plan. For purposes of the foregoing sentence, "open space" excludes parking areas, deferred parking areas, and existing and future building areas.

Section 12. Violation of Agreement. The parties acknowledge that monetary damages for a breach of this Agreement would be inadequate to compensate the parties for the benefit of their bargain. Accordingly, the parties expressly agree that in the event of a violation of this Agreement, the non-breaching party shall be entitled to receive specific performance; provided, however, that nothing herein shall limit the right of a non-breaching party to take all other actions to remedy the breach as are available at law or in equity.

Section 13. Amendment. Subject to the immediately following sentence, this Agreement may only be amended in a writing that is signed by the City and the Developers. Notwithstanding the foregoing sentence, if an amendment to this Agreement would affect only a portion of the Property, then this Agreement may be amended in a writing signed by the City and only those Developers who own the affected portion of the Property; provided, however, that the other Developers shall receive notice of such amendment at least fifteen (15) days prior to its recordation.

Section 14. Recording and Binding Effect. The rights and obligations under this Agreement are covenants that run with the land, and this Agreement shall be binding upon and inure to the benefit of the parties, as well as their subrogees, successors and assigns. It is the parties' intent that this Agreement shall be recorded with the Kent County Register of Deeds. The City shall be responsible for all costs associated with recording the Agreement. Upon the transfer of title to any portion of the Property by a Developer or any successor in title, the acquiring party shall be deemed to have acquired all of the Developer's (and such transferor's) rights and assumed all of the Developer's (and such transferor's) obligations described herein, and the Developer (and any subsequent transferor) shall be automatically be relieved of any further liability under this Agreement.

Section 15. Headings and Recitals. The headings and subheadings contained in this Agreement are included for convenience only. The parties agree, however, (i) that the Recitals form an integral part of the Agreement, (ii) that the parties have relied upon the representations contained in the Recitals, and (iii) that the Recitals are hereby incorporated into the Agreement by this reference.

Section 16. Miscellaneous.

A. Severability. The invalidity or unenforceability of any provision of this Agreement shall not affect the enforceability or validity of the remaining provisions and this Agreement shall be construed in all respects as if any invalid or unenforceable provision were omitted.

B. Notices. Any and all notices permitted or required to be given shall be in writing and sent either by mail or personal delivery to the address first above given. Either party may modify its notice address by providing the other party written notice of such modification.

C. Waiver. No failure or delay on the part of any party in exercising any right, power, or privilege under this Agreement shall operate as a waiver thereof, nor shall any single or partial exercise of any right, power, or privilege under this Agreement preclude further exercise thereof or the exercise of any other right, power, or privilege. The rights and remedies provided in this Agreement are cumulative and not exclusive of any rights and remedies provided by law.

D. Governing Law. This Agreement is being executed and delivered and is intended to be performed in the State of Michigan and shall be construed and enforced in accordance with, and the rights of the parties shall be governed by, the laws thereof.

E. Authorization. The parties affirm that their representatives executing this Agreement on their behalf are authorized to do so and that all resolutions or similar actions necessary to approve this Agreement have been adopted and approved.

[Remainder of Page Left Intentionally Blank. Signature Page Follows.]

The parties have executed this Agreement on the day and year first above written.

WITNESSES:

CITY OF KENTWOOD

____

______________________________, Mayor

____

____

DAN KASUNIC, Clerk

STATE OF MICHIGAN)
) ss.
COUNTY OF KENT)

On this ____ day of __________, 20__, before me a Notary Public, personally appeared ____________ and Dan Kasunic, the Mayor and Clerk, respectively, of the City of Kentwood, a Michigan municipal corporation, who, being first duly sworn, did say they signed this document on behalf of the City.

____
Print Name:____________________
Notary Public, __________ County, __________
Acting in _________ County
My Commission Expires:________________

[Remainder of Page Left Intentionally Blank. Additional Signature Page Follows.]

WITNESSES:

Daniel Schutte 5/28/14

Nicholas M. Moreno 5/28/14

STEELCASE INC.

By: ______________________

Name: David C. Sylvester

Its: Senior Vice President, Chief Financial Officer

STATE OF MICHIGAN)
) ss.
COUNTY OF KENT)

On this 28th day of May, 2014, before me a Notary Public, personally appeared David C. Sylvester, the Senior Vice President, Chief Financial Officer, of Steelcase Inc., a Michigan corporation, who, being first duly sworn, did say they signed this document on behalf of the corporation.

Anne T. Daniels

Print Name: Anne T. Daniels
Notary Public, Kent County, Mich
Acting in Kent County
My Commission Expires: 5·18·17

ANNE T DANIELS
NOTARY PUBLIC - STATE OF MICHIGAN
COUNTY OF KENT
My Commission Expires May 18th, 2017

[Remainder of Page Left Intentionally Blank. Additional Signature Page Follows.]

WITNESSES:

Nancy E Hansen

Lisa Tomasello

FRANKLIN 5565 BROADMOOR, LLC

By: [signature]

Name: Donald J. Shoemaker

Its: Manager

STATE OF Illinois)
) ss.
COUNTY OF Cook)

On this 27th day of May, 2014, before me a Notary Public, personally appeared Donald J. Shoemaker, the Manager, of Franklin 5565 Broadmoor, LLC, a Michigan limited liability company, who, being first duly sworn, did say they signed this document on behalf of the company.

OFFICIAL SEAL
KIMBERLY M BANKS
Notary Public - State of Illinois
My Commission Expires Jun 13, 2016

Kimberly M. Banks

Print Name: Kimberly M. Banks

Notary Public, Illinois County, Cook

Acting in Cook County

My Commission Expires: June 13, 2016

[Remainder of Page Left Intentionally Blank. Additional Signature Page Follows.]

WITNESSES:

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ROSKAM BAKING COMPANY

By: ______________________________
Name: Cameron Roskam
Its: President

STATE OF MICHIGAN)
) ss.
COUNTY OF KENT)

On this 28th day of May, 2014, before me a Notary Public, personally appeared Cameron Roskam, the President, of Roskam Baking Company, a Michigan corporation, who, being first duly sworn, did say they signed this document on behalf of the corporation.

____
Print Name: Cynthia Ann Lemmink
Notary Public, Kent County, MI
Acting in Kent County
My Commission Expires: 12-26-16

[Remainder of Page Left Intentionally Blank. Additional Signature Page Follows.]

Cynthia Ann Lemmink
Notary Public of Michigan
Kent County
Expires 12/26/2016
Acting in the County of KENT

WITNESSES:

____

____

PROCESSING SPECIALTIES, INC.

By: ______________________________

Name: Cameron Roskam

Its: President

STATE OF MICHIGAN)
) ss.
COUNTY OF KENT)

On this 28TH day of May, 2014, before me a Notary Public, personally appeared Cameron Roskam, the President, of Processing Specialties, Inc., a Michigan corporation, who, being first duly sworn, did say they signed this document on behalf of the corporation.

____

Print Name: Cynthia Ann Lemmink

Notary Public, Kent County, MI

Acting in Kent County

My Commission Expires: 12-26-16

Drafted By/Return To:
Nicolas M. Morano
Dickinson Wright PLLC
200 Ottawa Ave., N.W., Suite 1000
Grand Rapids, Michigan 49503
(616) 458-1300

Cynthia Ann Lemmink
Notary Public of Michigan
Kent County
Expires 12/26/2016
Acting in the County of KENT

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Kent Cnty MI Rgstr 03/19/2019 SEAL

2017 Dev. Agreement Amendment

FIRST AMENDMENT TO PUD DEVELOPMENT AGREEMENT

This First Amendment to PUD Development Agreement (the "First Amendment") is executed this 12th day of April, 2017, by and among the CITY OF KENTWOOD, a Michigan municipal corporation, the address of which is 4900 Breton Avenue SE, P.O. Box 8848, Kentwood, Michigan 49518-8848 (the "City"), FRANKLIN 5565 BROADMOOR, LLC, a Michigan limited liability company, the address of which is 55 Shuman Boulevard, Suite 178, Naperville, Illinois 60563 ("Franklin Partners"), ROSKAM BAKING COMPANY, a Michigan corporation, the address of which is 4880 Corporate Exchange Boulevard SE, Grand Rapids, Michigan 49512 ("Roskam"), and PROCESSING SPECIALTIES, INC., a Michigan corporation, the address of which is 4880 Corporate Exchange Boulevard SE, Grand Rapids, Michigan 49512 ("Processing Specialties"). Steelcase Inc. ("Steelcase"), Franklin Partners, Roskam and Processing Specialties are sometimes referred to herein individually as a "Developer" and collectively as the "Developers."

RECITALS

A. In 1987, Steelcase owned certain real property in the City of Kentwood located south and east of 52nd Street and East Paris Avenue, which real property is more particularly described on **Exhibit A** attached hereto and incorporated by reference ("Property"). The Property consists of approximately 497.45 acres.

B. Prior to 1982, certain portions of the Property were zoned for the following classifications: I-I Light Industrial, A-I Agricultural, and RI-B Single Family Residential. In 1982, a portion of the Property was rezoned to Industrial Planned Unit Development ("IPUD"). On May 5, 1987, pursuant to Ordinance No. 14-87, the City rezoned the balance of the Property to IPUD. At that time, the City determined that the development of the Property into an industrial campus for Steelcase's manufacturing and distribution operations would be compatible with adjacent land uses and the City's Master Plan.

C. At the time the Property was rezoned by the City to IPUD, the City's Zoning Ordinance did not contain a requirement that the developer of the Property enter into a formal development agreement with the City detailing the various characteristics of the IPUD. However, in connection with the rezoning of the Property to IPUD, Steelcase did provide the City with a "Written Statement of the PUD," a copy of which is contained in **Exhibit B** attached hereto and incorporated by reference ("Original IPUD Statement"). In addition, at the time of the rezoning of the Property to IPUD, Steelcase also submitted a site plan to the City, a copy of which is contained in **Exhibit C** attached hereto and incorporated by reference ("Original IPUD Plan").

D. Since May 5, 1987, Steelcase has developed the Property as an industrial campus for its manufacturing and distribution operations, and consistent with the Original IPUD Statement and the Original IPUD Plan. The Property has been substantially, but not entirely, developed by Steelcase. In particular, the Property currently consists of the following structural elements: (i) three (3) large industrial manufacturing buildings ranging in size from approximately 660,000 square feet to 874,000 square feet, (ii) a shipping distribution building that is approximately 875,348 square feet, (iii) two (2) shipping fleet maintenance buildings that are approximately 23,758 square feet and 40,225 square feet, respectively, (iv) an energy center that is approximately 14,282 square feet, and (v) a fire pump house that is approximately 1,891 square feet.

E. In 2006, Steelcase sold a portion of the Property commonly known as 5353 Broadmoor Avenue SE, Kentwood, Michigan 49512 (Tax Id. No. 41-18-36-200-047), and more particularly described on **Exhibit D** attached hereto and incorporated by reference ("5353 Broadmoor Property"), to Franklin Broadmoor, L.L.C. In 2009, Franklin Broadmoor, L.L.C. sold the 5353 Broadmoor Property to Processing Specialties and Roskam. As of the date of this Agreement, Processing Specialties owns an undivided sixty-seven percent (67%) interest in the 5353 Broadmoor Property and Roskam owns an undivided thirty-three percent (33%) interest in the 5353 Broadmoor Property.

F. Steelcase sold a portion of the Property more particularly described on **Exhibit E** attached hereto and incorporated by reference ("KWE Property") to Franklin Partners. The KWE Property consists of properties with the following addresses and Tax Identification Numbers: (i) 5565 Broadmoor Avenue, Kentwood, Michigan 49512 (Tax Id. No. 48-18-36-400-019), (ii) 5798 Broadmoor Avenue SE, Grand Rapids, Michigan 49512 (Tax Id. No. 41-19-31-351-001), and (iii) 5824 Patterson Avenue SE, Grand Rapids, Michigan 49512 (Tax Id. No. 41-19-31-351-002).

G. As part of the sale of the KWE Property to Franklin Partners, certain traffic circulation patterns within the Property needed to be altered. In order to effectuate those alterations, the City's ordinances required that the Developers submit an updated IPUD site plan to the Kentwood City Commission for approval as an amendment to the Original IPUD Plan. That updated and approved IPUD site plan is set forth in **Exhibit F** attached hereto and incorporated by reference ("Revised 2014 IPUD Plan").

H. Also, due to new requirements in the City's zoning ordinance ("Zoning Ordinance") since the time that the Property was rezoned to IPUD, the City required that Developers enter into an agreement to confirm the nature of the existing development of the Property, guide future development of the Property, and memorialize the parties' understandings. Accordingly, on or about May 28, 2014, the City and Developers entered into a PUD Development Agreement ("Agreement") which was recorded with the Kent County Register of

Deeds at Instrument No. 20140530-0042579. The parties acknowledged and agreed that the Revised 2014 IPUD Plan replaced and superseded the Original IPUD Plan. The parties further acknowledged and agreed that the Agreement replaced and superseded the Original IPUD Statement.

I. The Developers intend to utilize the Property as an industrial campus consisting of multiple shipping, manufacturing and service buildings as shown on the Revised 2014 IPUD Plan. The following provides a brief summary of certain existing elements of the Property, as well as future plans for certain elements of the Property:

- *Architectural and Landscaping Features* - The existing three manufacturing buildings and the distribution building have a precast concrete lower band with vertical corrugated steel siding above. Office elements are architectural brick and mortar. The Property has mature dense landscaping features screening the site from public view and screening parking areas from the perimeter road. Future development within the Property will follow similar landscaping features, depending on function, and will be developed architecturally in a manner consistent with the City's conditions of approval associated with the Revised 2014 IPUD Plan, except to the extent that an exception is permitted in this Agreement or authorized in the future by the City.

- *Open Space Features* - The current development of the Property incorporates large green space areas. However, these areas are not designated for shared or public use in the Original IPUD Statement or the Original IPUD Plan. The Revised 2014 IPUD Plan does not add any private or public open space features to the Original IPUD Plan. Depending on future needs for the Property, however, private or public open space features could be added in the future.

- *Relationship to the Master Plan.* The existing and planned development of the Property continues to serve the goals of the City Master Plan by retaining the zoning of IPUD, and continuing use of the Property as an industrial campus.

J. The Property has been developed in accordance with the Revised 2014 IPUD Plan.

K. Franklin Partners has submitted a revised site plan, prepared by Fishbeck, Thompson, Carr and Huber, dated March 6, 2017, as set forth in **Exhibit G**, a copy of which is attached hereto and incorporated by reference (the "Revised 2017 IPUD Plan") and applied for a major change to the Revised 2014 IPUD Plan in accordance with Section 12.13 of the Zoning Ordinance. The purpose of the major change is to seek approval to increase the amount of industrial space by 115,000 square feet and to allow for an 18,000 square foot credit union facility on the Property together with related improvements, all as shown on the Revised 2017 IPUD Plan.

L. The City's Planning Commission reviewed the Revised 2017 IPUD Plan and request for major change and recommended conditional approval to the City Commission on April 25, 2017. After a public hearing on May 8, 2017, the City Commission approved the major change to the Revised 2014 IPUD Plan subject to certain conditions and bases as described in the City of Kentwood Planning Commission Approved Findings of Fact, dated April 17, 2017, a copy of which is attached hereto as **Exhibit H** and incorporated by reference (the "Conditions"). The parties acknowledge and agree that the Revised 2017 IPUD Plan replaces and supersedes the Original IPUD Plan and the Revised 2014 IPUD Plan.

M. One of the Conditions was a requirement that the Agreement be amended and ratified to reflect the changes set forth above. Section 13 of the Agreement permits its amendment by the City and the affected Developers following certain notice requirements.

N. Franklin Partners, Roskam, and Processing Specialties, being parties signing the Agreement in 2014 and which own portions of the property affected by the major change to the Revised 2014 IPUD Plan, approve of and hereby ratify the major change to the Revised 2014 IPUD Plan, as referenced in the Revised 2017 IPUD Plan.

O. The City, Franklin Partners, Roskam, and Processing Specialties intend for future development on the Property to comply with the Revised 2017 IPUD Plan, as applicable.

P. Except as expressly set forth in this First Amendment, it is the intent of the parties that the Agreement is to remain in full force and effect.

AGREEMENT

For good and valuable consideration including, but not limited to, the covenants and pledges contained herein, and the City's agreement to forego the posting of additional performance guarantees, the sufficiency of which is acknowledged and relied upon, the parties agree as follows:

Section 1. Amendment of Section 1. Section 1 of the Agreement is amended to read in full as follows:

Section 1. Compliance with Laws, Ordinances, Permits. Each Developer agrees that the Developer, its successors and assigns shall only construct, install, and operate buildings and other structures ("Improvements") upon the Property in accordance with approvals received from governmental entities with proper jurisdiction. No new Improvements, except as shown on the Revised 2017 IPUD Plan, shall be constructed or installed except with the prior approval of the City, issued in accordance with the Zoning Ordinance, which approval shall not be unreasonably withheld, delayed, or conditioned, and such construction and/or installation shall be consistent with all applicable City ordinances. In constructing Improvements upon the Property, each Developer agrees to comply with all state and local laws, ordinances, and regulations as well as the terms of this Agreement. Without limiting the preceding sentence, it is understood and agreed that except as expressly provided for herein, development of Improvements upon the Property must comply with applicable provisions of the Zoning Ordinance.

Section 2. Amendment of Section 2. Section 2 of the Agreement is amended to read in full as follows:

Section 2. Compliance with Governmental Approvals. Without limiting the provisions of Section 1, each Developer agrees that the Developer, its successors and assigns shall design, develop, construct and operate the Improvements and associated developments in accordance with the terms and conditions of approval received from any governmental entity with jurisdiction over the particular Improvement or associated development including, without limitation, the terms and conditions of this Agreement and the City Commission's conditions of approval granted on May 8, 2017. Each Developer acknowledges and agrees that the Developer, its successors and assigns may not seek variances and/or deviations from the Revised 2017 IPUD Plan from the City's Zoning Board of Appeals; provided, however, that this prohibition shall not limit the right of a Developer to seek a variance from the Zoning Board of Appeals in order to construct or install a particular Improvement or to the extent the Zoning Ordinance requires or authorizes a variance not otherwise prohibited by this Agreement.

Section 3. Amendment of Subsection 3.A. Subsection 3.A. of the Agreement is amended to read in full as follows:

Section 3. Conditions. The Property shall be developed, used and maintained consistent with the following:

A. Street Access.

i. Currently, access within the Property is provided via private streets that are maintained by the Developers as set forth below. The Property currently has limited access points to public rights-of-way, and it is an important feature of this Agreement to reasonably limit access points to public rights-of-way when appropriate, subject to the City Commission's conditions of approval and the findings and recommendations of any Traffic Study as set forth herein.

ii. Currently, the 5353 Broadmoor Property has two access points to Broadmoor Avenue as shown on the Revised 2017 IPUD Plan. The KWE Property currently has one access point to Patterson Avenue as shown on the Revised 2017 IPUD Plan. As part of the sale of the KWE Property to Franklin Partners, a second means of access to Broadmoor Avenue to and from the KWE Property was provided through the 5353 Broadmoor Property as shown on the Revised 2017 IPUD Plan. In particular, the private drive currently serving the KWE Property was connected to the private drive on the 5353 Broadmoor Property which leads out to Broadmoor Avenue. An easement between Processing Specialties and Roskam, as owners of the 5353 Broadmoor Property, and Franklin

Partners, as owner of the KWE Property, was entered into (a) to allow access to Broadmoor Avenue for the KWE Property, and (b) to allocate maintenance responsibilities for the Shared Private Drive (as defined below) between the KWE Property and the 5353 Broadmoor Property. The remainder of the Property that is owned by Steelcase ("Steelcase's Remaining Property"), and does not include the KWE Property or the 5353 Broadmoor Property, has one access point to 52nd Street on the north side of the Property and another access point to 60th Street on the south side of the Property. As envisioned by the Revised 2017 IPUD Plan, Steelcase's Remaining Property will not utilize any of the private roads located on the KWE Property or the 5353 Broadmoor; rather it will utilize only those private roads located on Steelcase's Remaining Property.

iii. The Revised 2017 IPUD Plan, consistent with the Revised 2014 IPUD Plan, identifies a potential future access point via a new curb cut from Steelcase's Remaining Property to East Paris Avenue on the northwest side of the Property ("East Paris Proposed Future Access Point"). Construction of the East Paris Proposed Future Access Point may occur if the East Paris Proposed Future Access Point is approved by the City's Community Development Department staff ("Staff"). If the Staff does not approve construction of the East Paris Proposed Future Access Point, then the Staff's decision may be appealed to the City's Planning Commission. Additionally, subject to the restriction on additional proposed curb cuts onto East Paris Avenue as set forth below, if a Developer proposes future access points to public rights-of-way via curb cuts other than those shown on the Revised 2017 IPUD Plan ("Other Future Access Points" and, together with the East Paris Proposed Future Access Points, the "Future Access Points"), then those Other Future Access Points will only be permitted if they are approved as a major change to the Revised 2017 IPUD Plan, which will include the completion and consideration of a Traffic Study as set forth herein. Notwithstanding the foregoing, except as shown on the Revised 2017 IPUD Plan, there shall be no future Other Future Access Points from individual building sites on the Property onto East Paris Avenue unless such Other Future Access Points are permitted pursuant to an amendment to this Agreement approved by the City in accordance with this Agreement and/or the Zoning Ordinance, as applicable.

iv. A Future Access Point may only be constructed if a traffic impact study ("Traffic Study") consistent with the terms of this Agreement recommends that the Future Access Point should be constructed. The Traffic Study shall be conducted and prepared by a reputable, appropriately qualified, independent third-party person or entity that is mutually agreed upon by the City and the applicable Developer(s), and also in accordance with the following terms. Prior to the construction of any Future Access Point, the applicable Developer(s) shall notify the City of the request for the Future Access Point and shall arrange a meeting to discuss the Future Access Point. The meeting shall be held as promptly as possible by the parties after the notice of the request is delivered to the City. At the meeting, the City and the applicable Developer(s) shall negotiate in good faith with respect to the following items which must be considered for inclusion as part of any Traffic Study: (a) the person or entity that will conduct and prepare the Traffic Study (recognizing that such person or entity must be reputable, appropriately qualified, familiar with the City's traffic patterns and independent), (b) the precise type of Traffic Study needed under the prevailing circumstances, (c) the area limits for the Traffic Study, (d) the horizon year to be used for the Traffic Study, (e) other assumptions for background data to be included in the Traffic Study (including, without limitation, existing recent traffic counts, scheduled road improvements, other development projects in the area, trip generation, etc.), (f) any access management principles that are applicable under the prevailing circumstances, (g) any other items that are relevant to the review of the Future Access Point being considered, such as a traffic crash analysis, future traffic, trip reduction factors, directional distribution and assignment, site access and circulation, and evaluation of mitigation alternatives, and (h) the evaluation criteria and/or software to be used in connection with the Traffic Study. For purposes of subsection (h) above, the City and applicable Developer(s) may, but shall not be required to, utilize one or more of the following publications for purposes of evaluating the Traffic Study: (x) Evaluating Traffic Impact Studies - Recommended Practice for Michigan Communities, (y) Traffic Access and Impact Studies for Site Development, and/or (z) MDOT Access Management Guidebook. All costs for the Traffic Study as well as any recommended Future Access Point shall be borne by the requesting Developer(s). For purposes of agreeing upon the aforementioned Traffic Study items, both the City and the applicable Developer(s) shall act in a reasonable manner.

v. If a Future Access Point is recommended pursuant to the Traffic Study, then the design of all curb cuts onto public rights-of-way that are associated with the Future Access Point shall be reviewed and approved by the appropriate governmental agency(ies) with proper jurisdiction. Prior to construction of any curb cuts by any Developer(s), that Developer(s) shall apply for and obtain all approvals and permits necessary for the curb cuts. Contemporaneous with the construction of such curb cuts, the applicable Developer(s) will make, at its (or their) expense, all improvements required by the Traffic Study.

Section 4. Amendment of Subsection 3.I. Subsection 3.I. of the Agreement is amended to read in full as follows:

I. Limitations on Use. Except as provided otherwise in this Agreement, the Developers acknowledge and agree that use of the Property will be limited to those uses that are designated as "permitted uses" or "special land uses" in the City's Zoning Ordinance as it pertains to Industrial Planned Unit Development Districts. Notwithstanding the foregoing sentence, future Improvements to be located along East Paris Avenue to the west of the proposed internal private road as shown on the Revised 2017 IPUD Plan will be limited to the following uses: (i) corporate offices associated with industrial operations, (ii) financial institutions, (iii) office buildings or offices uses, (iv) research and development facilities, (v) trade or industrial schools, (vi) clinics, (vi) day care centers, (vii) printing and publishing, and (viii) accessory buildings and uses subject to sections 3.15 and 3.16 of the Zoning Ordinance.

Section 5. Amendment of Section 4. Section 4. of the Agreement is amended to read in full as follows:

Section 4. Phases. Past development of the Property by Steelcase occurred in multiple phases. The Revised 2017 IPUD Plan reflects the existing development of the Property to date and also a concept for future development of the Property. Future development of the Property may, but need not, occur in phases. Also, future development of the Property may, but need not, occur in accordance with the Revised 2017 IPUD Plan; provided, however, that before development of the Property occurs which is not substantially in accordance with the Revised 2017 IPUD Plan as determined by the City in its reasonable discretion, then the Developers, or any one of them as applicable, will comply with this Agreement and/or the City's Zoning Ordinance as it relates to the amendment process for Industrial Planned Unit Developments or rezoning, if applicable.

Section 6. Amendment of Section 6. Section 6. of the Agreement is hereby amended to read in full as follows:

Section 6. Deviations. The City hereby ratifies any deviations from the City's Zoning Ordinance and/or the Updated IPUD Statement that were previously approved and/or exist on the Property as of the date of this Agreement, as reflected in the Revised 2017 IPUD Plan. In addition, the City grants the following deviations from the City's Zoning Ordinance and/or prior zoning approvals:

Section(s)	Deviation(s)
12.08(E)(2) and 10.03(B) of the Zoning Ordinance	These Sections of the Zoning Ordinance set forth the minimum required setbacks. The City hereby grants a deviation from the requirements of Sections 12.08(E)(2) and 10.03(B) to permit the following: ∘ Overhead bridges which connect buildings located on the Property (each, an "Overhead Connecting Bridge") may lie within the minimum required setbacks as measured against any existing or future property lines that are contained within the Property. ∘ Any Overhead Connecting Bridge that is not being used by the Developers, or their employees, agents, lessees or successors, may be abandoned in place. In connection with the abandonment of any Overhead Connecting Bridge, the Developers, or any one of them, may disconnect any utilities running through the Overhead Connecting Bridge and may place fire protection bulkheads in the Overhead Connecting Bridge, which must comply with all applicable City codes and ordinances.
12.08(E)(5)	This Section of the Zoning Ordinance sets forth the requirements for finish materials on Improvements located at the Property. The City hereby grants a deviation from the requirements of Section 12.08(E)(5) for existing Improvements at the Property and certain other proposed Improvements as shown on the Revised IPUD Site Plan, as follows: ∘ If the proposed Improvements shown on the Revised 2017 IPUD Plan as buildings A, D, K, L, M or N are constructed in the future, then the finish materials for the front or side walls of such Improvements which face public rights-of-way shall comply with Section 10.03(C) of the Zoning Ordinance, unless a further deviation and/or a variance is sought and obtained from the City in accordance with this Agreement and/or Zoning Ordinance, as applicable. ∘ All Improvements which exist on the Property as of the date of this Agreement may maintain their present finished materials, and any maintenance, repairs, and/or restorations of such Improvements may also utilize the present finished materials.

Section 7. Amendment of Section 8. Section 8. of the Agreement is amended to read in full as follows:

Section 8. Internal Rights of Way. The rights-of-way that circulate within the Property are private roads. As shown on the Revised 2017 IPUD Plan, the private roads on Steelcase's Retained Property serve only those Improvements located on Steelcase's Retained Property, and Steelcase is responsible for maintaining said private roads. Also, as shown on the Revised 2017 IPUD Plan, the private roads located on the KWE Property serve only those Improvements located on the KWE Property, and Franklin Partners will be responsible for maintaining said private roads. Finally, as shown on the Revised 2017 IPUD Plan, except as provided herein, the private roads located on the 5353 Broadmoor Property serve only those Improvements located on the 5353 Broadmoor Property and Processing Specialties and Roskam are responsible for maintaining said private roads. Currently, the sole exception to the foregoing is a private road that runs through the north side of the KWE Property onto the south side of the 5353 Broadmoor Property and deposits out to Broadmoor Avenue (the "Shared Private Drive"). Pursuant to an easement agreement between Process Specialties and Roskam, as grantor, and Franklin Partners, as grantee ("Shared Private Drive Easement Agreement"), Franklin Partners shall be granted the right to use the Shared Private Drive for ingress and egress to the KWE Property. The Shared Private Drive Easement Agreement also allocates responsibility for maintenance of the Shared Private Drive among Processing Specialties, Roskam and Franklin Partners. If, in the future, any one of the Developers (or their respective successors) conveys a portion of their respective properties to a third-party and, as a result of such conveyance, a private drive within the Property must be shared in order to provide access to and from the portion of the Property that is being conveyed, then the selling Developer(s) (or their respective successors) and the third-party purchaser(s) shall enter into easements similar to the Shared Private Drive Easement Agreement in order to address cross-access rights and allocation of maintenance responsibilities concerning the shared private drive. Consistent with the foregoing sentence, it is the intention of the parties to this Agreement to reasonably maintain circulation within the Property to provide individual parcels with access to public rights-of-way, subject to any legally required security, other reasonable security, or other requirements applicable to one or more of the Developers which require restriction on access through that Developer's portion of the Property. Nothing herein shall be interpreted to limit the ability of a Developer to agree with the City to improve private roads within the Property so as to dedicate those roads to the public. In such case, then, upon dedication and acceptance of such roads, the City shall take over all responsibilities and obligations of the rights-of-way as public roads by resolution and the applicable Developer(s) shall have no further obligations and responsibilities for the repair, maintenance and use of such roads.

Section 8. Amendment of Section 10. Section 10. of the Agreement is amended to read in full as follows:

Section 10. Stormwater. As part of the initial development of the Property, the Developer installed a comprehensive system to drain stormwater via stormwater pipes, a drainage ditch, retention/detention ponds and/or wetlands (collectively, the "Stormwater Drainage System"), all as indicated on the Revised 2017 IPUD Plan. In addition, the Developers have, or will, enter into drainage easements that allow the drainage of stormwater throughout various portions of the Property via the Stormwater Drainage System. Moreover, such easements also allocate responsibility for maintenance of the various portions of the Stormwater Drainage System. If, in the future, any one of the Developers (or their respective successors) conveys all or a portion of their respective properties to a third-party, then, as necessary, such Developer(s) (or their respective successors) shall enter into similar easements with the third-parties which permit the drainage of stormwater via the Stormwater Drainage System and allocate responsibility for maintenance of the Stormwater Drainage System. Further, with respect to the control and maintenance of the Stormwater Drainage System on the Property, the Developers (and their respective successors as to affected portions of the Property) are bound by that certain Hold Harmless Agreement in favor of the City dated July 5, 1988 and recorded on July 26, 1988 at Liber 2571, Page 421, Kent County, Michigan Register of Deeds. Moreover, with respect to the control and maintenance of certain retention/detention ponds located only on Steelcase's Retained Property, Steelcase (and its successors as to affected portions of Steelcase's Retained Property) is bound by those certain Hold Harmless Agreements in favor of the City dated June 23, 1987 and recorded on November 9, 1988 at Liber 2581, Page 1249, Kent County, Michigan Register of deeds, and dated February 18, 1991 and recorded on February 22, 1991 at Liber 2832, Page 1354, Kent County, Michigan Register of Deeds.

Section 9. Amendment of Section 11. Section 11. of the Agreement is amended to read in full as follows:

Section 11. Open Space. Developer acknowledges and agrees that a portion of the Property will remain open space as shown on the Revised 2017 IPUD Plan. For purposes of the foregoing sentence, "open space" excludes parking areas, deferred parking areas, and existing and future building areas.

Section 10. Recording and Binding Effect. The rights and obligations under this First Amendment are covenants that run with the land, and this First Amendment shall be binding upon and inure to the benefit of the parties, as well as their subrogees, successors and assigns. It is the parties' intent that this First Amendment shall be recorded with the Kent County Register of Deeds. Franklin Partners shall be responsible for all costs associated with recording the First Amendment. Upon the transfer of title to any portion of the Property by a Developer or any successor in title, the acquiring party shall be deemed to have acquired all of the Developer's (and such transferor's) rights and assumed all of the Developer's (and such transferor's) obligations described herein, and the Developer (and any subsequent transferor) shall be automatically be relieved of any further liability under this First Amendment.

Section 11. Headings and Recitals. The headings and subheadings contained in this First Amendment are included for convenience only. The parties agree, however, (i) that the Recitals form an integral part of the First Amendment, (ii) that the parties have relied upon the representations contained in the Recitals, and (iii) that the Recitals are hereby incorporated into the First Amendment by this reference.

Section 12. References to Agreement. All references to the Agreement shall be interpreted to mean the Agreement, as amended by this First Amendment.

20190319-0017095
Lisa Posthumus Lyons P:12/34 2:33PM
Kent Cnty MI Rgstr 03/19/2019 SEAL

Section 13. Remainder of Agreement. Except as modified in this First Amendment, the Agreement shall remain in full force and effect and binding on the parties.

CITY OF KENTWOOD,
a Michigan municipal corporation

By: ________________
Stephen C.N. Kepler
Its: MAYOR

COUNTY OF KENT

STATE OF MICHIGAN

Acknowledgment

Acknowledged before me by Stephen C.N. Kepler (name), the Mayor (title) of the City of Kentwood, a Michigan municipal corporation, on behalf of the corporation.

Becky L Schultz

Notary Public, Kent County, MI
Acting in Kent County, MI
My Commission Expires: 8-10-2024

BECKY L SCHULTZ
Notary Public, State of Michigan
County of Kent
My Commission Expires Aug. 10, 20..
Acting in the County of Kent

20190319-0017095
Lisa Posthumus Lyons P:13/34 2:33PM
Kent Cnty MI Rgstr 03/19/2019 SEAL

FRANKLIN 5565 BROADMOOR, LLC,
a Michigan limited liability company

By: ______________________
Donald J. Shoemaker
Its: Manager

COUNTY OF ~~KENT~~ DUPAGE

Acknowledgment

STATE OF ~~MICHIGAN~~ ILLINOIS
Acknowledged before me by Donald J Shoemaker (name), the Manager (title) of Franklin 5565 Broadmoor, LLC, a Michigan limited liability company, on behalf of the company.

Bernadette N Rodeghero
Notary Public, Will County, ~~MI~~ IL
Acting in DuPage County, ~~MI~~
My Commission Expires: ____________

OFFICIAL SEAL
BERNADETTE N RODEGHERO
NOTARY PUBLIC - STATE OF ILLINOIS
MY COMMISSION EXPIRES:03/17/19

20190319-0017095
Lisa Posthumus Lyons P:14/34 2:33PM
Kent Cnty MI Rgstr 03/19/2019 SEAL.

ROSKAM BAKING COMPANY,
a Michigan corporation

By: ______________________
Cameron Roskam
Its: President

COUNTY OF KENT

STATE OF MICHIGAN

Acknowledgment

Acknowledged before me by Cameron Roskam (name), the President (title) of Roskam Baking Company, a Michigan corporation, on behalf of the corporation.

____
Notary Public, Kent County, MI
Acting in Kent County, MI
My Commission Expires: 12-26-2023

CYNTHIA ANN LEMMINK
NOTARY PUBLIC, STATE OF MI
COUNTY OF KENT
MY COMMISSION EXPIRES Dec 26, 2023
ACTING IN COUNTY OF Kent

20190319-0017095
Lisa Posthumus Lyons P:15/34 2:33PM
Kent Cnty MI Rgstr 03/19/2019 SEAL

PROCESSING SPECIALTIES, INC.,
a Michigan corporation

By: ______________________

Cameron Roskam
Its: President

COUNTY OF KENT

STATE OF MICHIGAN

Acknowledgment

Acknowledged before me by Cameron Roskam (name), the President (title) of Processing Specialties, Inc., a Michigan corporation, on behalf of the corporation.

____

Notary Public, Kent County, MI
Acting in Kent County, MI
My Commission Expires: 12-26-2023

Prepared by / Return to:
Scott J. Steiner
RHOADES McKEE PC
55 Campau Avenue NW, Suite 300
Grand Rapids, MI 49503
(616) 235-3500

CYNTHIA ANN LEMMINK
NOTARY PUBLIC, STATE OF MI
COUNTY OF KENT
MY COMMISSION EXPIRES Dec 26, 2023
ACTING IN COUNTY OF Kent

EXHIBIT A

Legal Description of Property

Land situated in the County of Kent, City of Kentwood, State of Michigan, is described as follows:

Part of the West 1/2 of Section 36, Town 6 North, Range 11 West, City of Kentwood, Kent County, Michigan, described as: Commencing at North 1/4 corner; thence West along North Section line to a point 1107.67 feet North 89 degrees 57 minutes 07 seconds East along North Section line from Northwest corner of Section; thence South 2 degrees 21 minutes 05 seconds East to South line of the North 3/8 of the West 1/4 of the Northwest 1/4, extended East; thence West along said extended South line to the West Section line; thence South to the Northwest corner of the South 660 feet of the Northwest 1/4; thence East along the North line of said South 660 feet to the East line of the West 264 feet of the Northwest 1/4; thence South along said East line to North line of the South 330 feet of the Northwest 1/4; thence West along said North line to West Section line; thence South along West Section line to the North line of the South 165 feet of the Northwest 1/4; thence East along said North line to the East line of the West 320 feet of the Northwest 1/4; thence South along said East line to East and West 1/4 line; thence West to West 1/4 corner; thence South to the Southwest corner of the North 1/2 of the Southwest 1/4; thence East to Southeast corner of the North 1/2 of the Southwest 1/4; thence North along North and South 1/4 line to beginning, EXCEPT the North 50.0 feet thereof.

ALSO EXCEPT:
Commencing 1174.43 feet South 01 degrees 54 minutes 24 seconds East along North and South 1/4 line from North 1/4 corner; thence South 01 degrees 54 minutes 24 seconds East along North and South 1/4 line 493.01 feet; thence Westerly 192.74 feet on a 400.0 feet radius curve to the right long chord bears South 87 degrees 18 minutes 52 seconds West 190.88 feet; thence North 09 degrees 49 minutes 07 seconds East 506.16 feet; thence North 88 degrees 05 minutes 36 seconds East 88.0 feet to the point of beginning, Section 36, Town 6 North, Range 11 West.

Tax Item No. 41-18-36-100-050

AND

That part of Section 36, T6N, R11W, City of Kentwood, Kent County, Michigan, described as: Beginning at the South 1/4 corner of said Section 36; thence N90°00'00"W 1972.93 feet along the South line, SW 1/4, Section 36 to a point which is S90°00'00"E 660.00 feet from the SW corner of said Section; thence N00°00'00"E 469.00 feet; thence N81°12'15"W 194.43 feet; thence S77°33'30"W 61.43 feet; thence S61°35'00"W 474.19 feet to the West line, SW 1/4, Section 36; thence N02°01'30"W 1065.98 feet along said West line; thence S89°55'36"E 2635.79 feet along the North line of the South 1/2 of said SW 1/4 to the N-S 1/4 line, Section 36; thence N01°54'24"W 1322.51 along said N-S 1/4 line to the Center of said Section; thence N01°54'24"W 972.39 feet along said N-S 1/4 line; thence Northeasterly 105.26 feet along a 400.00 foot radius curve to the left, the chord of which bears N65°58'18"E 104.96 feet; thence S32°23'00"E 410.00 feet; thence Southeasterly 242.24 feet along a 485.00 foot radius curve to the left, the chord of which bears S46°41'30"E 239.73 feet; thence S61°00'00"E 209.53 feet; thence S41°00'00"W 138.63 feet; thence S47°00'00"E 113.67 feet; thence S00°00'30"W 2864.85 feet to the South line, SE 1/4, Section 36; thence N89°53'00"W 544.57 feet along said South line to the place of beginning.

Part of Tax Item No. 41-18-36-400-019

AND

That part of Section 36, T6N, R11W, and that part of the SW 1/4, Section 31, T6N, R10W, City of Kentwood, Kent County, Michigan, described as: Commencing at the South 1/4 corner of said Section 36; thence S89°53'00"E 544.57 feet along the South line of the SE 1/4, Section 36 to the Place of Beginning; thence N00°00'30"E 2864.85 feet; thence S47°00'00"E 261.33 feet; thence N59°32'00"E 600.00 feet; thence Northeasterly 282.48 feet along a 650.00 foot radius curve to the right, the chord of which bears N71°59'00"E 280.26 feet; thence N84°26'00"E 185.95 feet to the Westerly line of Highway M-37 (Broadmoor Avenue) Relocated 1993; thence S30°27'59"E 2109.64 feet along said Westerly line; thence S01°37'08"W 106.32 feet to the Westerly line of Patterson Avenue; thence Southwesterly 480.93 feet along the Westerly line of Patterson Avenue on a 532.29 foot radius curve to the left, the chord of which bears S24°04'43"W 464.74 feet; thence S01°48'18"E 751.21 feet along said Westerly line to the South line, SE 1/4, Section 36; thence N89°53'00"W 2061.00 feet along said South line to the place of beginning.

Tax Item Nos.:
41-19-31-351-001, 41-19-31-351-002 and Part of 41-18-36-400-019

AND

Part of the Northeast ¼ and Northwest ¼, Section 36, Town 6 North, Range 11 West, City of Kentwood, Kent County, Michigan, described as: Commencing at the North ¼ corner of said Section 36; thence South 01 degrees 54 minutes 24 seconds East 1174.43 feet along the West line of said Northeast ¼ to the place of beginning of this description; thence South 01 degrees 54 minutes 24 seconds East 250.00 feet along said West line; thence North 59 degrees 32 minutes 02 seconds East 1192.88 feet to the Westerly line of Broadmoor Avenue (M-37), 205 feet wide; thence South 30 degrees 27 minutes 59 seconds East 1587.89 feet along said Westerly line; thence South 84 degrees 26 minutes 00 seconds West 185.95 feet; thence Southwesterly 282.48 feet along a 650.00 foot radius curve to the left, the delta angle being 24 degrees 54 minutes 00 seconds and the chord of which bears South 71 degrees 59 minutes 00 seconds West 280.26 feet; thence South 59 degrees 32 minutes 00 seconds West 600.0 feet; thence North 47 degrees 00 minutes 00 seconds West 375.00 feet; thence North 41 degrees 00 minutes 00 seconds East 138.63 feet; thence North 61 degrees 00 minutes 00 seconds West 209.53 feet; thence Northwesterly 242.24 feet along a 485.00 foot radius curve to the left, the delta angle being 28 degrees 37 minutes 00 seconds and the chord of which bears North 46 degrees 41 minutes 30 seconds West 239.73 feet; thence North 32 degrees 23 minutes 00 seconds West 410.00 feet; thence Southwesterly 298.00 feet along a 400.00 foot radius curve to the right, the delta angle being 42 degrees 41 minutes 08 seconds and the chord of which bears South 79 degrees 46 minutes 32 seconds West 291.16 feet; thence North 09 degrees 49 minutes 07 seconds East

506.16 feet; thence North 88 degrees 05 minutes 36 seconds East 88.00 feet to the place of beginning.

Tax Item Nos.:
41-18-36-100-051 and 41-18-36-200-047

EXHIBIT B

Original IPUD Statement

See attached

20190319-0017095
Lisa Posthumus Lyons P:20/34 2:33PM
Kent Cnty MI Rgstr 03/19/2019 SEAL

Grand Rapids, MI 49501

"WRITTEN STATEMENT OF THE PUD"

March 9, 1987

City Planning Department
ATTN: Mr. Tim Johnson
City of Kentwood
Kentwood, MI. 49508

Dear Mr. Johnson:

In 1982, Steelcase Inc. presented to the Kentwood Planning Commission a master plan showing a 408 acre parcel, located in section 36, being developed into an industrial site. At that time, Kentwood approved the master plan, and rezoned the property to IPUD.

Steelcase is proposing, at this time, to incorporate the additional properties it has acquired since its initial purchase into a revised master plan. This will require these additional properties to be rezoned to IPUD.

In this revised master plan, we have continued to show six major manufacturing plants located around a central shipping facility. But because of acquiring additional property, we are now able to design all manufacturing plants as single story buildings versus some being two stories as shown on the original master plan. In addition, we have added one manufacturing plant of approximately 400,000 square feet.

To provide a more desirable working environment, we have located fifteen service type buildings along the perimeter of the site. This will provide a buffer zone between our manufacturing plants and the adjoining property on the west which is, at this time, zoned residential. We have also included an additional pond on the east and two on the north for storm detention.

We have also located our Fleet Facility on the north side of our site adjacent to North American Van Line's Property. This site was chosen because it is adjacent to our 24-hour guard post and truck entrance. This will keep the truck movement within the site to a minimum.

Steelcase, Storr & Davis

The construction will continue to be phased as the market place demands. The landscaping theme as demonstrated in the first phase will continue through the total site developments. Steelcase is committed to a campus like working environment with lots of trees, grassy areas, and ponds.

Sincerely,

Roger Lamer

Roger Lamer
Construction and Design

022601.RL/mg

171 ADOPT RES. 61-87 DESIGNATING SPECULATIVE BUILDING FOR EDCO, INC., 4261 AIRLANE DR.; ACT 198
Motion by Ancell, supported by Wylie, to adopt Resolution 61-87 designating the structure located at 4261 Airlane Drive SE as a Speculative Building for EDCO, Inc.; under Act 198.

Roll Call Vote: Yeas: Ancell, Cargill, Christensen, Mast, Wylie, and Mayor DeRuiter. Nays: VanKeulen. Absent: None.

Resolution Adopted

Mayor DeRuiter opened the hearing to consider an application for an Industrial Facilities Exemption Certificate for EDCO, Inc., 4261 Airlane Drive SE; under Act 198.

After presentation and discussion:

172 ADOPT RES. 62-87 APPROVING APPLICATION FOR IND. FAC. EXEMPT. CERT. FOR EDCO, INC., 4261 AIRLANE DR.; ACT 198
Motion by Wylie, supported by Ancell, to close the hearing and adopt Resolution 62-87 approving the application for an Industrial Facilities Exemption Certificate for EDCO, Inc., 4261 Airlane Drive SE, with the change in Page 2, Paragraph 2, as indicated in Assessor Deborah Ring's memo of May 5, 1987; under Act 198.

Roll Call Vote: Yeas: Ancell, Cargill, Christensen, Mast, Wylie, and Mayor DeRuiter. Nays: VanKeulen. Absent: None.

Resolution Adopted

Mayor DeRuiter opened the hearing to consider the request from Steelcase, Inc. to rezone property located south and east of 52nd Street and East Paris from I-1, A-1, and R1-B to IPUD, Industrial Planned Unit Development and to approve the site plan.

After presentation and discussion:

Motion by Ancell, supported by Wylie, to close the hearing.

Motion Carried

173 ADOPT ORD. 14-87 REZONING STEELCASE, INC. PROPERTY AT 52ND & E. PARIS FROM I-1, A-1, & R1-B TO IPUD
Motion by Cargill, supported by Ancell, to adopt Ordinance 14-87 amending the Zoning Ordinance to rezone property located south and east of 52nd Street and East Paris from I-1 Light Industrial, A-1 Agricultural, and R1-B Single Family Residential to IPUD, Industrial Planned Unit Development for Steelcase, Inc. according to the basis stated in the Planning Commission Findings of Fact dated April 28, 1987.

Roll Call Vote: Yeas: All. Nays: None. Absent: None.

Ordinance Adopted

174 APPROVE SITE PLAN FOR STEELCASE IPUD AT 52ND & E. PARIS
Motion by Cargill, supported by Ancell, to approve the site plan for the Steelcase, Inc. IPUD located south and east of 52nd Street and East Paris subject to the conditions in the Planning Commission Findings of Fact dated April 28, 1987.

20190319-0017095
Lisa Posthumus Lyons P:23/34 2:33PM
Kent Cnty MI Rgstr 03/19/2019 SEAL

EXHIBIT C

ORIGINAL IPUD PLAN

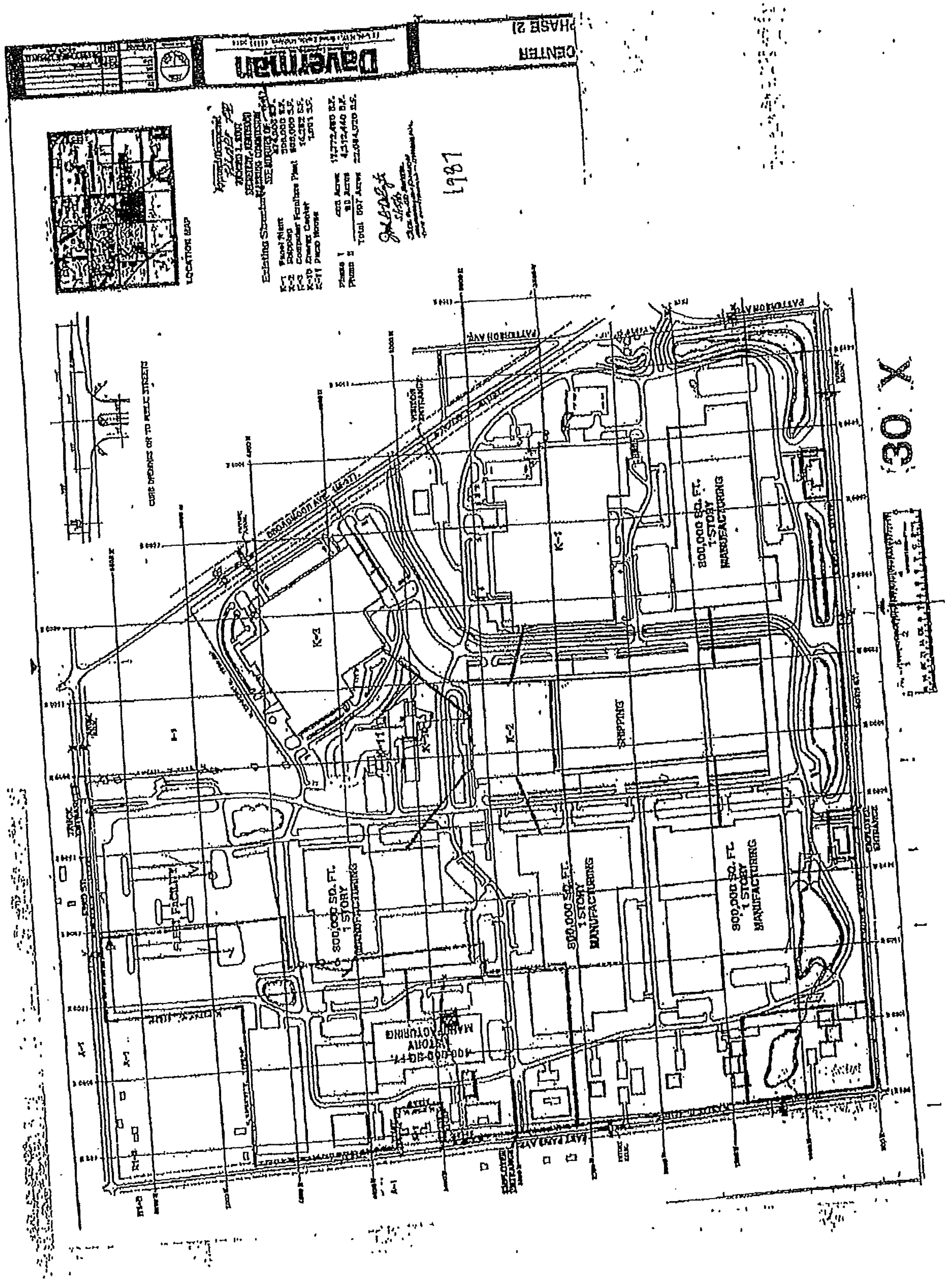


EXHIBIT D

Legal Description of 5353 Broadmoor Property

Land situated in the County of Kent, City of Kentwood, State of Michigan, is described as follows:

Part of the Northeast ¼ and Northwest ¼, Section 36, Town 6 North, Range 11 West, City of Kentwood, Kent County, Michigan, described as: Commencing at the North ¼ corner of said Section 36; thence South 01 degrees 54 minutes 24 seconds East 1174.43 feet along the West line of said Northeast ¼ to the place of beginning of this description; thence South 01 degrees 54 minutes 24 seconds East 250.00 feet along said West line; thence North 59 degrees 32 minutes 02 seconds East 1192.88 feet to the Westerly line of Broadmoor Avenue (M-37), 205 feet wide; thence South 30 degrees 27 minutes 59 seconds East 1587.89 feet along said Westerly line; thence South 84 degrees 26 minutes 00 seconds West 185.95 feet; thence Southwesterly 282.48 feet along a 650.00 foot radius curve to the left, the delta angle being 24 degrees 54 minutes 00 seconds and the chord of which bears South 71 degrees 59 minutes 00 seconds West 280.26 feet; thence South 59 degrees 32 minutes 00 seconds West 600.0 feet; thence North 47 degrees 00 minutes 00 seconds West 375.00 feet; thence North 41 degrees 00 minutes 00 seconds East 138.63 feet; thence North 61 degrees 00 minutes 00 seconds West 209.53 feet; thence Northwesterly 242.24 feet along a 485.00 foot radius curve to the left, the delta angle being 28 degrees 37 minutes 00 seconds and the chord of which bears North 46 degrees 41 minutes 30 seconds West 239.73 feet; thence North 32 degrees 23 minutes 00 seconds West 410.00 feet; thence Southwesterly 298.00 feet along a 400.00 foot radius curve to the right, the delta angle being 42 degrees 41 minutes 08 seconds and the chord of which bears South 79 degrees 46 minutes 32 seconds West 291.16 feet; thence North 09 degrees 49 minutes 07 seconds East 506.16 feet; thence North 88 degrees 05 minutes 36 seconds East 88.00 feet to the place of beginning.

Tax Item Nos.:
41-18-36-100-051 and 41-18-36-200-047

EXHIBIT E

Legal Description of KWE Property

Land situated in the County of Kent, City of Kentwood, State of Michigan, is described as follows:

That part of Section 36, T6N, R11W, and that part of the SW 1/4, Section 31, T6N, R10W, City of Kentwood, Kent County, Michigan, described as: Commencing at the South 1/4 corner of said Section 36; thence S89°53'00"E 544.57 feet along the South line of the SE 1/4, Section 36 to the Place of Beginning; thence N00°00'30"E 2864.85 feet; thence S47°00'00"E 261.33 feet; thence N59°32'00"E 600.00 feet; thence Northeasterly 282.48 feet along a 650.00 foot radius curve to the right, the chord of which bears N71°59'00"E 280.26 feet; thence N84°26'00"E 185.95 feet to the Westerly line of Highway M-37 (Broadmoor Avenue) Relocated 1993; thence S30°27'59"E 2109.64 feet along said Westerly line; thence S01°37'08"W 106.32 feet to the Westerly line of Patterson Avenue; thence Southwesterly 480.93 feet along the Westerly line of Patterson Avenue on a 532.29 foot radius curve to the left, the chord of which bears S24°04'43"W 464.74 feet; thence S01°48'18"E 751.21 feet along said Westerly line to the South line, SE 1/4, Section 36; thence N89°53'00"W 2061.00 feet along said South line to the place of beginning.

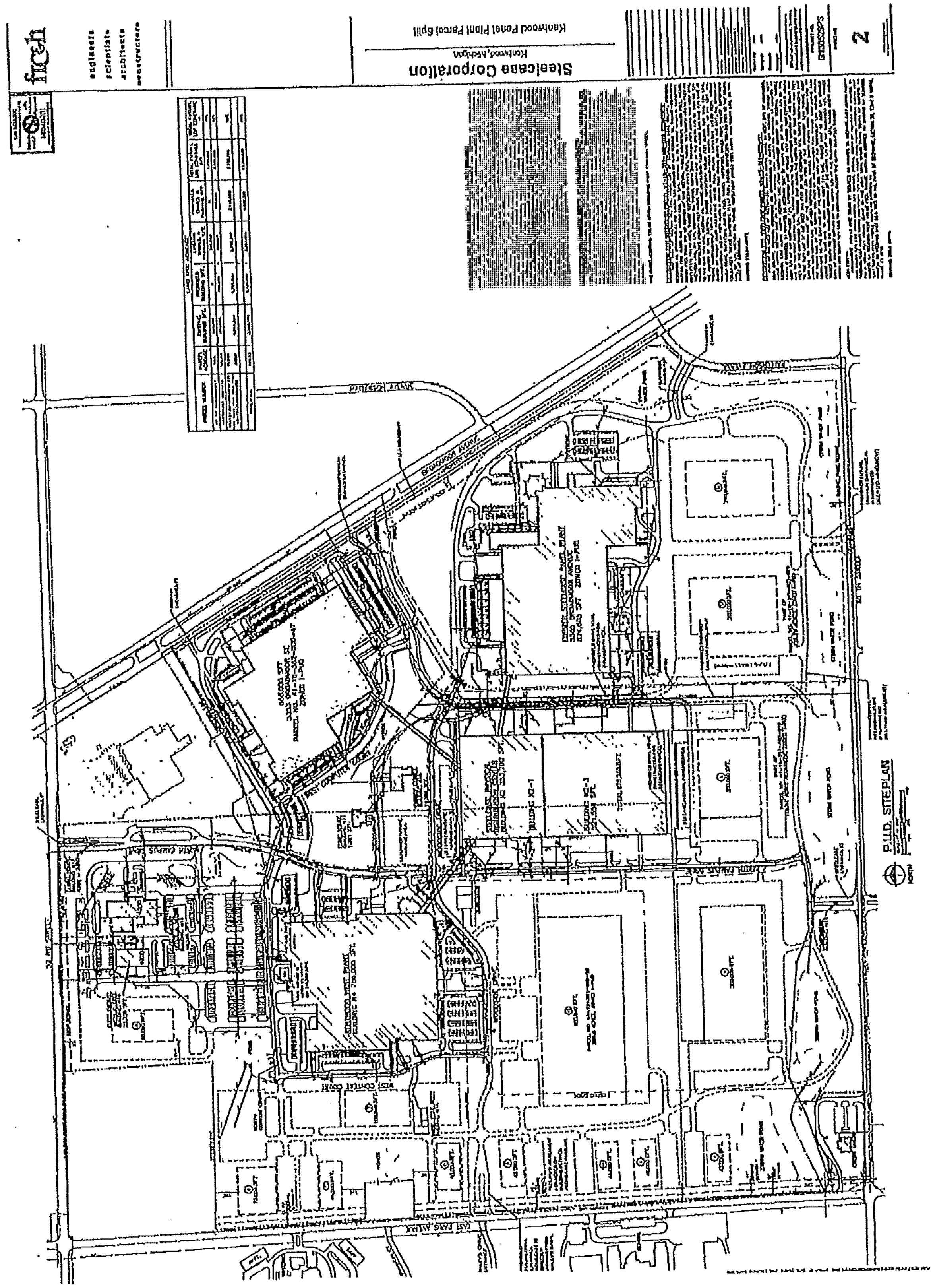
Tax Item Nos.:
41-19-31-351-001, 41-19-31-351-002 and Part of 41-18-36-400-019

20190319-0017095
Lisa Posthumus Lyons P:26/34 2:33PM
Kent Cnty MI Rgstr 03/19/2019 SEAL

EXHIBIT F

REVISED 2014 IPUD PLAN

20190319-0017095
Lisa Posthumus Lyons P:27/34 2:33PM
Kent Cnty MI Rgstr 03/19/2019 SEAL

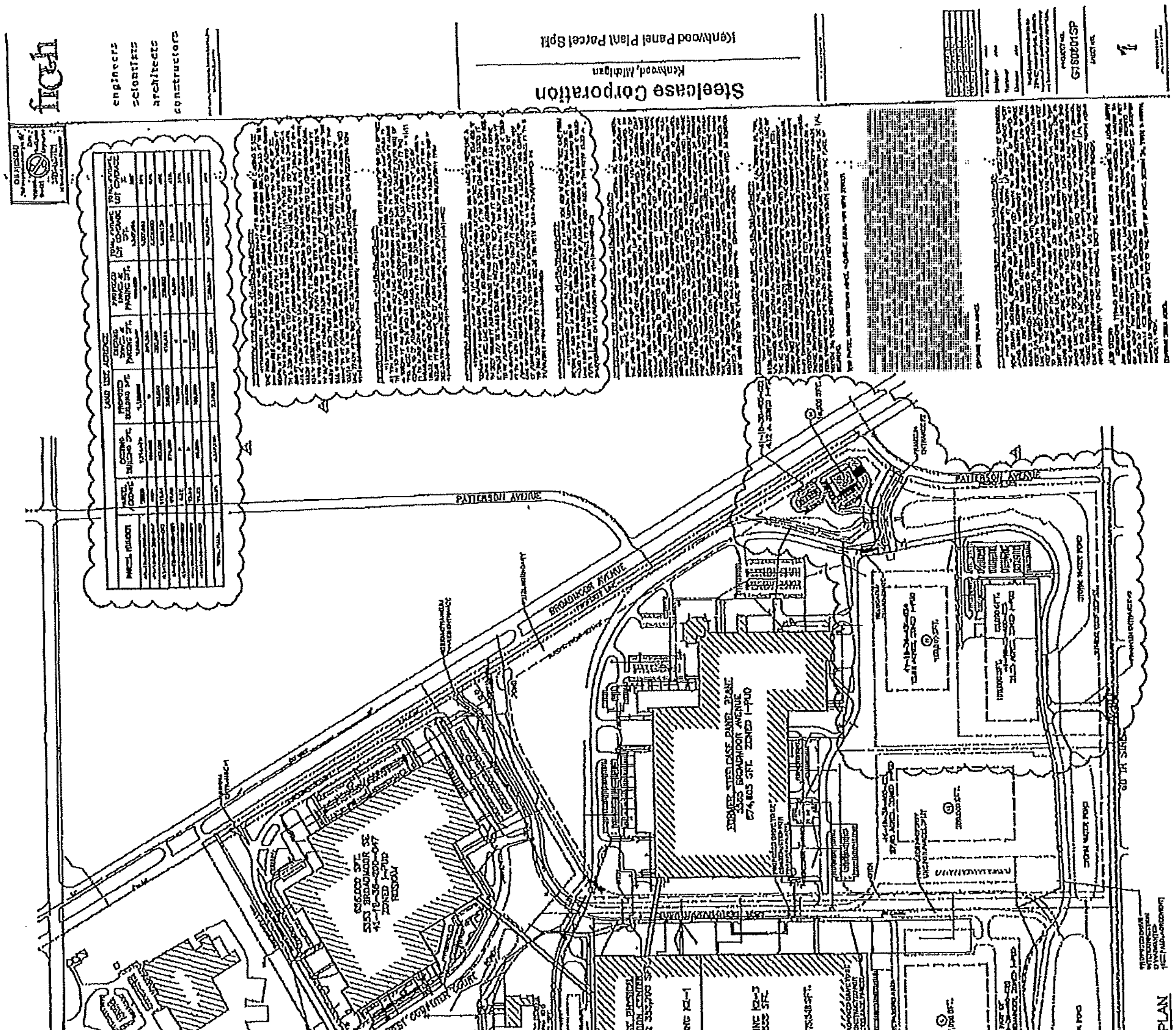


20190319-0017095
Lisa Posthumus Lyons P:28/34 2:33PM
Kent Cnty MI Rgstr 03/19/2019 SEAL

EXHIBIT G

REVISED 2017 IPUD PLAN

20190319-0017095
Lisa Posthumus Lyons P:29/34 2:33PM
Kent Cnty MI Rgstr 03/19/2019 SEAL



20190319-0017095
Lisa Posthumus Lyons P:30/34 2:33PM
Kent Cnty MI Rgstr 03/19/2019 SEAL

EXHIBIT H

2017 FINDINGS OF FACT AND CONDITIONS

20190319-0017095
Lisa Posthumus Lyons P:31/34 2:33PM
Kent Cnty MI Rgstr 03/19/2019 SEAL

CITY OF KENTWOOD
PLANNING COMMISSION
APPROVED
FINDINGS OF FACT
APRIL 25, 2017

Golder 4/3/17

PROJECT:	Franklin Partners (Steelcase) PUD Major Change
APPLICATION:	11-17
REQUEST:	Major Change to an Approved PUD Site Plan
LOCATION:	Patterson and Broadmoor Avenue area
HEARING DATE:	April 11, 2017
MOTION:	**Motion by Benoit, supported by Pemberton, to recommend to the City Commission conditional approval of the request for Major Change to and Approved PUD Site Plan for the site plan dated March 6, 2017 for the Franklin Partners (Steelcase) PUD as described in Case No. 11-17. Approval is conditioned on conditions 1-7 and basis points 1-7 as described in Golder's memo dated April 3, 2017.**

- Motion Carried (6-0) –
- Bridson, Kape and Young absent –

CONDITIONS:

1. Review and approval by staff and the city attorney of the revised PUD Development Agreement, and execution of the Development Agreement by all parties.
2. Compliance with the City Engineer memo dated March 17, 2017, and the Kentwood Fire Marshal memo dated March 14, 2017.
3. At the time of final approval, applicant shall provide documentation that proposed industrial buildings meet the city's parking standards.
4. Final approval by the Kent County Road Commission of driveway design at the Patterson Avenue entrance.
5. Applicant shall widen the boulevard entrance to allow for a right turn ingress lane serving the proposed credit union if deemed necessary by

the Kent County Road Commission or the City. The ingress lane will be required if the Kent County Road Commission or the City determines that truck traffic regularly creates conflict with credit union traffic or Patterson Avenue

6. Staff approval of final building elevations, landscaping and lighting.

7. Planning Commission approval of the final PUD plan.

BASIS

1. A Planned Unit Development approved in 2014 for Steelcase and Franklin Partners. A PUD Agreement was signed at that time detailing requirements and restrictions within the development. With the proposed major change, the overall PUD Agreement must be amended and ratified by those that signed the 2014 agreement.

2. The revised site plan proposes an additional 115,000 square feet of industrial buildings. With the final PUD approval, the applicant must show that the city's parking standards can be met.

3. Patterson Avenue is under the jurisdiction of the Kent County Road Commission. The KCRC will approve any proposed changes to the driveway access at Patterson Avenue.

4. The applicant has relocated the guard shack to the internal driveway serving the Roskam property. At this time, truck traffic is not anticipated to back up enough to block access to the credit union. However, if truck traffic does increase significantly, it may block access to the credit union. The boulevard median could be used to accommodate the improvement.

5. The PUD Agreement outlines requirements for the tree preservation and landscaping plans within the PUD. These can be addressed at the time of final PUD Approval.

6. Chapter 12 requires finish materials for building façade visible from a public right of way or parking lots. The façade requirement would hold any new construction to the same standard that is used for any commercial or industrial building within the city.

7. Discussion and representations during the work session and public hearings.

20190319-0017095
Lisa Posthumus Lyons P:33/34 2:33PM
Kent Cnty MI Rgstr 03/19/2019 SEAL

CITY OF KENTWOOD
CITY COMMISSION
APPROVED
FINDINGS OF FACT
MAY 8, 2017

Golder 4/3/17

PROJECT: Franklin Partners (Steelcase) PUD Major Change.

APPLICATION: 11-17

REQUEST: Major Change to an Approved PUD Site Plan

LOCATION: Patterson and Broadmoor Avenue area

HEARING DATE: April 11, 2017

MOTION: **Motion by Clanton, seconded by DeMaagd to conditionally approve the major change to the approved PUD site plan for Case No. 11-17 Franklin Partners (Steelcase) PUD subject to conditions 1-7 and basis points 1-7.**

Motion Carried.

CONDITIONS:

1. Review and approval by staff and the city attorney of the revised PUD Development Agreement, and execution of the Development Agreement by all parties.

2. Compliance with the City Engineer memo dated March 17, 2017, and the Kentwood Fire Marshal memo dated March 14, 2017.

3. At the time of final approval, applicant shall provide documentation that proposed industrial buildings meet the city's parking standards.

4. Final approval by the Kent County Road Commission of driveway design at the Patterson Avenue entrance.

5. Applicant shall widen the boulevard entrance to allow for a right turn ingress lane serving the proposed credit union if deemed necessary by the Kent County Road Commission or the City. The ingress lane will be required if the Kent County Road Commission or the City determines that truck traffic regularly creates conflict with credit union traffic or Patterson Avenue

20190319-0017095
Lisa Posthumus Lyons P-34/34 2:33PM
Kent Cnty MI Rgstr 03/19/2019 SEAL

6. Staff approval of final building elevations, landscaping and lighting.

7. Planning Commission approval of the final PUD plan.

BASIS

1. A Planned Unit Development approved in 2014 for Steelcase and Franklin Partners. A PUD Agreement was signed at that time detailing requirements and restrictions within the development. With the proposed major change, the overall PUD Agreement must be amended and ratified by those that signed the 2014 agreement.

2. The revised site plan proposes an additional 115,000 square feet of industrial buildings. With the final PUD approval, the applicant must show that the city's parking standards can be met.

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7. Discussion and representations during the work session and public hearings.

PROJECT STATEMENT: Application for Amendment to IPUD Plan – 4308 52nd Street NE, Kentwood, MI

INTRODUCTION

Transport Properties LLC is the contract purchaser from Steelcase Inc. of a 27-acre parcel (the "Site") that is currently part of a larger tax parcel owned by Steelcase having a parcel number of 41-18-36-100-050. The Site is currently operated and used by Steelcase as a maintenance facility and service storage yard for Steelcase's fleet of trucks, trailers and other vehicles. The Site and its maintenance buildings are securely self-contained within the Steelcase campus and serve only Steelcase vehicles. The existing site conditions are illustrated on Sheet Ex-1.

Transport Properties' plan is to continue to use the Site for commercial vehicle maintenance, truck and trailer parking, but to lease the property to 1, 2 or 3 separate operators. Such tenant operators may include a large shipping company (i.e. FedEx) which requires fleet repair and parking, or a local manufacturing company that requires additional off-site truck parking capacity, or a school bus or van fleet company, or a combination thereof. Transport Properties would convert the Site to a self-contained secure facility with direct access to 52nd Street and physically separated from the Steelcase campus.

SUMMARY OF PROPOSED MODIFICATIONS TO THE IPUD PLAN

Transport Properties' proposal is to modify the Site by adding additional paved parking area on the westerly third of the Site, providing 2 or 3 curb cuts onto 52nd Street and eliminating cross access between the Site and the Steelcase Campus. This proposal requires two modifications to the existing Final IPUD Plan for the Steelcase campus, each modification constituting a "Major Change" to the Final IPUD Plan:

(i) the addition of "Other Future Access Points" onto 52nd Street (constituting a Major Change under Section 3.A.iii of the Steelcase PUD Development Agreement dated May 28, 2014) and separation of the Site from the Steelcase campus by a new continuous landscaped barrier along the south property line and elimination of cross access; and

(ii) the removal from the IPUD Plan of the designation of a portion of the Site for future development of an 80,000 sq. ft. Building "A".

Transport Properties' plan does not reduce the 52nd Street landscape buffer area depth or intensity of landscaping, except in those areas which may become entry access points. These mature dense landscaping features screen the Site from public view and screen parking areas from perimeter roads. The proposed IPUD site changes are illustrated on Preliminary Site Plan, sheet SP-1.

USE AS AN INDUSTRIAL SERVICES FACILITY FOR TRUCK PARKING, STORAGE AND MAINTENANCE

Transport Properties believes the Site is appropriate for reuse and development as a self-contained industrial services facility (an "ISF") for the parking and storage of trucks, trailers and construction equipment/vehicles by one or more tenant operators. There is considerable demand in the greater Kentwood / Grand Rapids industrial logistics service market for secure, well-maintained, accessible vehicle storage and repair sites. Transport Properties has a proven track record of developing and operating over thirty ISFs in Michigan, Indiana and Illinois. Transport Properties owns, operates, leases and develops ISFs for the parking and storage of trucks, trailers, buses, and for contractor storage yards. These facilities sometimes include truck repair and maintenance buildings with ancillary office space. Transport Properties' ISF properties range from single tenant to multi-tenant integrated facilities.

Some properties are fleet storage and maintenance facilities for a single user. Other properties provide a campus for 2 or more tenants, each with its own secure site.

Transport Properties is in discussion with a variety of companies interested in leasing or acquiring all or a portion of the Site for ISF uses. Demand for an ISF at the Site is strong. ISF tenants are long-term users, typically with 10-year leases. Transport Properties tenants want paved, secure storage facilities. The types of companies that are interested in this Site include:

- Large shipping companies (FedEx, UPS, DHL, etc.) which require fleet storage and surge yards for high-demand periods and overflow parking
- Local and regional trucking companies that require truck parking and trailer storage capacity, either for their own fleet or for individual drivers, typically drivers who live in the vicinity of the parking yard;
- Local and regional industrial manufacturing companies that require additional off-site truck and trailer parking and storage capacity due to their on-site capacity limitations;
- School bus fleet parking, dispatch and service facilities;
- Wholesale truck and equipment sales entirely within an enclosed building.

The Kentwood land use categories applicable to these various potential ISF users would be:

- Motor Freight Terminal, defined as "a building *or area* in which [i] freight brought by truck is assembled and/or stored for routing or reshipment, or [ii] *in which semitrailers, including tractor and/or trailer units and other trucks, are parked or stored*." (Emphasis added). Motor Freight Terminal is a permitted use in the IPUD zoning district.[1] This land use classification should be applicable to most of the anticipated tenant types listed above, other than tenants whose principal business activity is more appropriately classified in an Industrial PUD as a use requiring Special Land Use approval such as a "contractor's storage yard" or a "vehicle repair establishment, major" facility.[2]

STATEMENT OF JUSTIFICATION

The proposed development of the Site continues to serve the goals of the City Master Plan by retaining the zoning of I-PUD and continues the use of the Site in a manner substantially similar to its use by Steelcase. The various uses by Transport Properties tenants are all substantially similar in character to Steelcase's use of the Site for its own fleet maintenance and vehicle parking and storage, so the proposed land use is consistent with the existing IPUD Plan.

Direct access to 52nd Street for tenants of the Site is a necessity for Steelcase. Steelcase needs to maintain a secure self-contained campus to comply with U.S. Customs rules and regulations. Accordingly, Steelcase requires physical separation of the Site from Steelcase's adjacent properties. Consequently, the Site will require its own direct access to 52nd Street. Existing access points along the Site's south

[1] Vehicle Repair Establishment, Major is a Special Land Use in the I-1 zoning district if vehicle repair is the principal use of the property. If vehicle repair is accessory to or incidental to the use of the property for vehicle parking and storage, the use of the existing repair facility on a proposed 8-acre Lot 3 should not require a SLU approval.

[2] A contractor's storage yard operator would need to obtain Special Land Use approval before operating on the Site and the contractor's outdoor storage areas must paved, located in the rear of the property and screened from the view of neighboring properties or from the street through the use of an approved landscape plan.

property line will be removed and the property improved with a continuous curb along the south property line. A secure perimeter fence will further separate the Site from the Steelcase campus.

52nd Street and the area roadways can support the volume of traffic that may be generated by the conversion of the Site to the uses proposed by Transport Properties with up to 3 curb cuts. This conclusion is supported by the traffic impact study (TIS) prepared by Spalding & DeDecker and submitted in support of this application. The TIS report concludes:

> "The addition of the traffic generated by the [] proposed development will not negatively impact operations of the signalized intersections under all three potential land use scenarios that were analyzed. Additionally, it was found that the additional access points for the parcels off 52nd Street will not have a negative impact on the roadway traffic."

Site stormwater drainage and detention will be provided by existing facilities and new drainage inlets and pipes for the expanded parking area. The developed 2/3rds of the Site drain into offsite Pond A and Pond B. The additional impervious surface area will drain into Pond A, which detention area can be expanded if necessary. Other Site utilities will be decoupled from Steelcase so that the Site is separately metered.

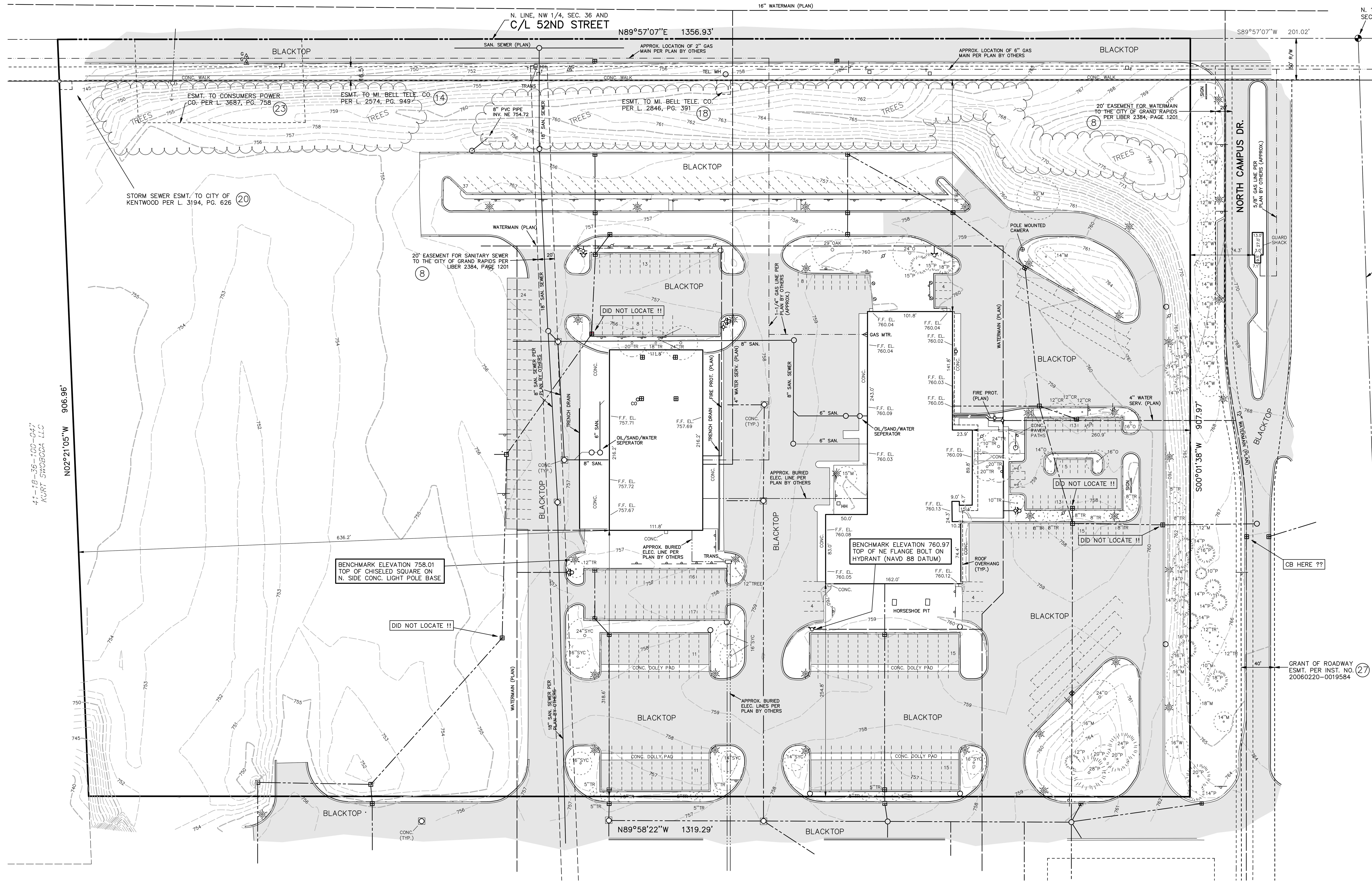
Because of the size of the Site and the existing vehicle repair and washing facilities, the Site lends itself to division into 2 or 3 separately leased premises (or separate ownership parcels), so long as new curb cuts can be secured to provide direct access to 52nd Street. Transport Properties has determined that there is sufficient interest in the greater Kentwood industrial market area for an ISF facility divisible into 7 to 8-acre sites. The two existing buildings would be used for repair, maintenance and washing, subject to tenant modifications to be determined.[3]

In all potential future tenant/user scenarios, Transport Properties anticipates maintaining the two existing shipping fleet maintenance buildings. Whether Transport Properties proposes improvements and/or additions to the existing buildings or changes in use of the interior spaces would be driven by the tenants' needs. For example, if the Site is divided into 3 leased parcels, the center parcel may be leased to an equipment rental company who may propose to convert one or more wash bays into additional repair bays or office space. Transport Properties does not anticipate that a third building would be developed on the westerly parcel because strong market demand exists for an 8-acre parking and storage yard without an office or repair building.

Transport Properties understands that Site Plan Review approval (and other governmental agency approvals) would be required in connection with final Site redevelopment plans (engineering, landscaping, etc.) for improvements such as the expansion of the parking area and closure of access along the south property line, and that land division approval may be required if the Site is to be further divided into two or three separate ownership parcels.

---

[3] Transport Properties does not propose to construct a new additional building on the western side of the Site. Transport Properties understands that the proposed amendment to the IPUD Plan eliminates reference to a Building "A" and that, if the IPUD Plan is amended as proposed, no additional building could be constructed on the Site without further amendment to the IPUD Plan.



PRELIMINARY

Description:

Part of the NW 1/4 of Section 36, T6N, R11W, City of Kentwood, Kent County, Michigan, described as: Commencing at the North 1/4 corner of said Section 36; thence S89°57'07"W 201.02 feet along the North line of said NW 1/4 to the PLACE OF BEGINNING of this description; thence S00°01'38"W 907.97 feet; thence N89°58'22"W 1319.29 feet; thence N02°21'05"W 906.96 feet to a point on the North line of said NW 1/4 which is N89°57'07"E 1107.67 feet from the NW corner of said Section 36; thence S89°57'07"W 1356.93 feet along said North line to the place of beginning.

SURVEYOR'S CERTIFICATE

To: Transport Properties, LLC
First American Title Insurance Company

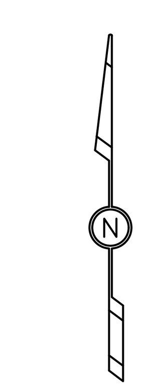
This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1, 2, 3, 4, 7(a), 8, 9, 16, 17 and 19 of Table A thereof. The field work was completed on September 28, 2022.

November 21, 2022

Brent M. Feyen, P.S. 55904

Notes:

1. Bearings are based on the North line of the NW 1/4, Section 36 = N89°57'07"E.
2. Recorded easement information is based on First American Title Insurance Company Commitment No. 978188, dated September 8, 2022. (Title Commitment covers additional property).
3. No portion of this property lies within a Special Flood Hazard Area, as identified by the Federal Insurance Administration, Department of Homeland Security. This property lies within Zone C (areas of minimal flooding) as identified on Flood Insurance Rate Map Community Panel No. 260107 0010 B, dated November 18, 1981 published by the Federal Emergency Management Agency.
4. This parcel contains 1,213,780 square feet (27.865 acres) including 52nd Street right of way.
5. There are a combined total of 279 painted parking spaces on the subject property including 211 regular parking spaces, 2 disabled parking spaces and 66 spaces for trailers.
6. On the date of this survey there was no visible evidence of current earth moving work, building construction or building additions. There are no known proposed changes in street R.O.W. lines or observed evidence of recent street or sidewalk construction or repairs.
7. Utility Note: Observed evidence of utilities has been shown. The surveyor makes no guarantee that the underground utilities shown comprise all such utilities in the area, either in service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated although he does certify that they are located as accurately as possible from information available. The surveyor has not physically located the underground utilities.



SCALE: 1" = 60'
1' CONTOUR INTERVAL

Notes Corresponding the Title Commitment No. 978188 Schedule B, Section II

Exception 8. Sanitary Sewer and Watermain Easement Agreement in favor of City of Grand Rapids and the Covenants, Conditions and Restrictions contained in instrument recorded in Liber 2384, page 1201. **Affects the subject property and plotted hereon**.

Exception 14. Easement in favor of Michigan Bell Telephone Company and the Covenants, Conditions and Restrictions contained in instrument recorded in Liber 2574, page 949. **Affects the subject property and plotted hereon**.

Exception 18. Easement in favor of Michigan Bell Telephone Company and the Covenants, Conditions and Restrictions contained in instrument recorded in Liber 2846, page 391. **Affects the subject property and plotted hereon**.

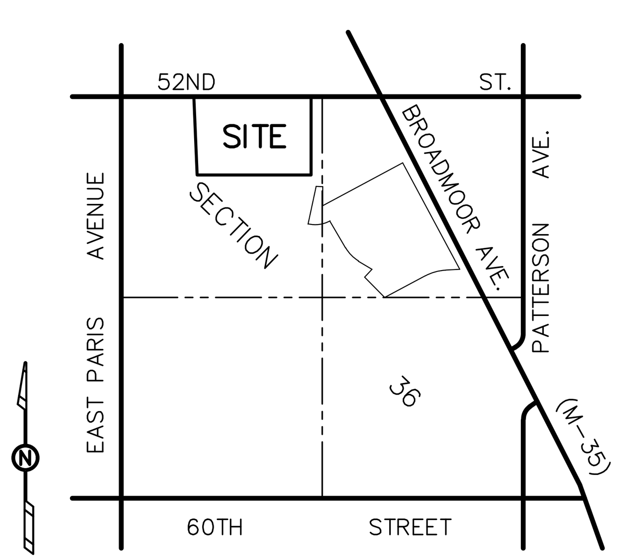
Exception 20. Drainage and Storm Sewer Easement in favor of City of Kentwood and the Covenants, Conditions and Restrictions contained in instrument recorded in Liber 3194, page 626. **Affects the subject property and plotted hereon**.

Exception 23. Easement for Guy Stub Anchor Pole, Guy Wires and Anchors in favor of Consumers Power Company and the Covenants, Conditions and Restrictions contained in instrument recorded in Liber 3687, page 758. **Affects the subject property and plotted hereon**.

Exception 31. This parcel is subject to the Terms and Conditions contained in Affidavit as disclosed by instrument recorded in Instrument No. 20070718-0071542.
Partial Release of Special Assessment Affidavit recorded in Instrument No. 20140714-0054426. (subject property not included in release).
Affidavit of Assessment Release recorded in Instrument No. 20211210133116. (subject property not included in release).

Exception 34. This parcel is subject to the terms and conditions contained in PUD Development Agreement as disclosed by instrument recorded in Instrument No. 20140530-0042579 and First Amendment to PUD Development Agreement recorded in Instrument No. 20190319-0017095.

PRELIMINARY



LOCATION MAP
SCALE: 1" = 2000'

LEGEND

○ = IRON STAKE FOUND	∞ = CLEAN OUT
● = IRON STAKE SET	= FLAGPOLE
= UTILITY POLE & GUY WIRE	T☐ = TELEPHONE BOX
= LIGHT POLE	G△ = BURIED GAS LINE MARKER
= SIGN	= OVERHEAD WIRES
= ELECTRIC OUTLET	O = OAK TREE
= HYDRANT	P = PINE TREE
= WATERMAIN VALVE	TR = UNKNOWN TREE
HH☐ = HANDHOLE	M = MAPLE TREE
= IRRIGATION VALVE	SYC = SYCAMORE TREE
= POST INDICATOR VALVE	W = WALNUT TREE
TRANS = TRANSFORMER	
⊞ = CATCH BASIN	
○ = MANHOLE	

ALTA/NSPS LAND TITLE SURVEY

RE: 4308 52ND STREET SE

FOR: HIGHPOINT REAL ESTATE
ATTN: BRIAN SIKMA
5500 CASCADE RD. SE (STE. 200)
GRAND RAPIDS, MI 49546

PART OF THE NW 1/4, SECTION 36, T6N, R11W, CITY OF KENTWOOD, KENT COUNTY, MICHIGAN

DATE	REVISION	BY
.	.	.

exxel engineering, inc.
planners · engineers · surveyors
5252 Clyde Park, S.W. • Grand Rapids, MI 49509
Phone: (616) 531-3660 www.exxelengineering.com

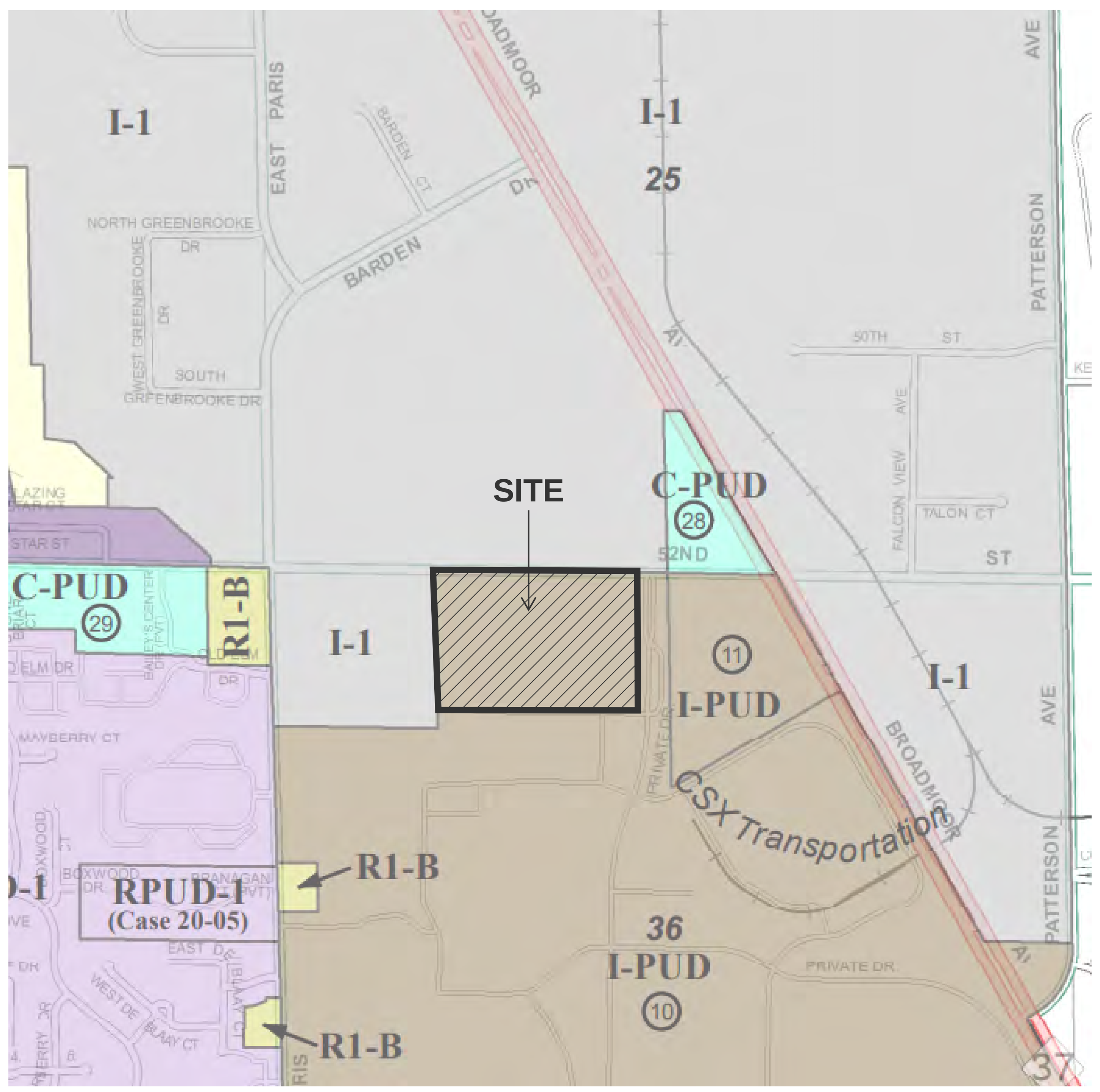
DRAWN BY: JJS	PROJ. ENG.: .	SHEET 1 of 2
APPROVED BY: BMF	PROJ. SURV.: BMF	
FILE NO.: S221886	DATE: 11/21/2022	

P:\Projects\2022\221886\Drawings\221886.dwg-TP-bfey

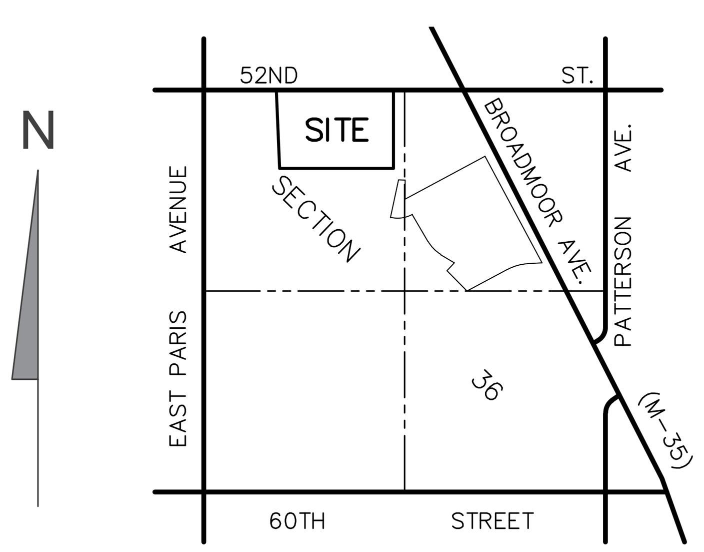
STEELCASE, INC
PRELIMINARY PUD SITE PLAN SUBMITTAL
4208 52ND STREET SE, KENTWOOD, MI

CONTENTS:

TOTAL SITE AREA	1,180,846.00	SF	27.11	AC
EXISTING CONDITIONS				
Existing Green Space	660,352.00	SF	15.16	AC
Existing Impervious	520,494.00	SF	11.95	AC
APPROVED PUD				
Approved Green Space	381,402.00	SF	8.76	AC
Approved Impervious	799,444.00	SF	18.35	AC
PROPOSED PUD AMENDMENT				
Proposed Green Space	307,125.00	SF	7.05	AC
Proposed Impervious	873,721.00	SF	20.06	AC



ZONING MAP



LOCATION MAP
SCALE: 1" = 2000'

TRANSPORT PROPERTIES

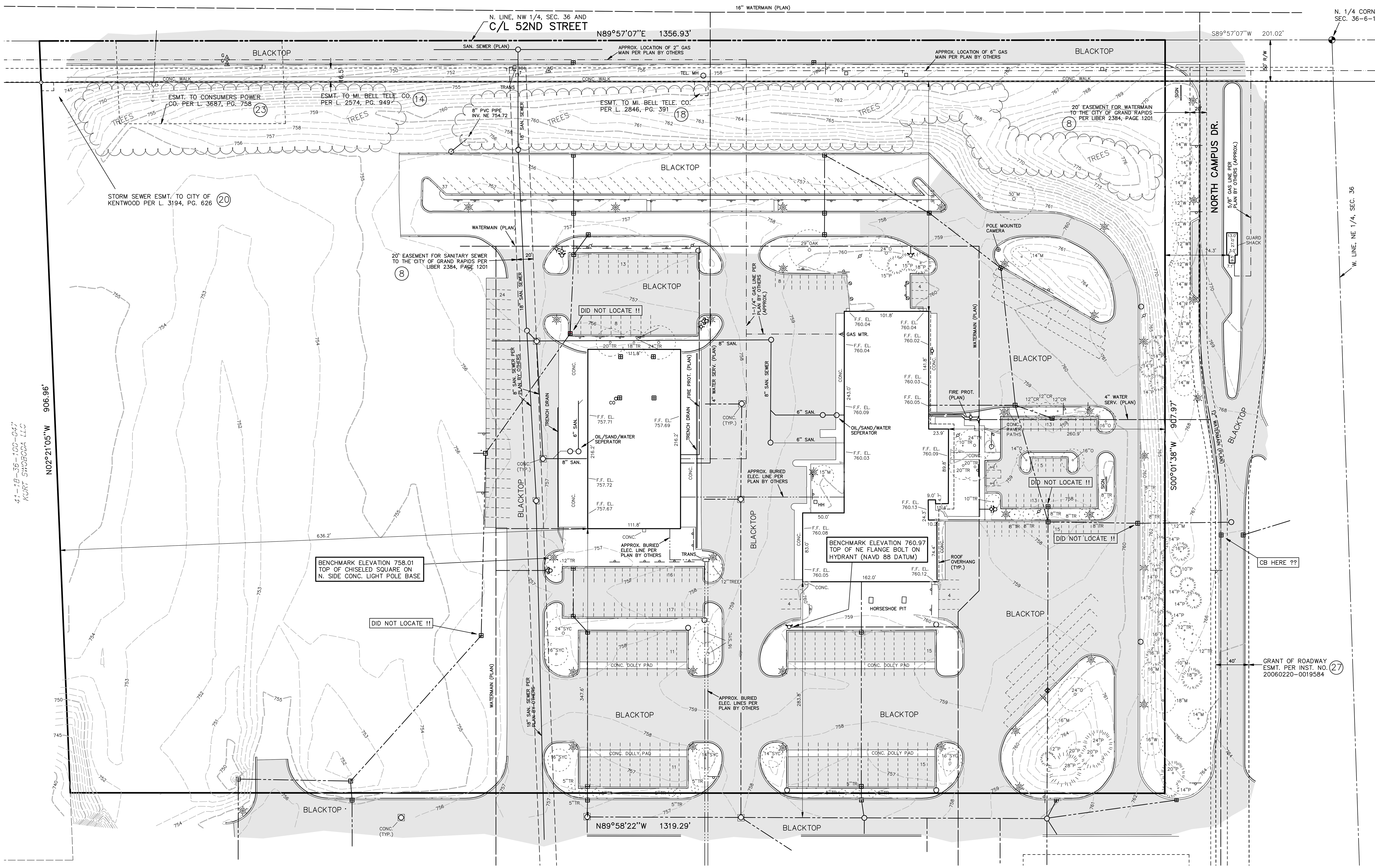
DATE	ISSUE
11/18/2022	PRELIMINARY PUD SITE PLAN SUBMITTAL

IPUD AMENDMENT
4308 52ND STREET SE
KENTWOOD, MICHIGAN 49512

11/18/2022

TITLE SHEET

T-1



Description:
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N

0 60' 120'

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1. Bearings are based on the North line of the NW 1/4, Section 36 = N89°57'07"E.
2. Recorded easement information is based on First American Title Insurance Company Commitment No. 978188, dated September 8, 2022. (Title Commitment covers additional property).
3. No portion of this property lies within a Special Flood Hazard Area, as identified by the Federal Insurance Administration, Department of Homeland Security. This property lies within Zone C (areas of minimal flooding) as identified on Flood Insurance Rate Map Community Panel No. 260107 0010 B, dated November 18, 1981 published by the Federal Emergency Management Agency.
4. This parcel contains 1,213,780 square feet (27.865 acres) including 52nd Street right of way.
5. There are a combined total of 279 painted parking spaces on the subject property including 211 regular parking spaces, 2 disabled parking spaces and 66 spaces for trailers.
6. On the date of this survey there was no visible evidence of current earth moving work, building construction or building additions. There are no known proposed changes in street R.O.W. lines or observed evidence of recent street or sidewalk construction or repairs.
7. Utility Note: Observed evidence of utilities has been shown. The surveyor makes no guarantee that the underground utilities shown comprise all such utilities in the area, either in service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated although he does certify that they are located as accurately as possible from information available. The surveyor has not physically located the underground utilities.

Notes Corresponding the Title Commitment No. 978188 Schedule B, Section II

Exception 8 — Sanitary Sewer and Watermain Easement Agreement in favor of City of Grand Rapids and the Covenants, Conditions and Restrictions contained in instrument recorded in Liber 2384, page 1201. **Affects the subject property and plotted hereon.**

Exception 14 — Easement in favor of Michigan Bell Telephone Company and the Covenants, Conditions and Restrictions contained in instrument recorded in Liber 2574, page 949. **Affects the subject property and plotted hereon.**

Exception 18 — Easement in favor of Michigan Bell Telephone Company and the Covenants, Conditions and Restrictions contained in instrument recorded in Liber 2846, page 391. **Affects the subject property and plotted hereon.**

Exception 20 — Drainage and Storm Sewer Easement in favor of City of Kentwood and the Covenants, Conditions and Restrictions contained in instrument recorded in Liber 3194, page 626. **Affects the subject property and plotted hereon.**

Exception 23 — Easement for Guy Stub Anchor Pole, Guy Wires and Anchors in favor of Consumers Power Company and the Covenants, Conditions and Restrictions contained in instrument recorded in Liber 3687, page 758. **Affects the subject property and plotted hereon.**

Exception 31 — This parcel is subject to the Terms and Conditions contained in Affidavit as disclosed by instrument recorded in Instrument No. 20070718-0071542.
Partial Release of Special Assessment Affidavit recorded in Instrument No. 20140714-0054426. (subject property not included in release).
Affidavit of Assessment Release recorded in Instrument No. 20211210133116. (subject property not included in release).

Exception 34 — This parcel is subject to the terms and conditions contained in PUD Development Agreement as disclosed by instrument recorded in Instrument No. 20140530-0042579 and First Amendment to PUD Development Agreement recorded in Instrument No. 20190319-0017095.

PRELIMINARY

LEGEND

○ = IRON STAKE FOUND	CO = CLEAN OUT
● = IRON STAKE SET	= FLAGPOLE
= UTILITY POLE & GUY WIRE	T = TELEPHONE BOX
= LIGHT POLE	G = BURIED GAS LINE MARKER
= SIGN	= OVERHEAD WIRES
= ELECTRIC OUTLET	O = OAK TREE
= HYDRANT	P = PINE TREE
= WATERMAIN VALVE	TR = UNKNOWN TREE
HH = HANDHOLE	M = MAPLE TREE
= IRRIGATION VALVE	SYC = SYCAMORE TREE
= POST INDICATOR VALVE	W = WALNUT TREE
TRANS = TRANSFORMER	
= CATCH BASIN	
= MANHOLE	

Steelcase

TRANSPORT PROPERTIES
9500 W BRYN MAWR AVE, ROSEMONT IL
WWW.TRANSPORTPROP.COM

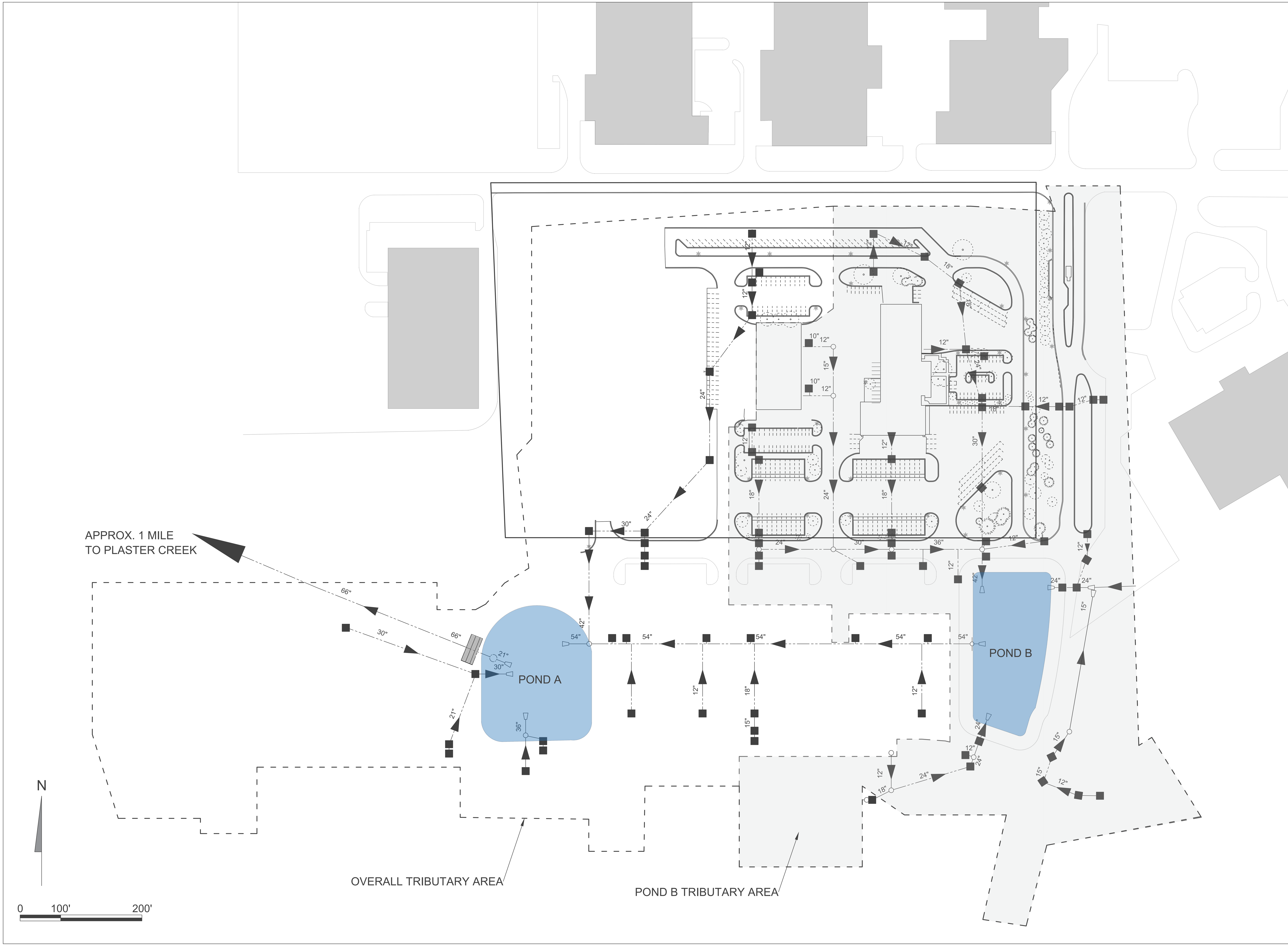
DATE	ISSUE
11/18/2022	PRELIMINARY PUD SITE PLAN SUBMITTAL

IPUD AMENDMENT
4308 52ND STREET SE
KENTWOOD, MICHIGAN 49512

11/18/2022

EXISTING SITE CONDITIONS

EX-1



Steelcase

TRANSPORT PROPERTIES

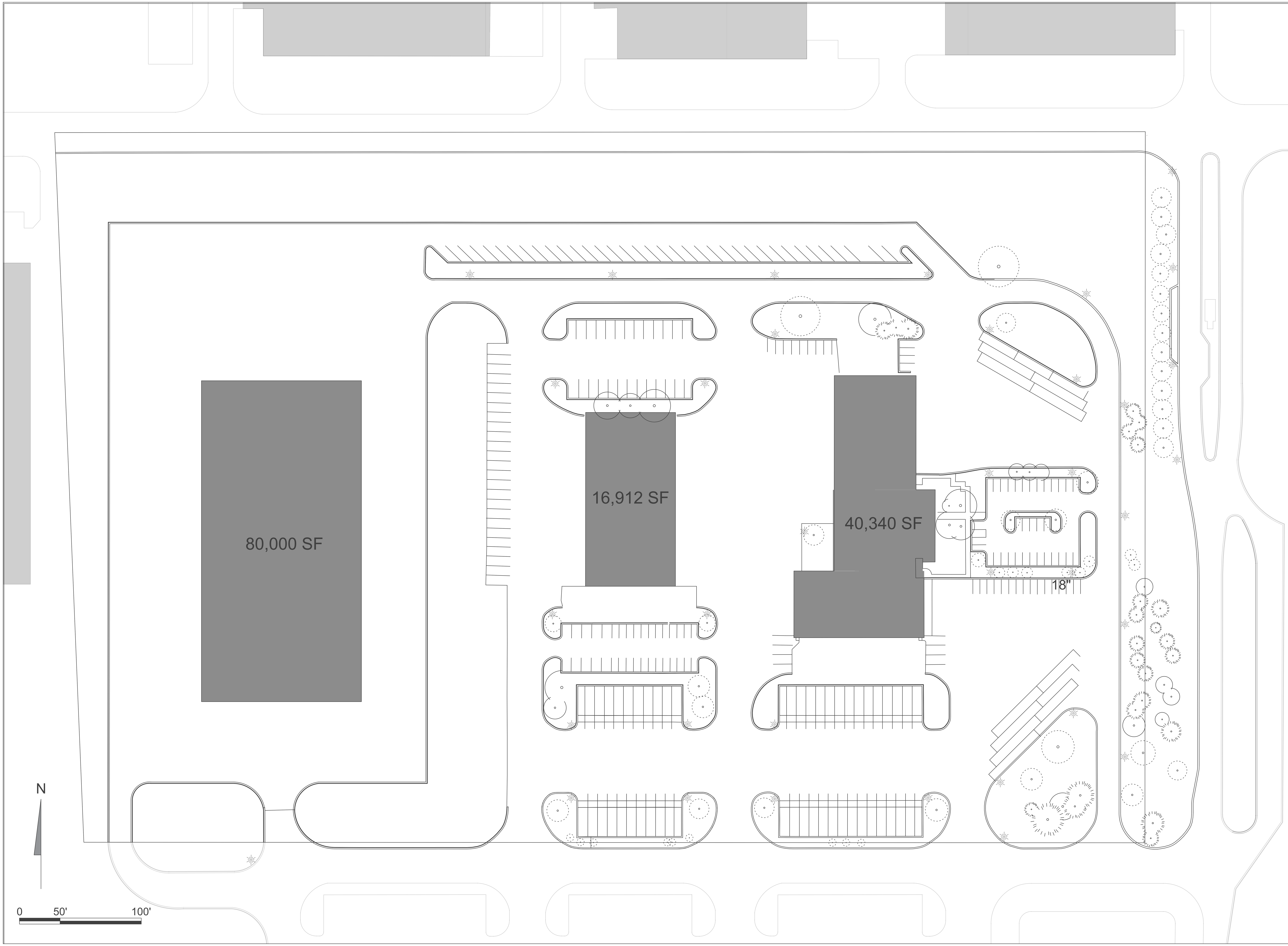
DATE	ISSUE
11/18/2022	PRELIMINARY PUD SITE PLAN SUBMITTAL

IPUD AMENDMENT
4308 52ND STREET SE
KENTWOOD, MICHIGAN 49512

11/18/2022

EXISTING SITE CONDITIONS: DRAINAGE PATTERN

EX-2



TRANSPORT PROPERTIES
9500 W BRYN MAWR AVE, ROSEMONT, IL
WWW.TRANSPORTPROP.COM

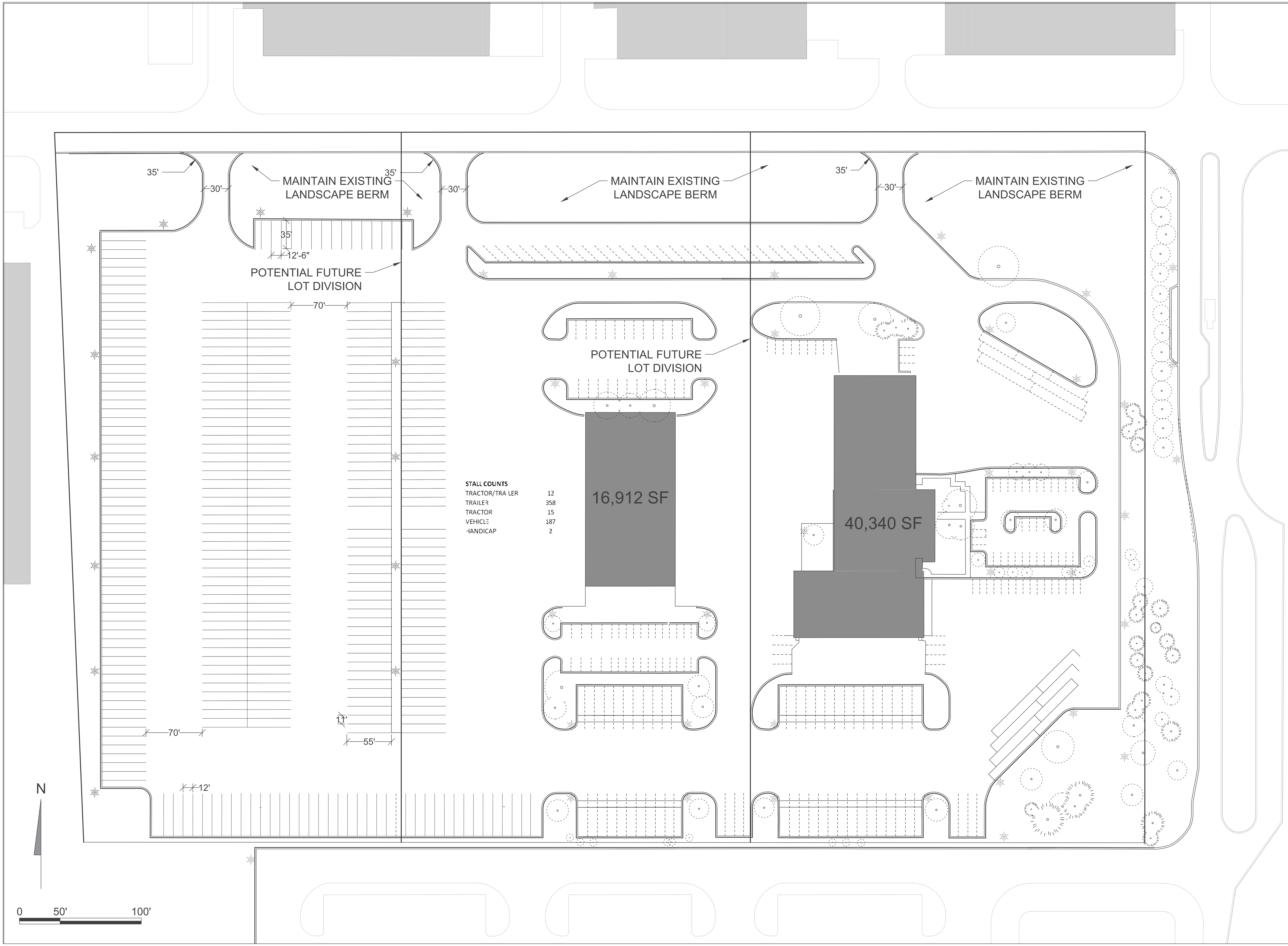
DATE	ISSUE
11/18/2022	PRELIMINARY PUD SITE PLAN SUBMITTAL

IPUD AMENDMENT
4308 52ND STREET SE
KENTWOOD, MICHIGAN 49512

11/18/2022

APPROVED PLAN
PER ZONING
(IPUD)

SP-0



Steelcase

TRANSPORT PROPERTIES
9500 W BRYN MAWR AVE, ROSEMONT, IL
WWW.TRANSPORTPROP.COM

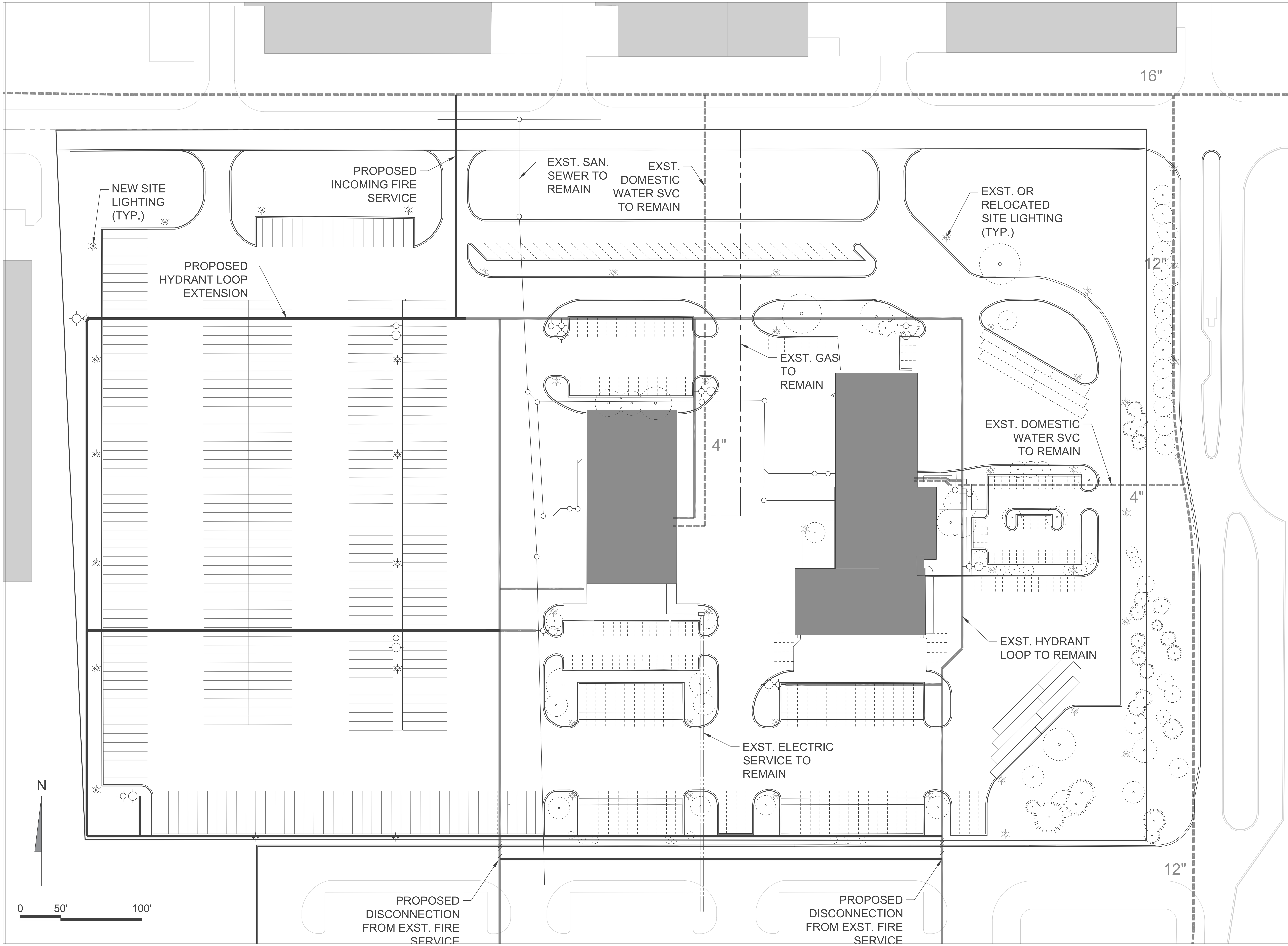
DATE	ISSUE
11/18/2022	PRELIMINARY PUD SITE PLAN SUBMITTAL

IPUD AMENDMENT
4308 52ND STREET SE
KENTWOOD, MICHIGAN 49512

11/18/2022

PRELIMINARY
SITE
PLAN

SP-1



Steelcase

TRANSPORT PROPERTIES

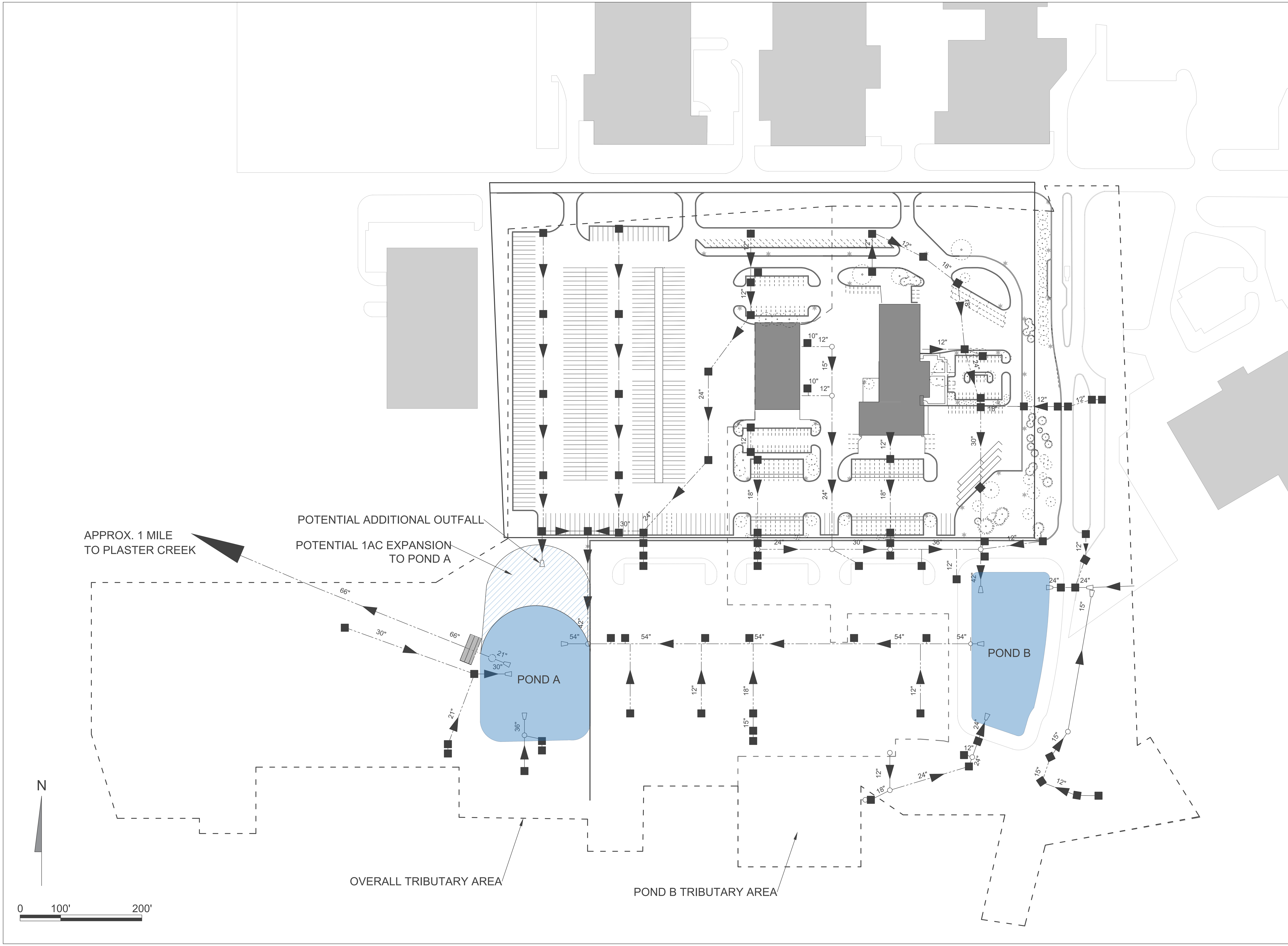
DATE	ISSUE
11/18/2022	PRELIMINARY PUD SITE PLAN SUBMITTAL

IPUD AMENDMENT
4308 52ND STREET SE
KENTWOOD, MICHIGAN 49512

11/18/2022

PRELIMINARY PROPOSED SITE UTILITIES

SU-1



Steelcase

TRANSPORT PROPERTIES

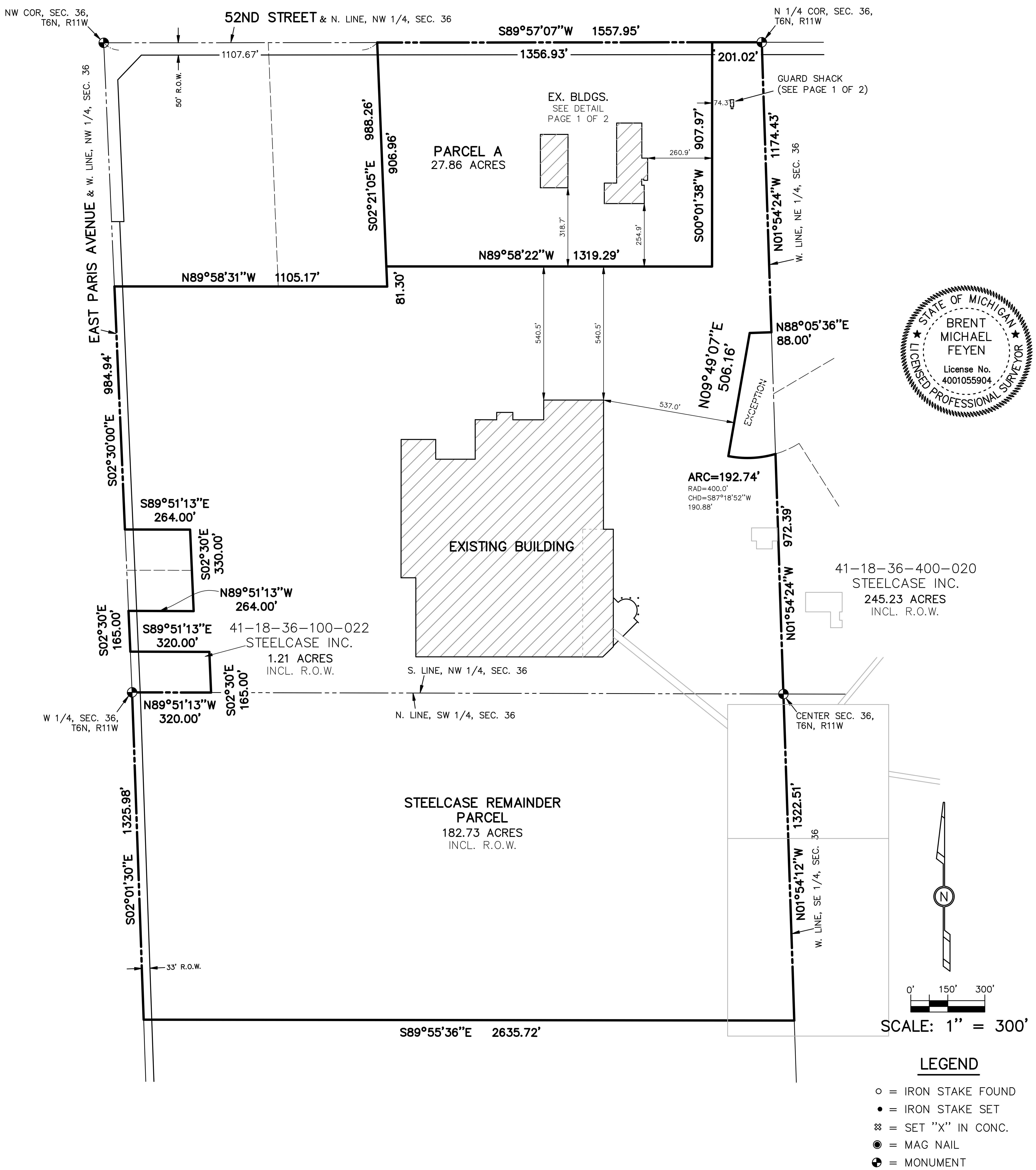
DATE	ISSUE
11/18/2022	PRELIMINARY PUD SITE PLAN SUBMITTAL

IPUD AMENDMENT
4308 52ND STREET SE
KENTWOOD, MICHIGAN 49512

11/18/2022

PRELIMINARY
PROPOSED
DRAINAGE
PATTERN

ST-1



Parent Parcel Description:

Part of the West 1/2 of Section 36, Town 6 North, Range 11 West, City of Kentwood, Kent County, Michigan, described as: Commencing at North 1/4 corner; thence West along North Section line to a point 1107.67 feet North 89 degrees 57 minutes 07 seconds East along North Section line from Northwest corner of Section; thence South 2 degrees 21 minutes 05 seconds East to South line of the North 3/8 of the West 1/4 of the Northwest 1/4, extended East; thence West along said extended South line to the West Section line; thence South to the Northwest corner of the South 660 feet of the Northwest 1/4; thence East along the North line of said South 660 feet to the East line of the West 264 feet of the Northwest 1/4; thence South along said East line to North line of the South 330 feet of the Northwest 1/4; thence West along said North line to West Section line; thence South along West Section line to the North line of the South 165 feet of the Northwest 1/4; thence East along said North line to the East line of the West 320 feet of the Northwest 1/4; thence South along said East line to East and West 1/4 line; thence West to West 1/4 corner; thence South to the Southwest corner of the North 1/2 of the Southwest 1/4; thence East to Southeast corner of the North 1/2 of the Southwest 1/4; thence North along North and South 1/4 line to beginning.
EXCEPT;
Commencing 1174.43 feet South 01 degrees 54 minutes 24 seconds East along North and South 1/4 line from North 1/4 corner; thence South 01 degrees 54 minutes 24 seconds East along North and South 1/4 line 493.01 feet; thence Westerly 192.74 feet on a 400.0 foot radius curve to the right long chord bears South 87 degrees 18 minutes 52 seconds West 190.88 feet; thence North 09 degrees 49 minutes 07 seconds East 506.16 feet; thence North 88 degrees 05 minutes 36 seconds East 88.0 feet to the point of beginning, Section 36, Town 6 North, Range 11 West.

Steelcase Remainder Description:

Part of the West 1/2 of Section 36, Town 6 North, Range 11 West, City of Kentwood, Kent County, Michigan, described as: BEGINNING at North 1/4 corner; thence S89°57'07"W 201.02 feet along the North line of the NW 1/4 of said Section 36; thence S00°01'38"W 907.97 feet; thence N89°58'22"W 1319.29 feet to a line bearing S02°21'05"E, which if extended Northerly would intersect the North line of said NW 1/4 at a point 1107.67 East of the NW Section corner; thence S02°21'05"E 81.30 feet along said line to the South line of the North 3/8 of the West 1/4 of the Northwest 1/4, extended East; thence N89°58'31"W 1105.17 feet along said extended South line to the West Section line; thence S02°30'00"E 984.94 feet to the Northwest corner of the South 660 feet of the Northwest 1/4; thence East along the North line of said South 660 feet to the East line of the West 264 feet of the Northwest 1/4; thence South along said East line to North line of the South 330 feet of the Northwest 1/4; thence West along said North line to West Section line; thence South along West Section line to the North line of the South 165 feet of the Northwest 1/4; thence East along said North line to the East line of the West 320 feet of the Northwest 1/4; thence South along said East line to East and West 1/4 line; thence West to West 1/4 corner; thence South to the Southwest corner of the North 1/2 of the Southwest 1/4; thence East to Southeast corner of the North 1/2 of the Southwest 1/4; thence North along North and South 1/4 line to beginning.
EXCEPT;
Commencing 1174.43 feet South 01 degrees 54 minutes 24 seconds East along North and South 1/4 line from North 1/4 corner; thence South 01 degrees 54 minutes 24 seconds East along North and South 1/4 line 493.01 feet; thence Westerly 192.74 feet on a 400.0 foot radius curve to the right long chord bears South 87 degrees 18 minutes 52 seconds West 190.88 feet; thence North 09 degrees 49 minutes 07 seconds East 506.16 feet; thence North 88 degrees 05 minutes 36 seconds East 88.0 feet to the point of beginning, Section 36, Town 6 North, Range 11 West.

Description of Parcel A:

Part of the NW 1/4 of Section 36, T6N, R11W, City of Kentwood, Kent County, Michigan, described as: Commencing at the North 1/4 corner of said Section 36; thence S89°57'07"W 201.02 feet along the North line of said NW 1/4 to the PLACE OF BEGINNING of this description; thence S00°01'38"W 907.97 feet; thence N89°58'22"W 1319.29 feet; thence N02°21'05"W 906.96 feet to a point on the North line of said NW 1/4 which is N89°57'07"E 1107.67 feet from the NW corner of said Section 36; thence S89°57'07"W 1356.93 feet along said North line to the place of beginning.

PROPOSED LAND DIVISION MAP

RE: 4308 52ND ST

FOR: HIGHPOINT REAL ESTATE
ATTN: BRIAN SIKMA
5500 CASCADE ROAD SE
GRAND RAPIDS, MI 49546

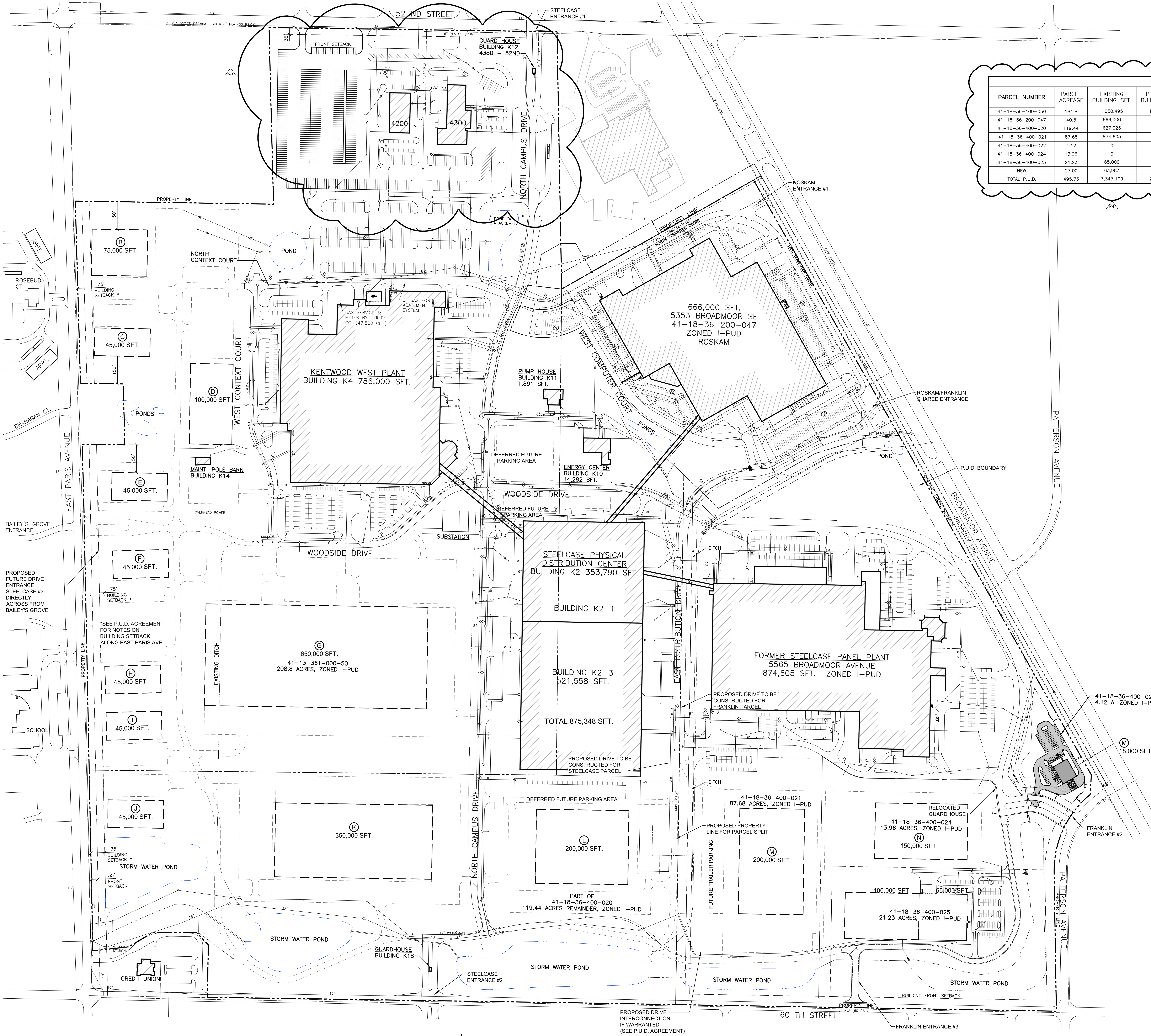
PART OF THE W 1/2, SECTION 36, T6N, R11W, CITY OF KENTWOOD, KENT COUNTY, MICHIGAN

DATE	REVISION	BY
.	.	.

exxel engineering, inc.
planners · engineers · surveyors
5252 Clyde Park, S.W. • Grand Rapids, MI 49509
Phone: (616) 531-3660 www.exxelengineering.com

DRAWN BY:	BB	PROJ. ENG.:	.	SHEET
APPROVED BY:	.	PROJ. SURV.:	BF	1 of 1
FILE NO.:	S221886	DATE:	11/20/2022	

P:\Projects\2022\221886\Drawings\221886.dwg-PLR-bfey



DRAFT P.U.D. SITE PLAN

Call MISS DIG
3 full working days before you dig:
Michigan's One-Call
Utility Notification Organization
1-800-482-7171
on the net at: www.missdig.org

LAND USE ACREAGE							
PARCEL NUMBER	PARCEL ACREAGE	EXISTING BUILDING SFT.	PROPOSED BUILDING SFT.	EXISTING DRIVES & PARKING SFT.	PROPOSED DRIVES & PARKING SFT.	TOTAL FUTURE LOT COVERAGE SFT.	TOTAL FUTURE LOT COVERAGE %
41-18-36-100-050	181.8	1,050,495	1,050,000	1,235,347	1,250,000	4,585,842	58%
41-18-36-200-047	40.5	666,000	0	561,583	0	1,227,583	69%
41-18-36-400-020	119.44	627,026	595,000	500,000	500,000	2,222,000	43%
41-18-36-400-021	87.68	874,605	200,000	610,524	200,000	1,885,129	49%
41-18-36-400-022	4.12	0	18,000	0	55,000	73,000	41%
41-18-36-400-024	13.96	0	150,000	0	200,000	350,000	57%
41-18-36-400-025	21.23	65,000	100,000	140,000	150,000	455,000	44%
NEW	27.00	63,983	0	460,000	300,000	760,000	65%
TOTAL P.U.D.	495.73	3,347,109	2,115,500	3,507,454	2,355,000	11,325,063	52%

R4

DESCRIPTION FOR PARCEL 41–18–36–400–021:

411836400021 PART OF E 1/2 OF SEC COM 544.57 FT S 89D 53M 00S E ALONG S SEC LINE FROM S 1/4 COR TH N 0D 00M 30S E 2864.85 FT TH S 47D 00M 00S E 261.33 FT TH N 59D 32M 00S E 600.0 FT TH NELY 282.48 FT ALONG A 650 FT RAD CURVE TO RT /LONG CHORD BEARS N 71 D 59M 00S E 280.26 FT/TH N 84D 26M 00S E 185.95 FT TO WLY LINE OF STL M–37 TH S 30D 27M 59S E ALONG SD WLY LINE 1478.88 FT TH S 13D 27M 00S W 568.39 FT TH S 35D 37M 00S E 127.54 FT TH N 80D 18M 07S E 11.11 FT TH SELY 174.53 FT ALONG A 250 FT RAD CURVE TO RT /LONG CHORD BEARS S 79D 41M 53S E 171.01 FT/ TH S 59D 41M 53S E 122.37 FT TO WLY LINE OF PATTERSON AVE TH SWLY ALONG SD WLY LINE 100.14 FT ON A 532.29 FT RAD CURVE TO LT /LONG CHORD BEARS S 30D 18M 07S W 100.0 FT/ TH N 59D 41M 53S W 122.37 FT TH NWLY 104.72 FT ALONG A 150 FT RAD CURVE TO LT /LONG CHORD BEARS N 79D 41M 53S W 102.61 FT/TH S 80D 18M 07S W 145.0 FT TH N 9D 41M 53S W 100.0 FT TH NLY 49.0 FT ALONG A 516.50 FT RAD CURVE TO RT /LONG CHORD BEARS N SD 26M 10S W 48.98 FT/TH NWLY 76.07 FT ALONG A 50 FT RAD CURVE TO LT /LONG CHORD BEARS N 46D 18M 03S W 68.94 FT/TH N 89D 53M 00S W 647.27 FT TH NWLY 120.92 FT ALONG A 216.50 FT RAD CURVE TO RT /LONG CHORD BEARS N 73D 53M 00S W 119.35 FT/ TH N 57D 53M 00S W 152.13 FT TH S 0D 00M 30S 1355.16 FT TO S SEC LINE TH N 89D 53M 00S W ALONG S SEC LINE 774.76 FT TO BEG * SEC 36 T6N R11W 87.68 A. SPLIT/COMBINED ON 09/25/2014 FROM 41–18–36–400–019, 41–19–31–351–001, 41–19–31–351–002;

DESCRIPTION FOR PARCEL 41–18–36–400–022:

411836400022 PART OF SE 1/4 SEC 36 OF SEC 36 T6N R11W & PART OF SW 1/4 OF SEC 31 T6N R10W COM AT SE COR OF SEC 36 TH N 89D 53M 00S W ALONG S SEC LINE 50.03 FT TH N 1D 48M 18S W ALONG WLY LINE OF PATTERSON AVE 751.21 FT TH NELY 348.35 FT ALONG A 532.29 FT RAD CURVE TO RT /LONG CHORD BEARS N 16D 56M 36S E 342.17 FT/TO BEG OF THIS DESC – TH N 59D 41 M 53S W 122.37 FT TH NWLY 174.53 FT ALONG A 250 FT RAD CURVE TO LT /LONG CHORD BEARS N 79D 41M 53S W 171.01 FT/ TH S 80D 18M 07S W 11.11 FT TH N 35D 37M 00S W 127.54 FT TH N 13D 27M 00S E 568.39 FT TO WLY LINE OF BROADMOOR AVE TH S 30D 27M 59S E ALONG SD WLY LINE 630.76 FT TH S 1D 37M 08S W 106.32 FT TO WLY LINE OF PATTERSON AVE TH SWLY ALONG SD WLY LINE 132.58 FT ON A 532.89 FT RAD CURVE TO LT /LONG CHORD BEARS S 42D 49M 38S W 132.29 FT/ TO BEG * SEC 36 T6N R11W & SEC 31 T6N R10W 4.12 A. SPLIT/COMBINED ON 09/25/2014 FROM 41–18–36–400–019, 41–19–31–351–001, 41–19–31–351–002;

DESCRIPTION FOR PARCEL 41–18–36–400–024:

411836400024 PART OF SE 1/4 COM 50.03 FT N 89D 53M 00S W ALONG S SEC LINE & 1224.24 FT N 89D 53M 00S W ALONG S SEC LINE FROM SE COR OF SEC TH N 89D 53M 00S W ALONG S SEC LINE 62.0 FT TH N 0D 00M 30S E 1355.16 FT TH S 57D 53M 00S E 152.13 FT TH SELY 120.92 FT ALONG A 216.50 FT RAD CURVE TO LT /LONG CHORD BEARS S 73D 53M 00S E 119.35 FT/ TH S 89D 53M 00S E 647.27 FT TH SELY 76.07 FT ALONG A 50 FT RAD CURVE TO RT /LONG CHORD BEARS S 46D 18M 03S E 68.94 FT/ TH SLY 49.0 FT ALONG A 516.50 FT RAD CURVE TO LT /LONG CHORD BEARS S 5D 26M 10S E 49.98 FT/ TH S 9D 41M 53S E 100.0 FT TH N 80D 18M 07S E 145.0 FT TH SELY 104.72 FT ALONG A 150 FT RAD CURVE TO RT /LONG CHORD BEARS S 79D 41M 53S E 102.61 FT/TH S 59D 41 M 53S E 122.37 FT TO WLY LINE OF PATTERSON AVE TH SLY ALONG SD WLY LINE 235.98 FT ON A 532.29 FT RAD CURVE TO LT /LONG CHORD BEARS S 12D 12M 43S W 234.05 FT/ TH N 89D 53M 00S W 1200.22 FT TH S 0D 00M 30S W 763.02 FT TO BEG * SEC 36 T6N R11W 13.96 A. SPLIT/COMBINED ON 01/06/2016 FROM 41–18–36–400–023;

DESCRIPTION FOR PARCEL 41–18–36–400–025:

411836400025 PART OF SE 1/4 COM 50.03 FT N 89D 53M 00S W ALONG S SEC LINE FROM SE COR OF SEC TH N 89D 53M 00S W ALONG S SEC LINE 1224.24 FT TH N 0D 00M 30S E 763.02 FT TH S 89D 53M 00S E 1200.22 FT TO W LINE OF PATTERSON AVE TH S ALONG SD W LINE 12.23 FT ON A 532.29 FT RAD CURVE TO LT /LONG CHORD BEARS S 1D 08M 48S E 12.23 FT/TH S 1 D 48M 18S E ALONG SD W LINE 751.21 FT TO BEG * SEC 36 T6N R11W 21.23 A. SPLIT/COMBINED ON 01/06/2016 FROM 41–18–36–400–023;

DESCRIPTION FOR ROSKAM PARCEL 41–18–36–200–047:

THAT PART OF THE NORTHEAST 1/4 AND NORTHWEST 1/4, SECTION 36, TOWN 6 NORTH, RANGE 11 WEST, CITY OF KENTWOOD, KENT COUNTY, MICHIGAN, DESCRIBED AS: COMMENCING AT THE NORTH 1/4 CORNER OF SAID SECTION 36; THENCE SOUTH 01 DEGREES 54 MINUTES 24 SECONDS EAST 1174.43 FEET ALONG THE WEST LINE OF SAID NORTHEAST 1/4 TO THE PLACE OF BEGINNING OF THIS DESCRIPTION; THENCE SOUTH 01 DEGREES 54 MINUTES 24 SECONDS EAST 250.00 FEET ALONG SAID WEST LINE; THENCE NORTH 59 DEGREES 32 MINUTES 02 SECONDS EAST 1192.88 FEET TO THE WESTERLY LINE OF BROADMOOR AVENUE (M–37), 205 FEET WIDE; THENCE SOUTH 30 DEGREES 27 MINUTES 59 SECONDS EAST 1587.89 FEET ALONG SAID WESTERLY LINE; THENCE SOUTH 84 DEGREES 26 MINUTES 00 SECONDS WEST 185.95 FEET; THENCE SOUTHWESTERLY 282.48 FEET ALONG A 650.00 FOOT RADIUS CURVE TO THE LEFT, THE DELTA ANGLE BEING 24 DEGREES 54 MINUTES 00 SECONDS AND THE CHORD OF WHICH BEARS SOUTH 71 DEGREES 59 MINUTES 00 SECONDS WEST 280.26 FEET; THENCE SOUTH 59 DEGREES 32 MINUTES 00 SECONDS WEST 600.0 FEET; THENCE NORTH 47 DEGREES 00 MINUTES 00 SECONDS WEST 375.00 FEET; THENCE NORTH 41 DEGREES 00 MINUTES 00 SECONDS EAST 138.63 FEET; THENCE NORTH 61 DEGREES 00 MINUTES 00 SECONDS WEST 209.53 FEET; THENCE NORTHWESTERLY 242.24 FEET ALONG A 485.00 FOOT RADIUS CURVE TO THE LEFT, THE DELTA ANGLE BEING 28 DEGREES 37 MINUTES 00 SECONDS AND THE CHORD OF WHICH BEARS NORTH 46 DEGREES 41 MINUTES 30 SECONDS WEST 239.73 FEET; THENCE NORTH 32 DEGREES 23 MINUTES 00 SECONDS WEST 410.00 FEET; THENCE SOUTHWESTERLY 298.00 FEET ALONG A 400.00 FOOT RADIUS CURVE TO THE RIGHT, THE DELTA ANGLE BEING 42 DEGREES 41 MINUTES 08 SECONDS AND THE CHORD OF WHICH BEARS SOUTH 79 DEGREES 46 MINUTES 32 SECONDS WEST 291.16 FEET; THENCE NORTH 09 DEGREES 49 MINUTES 07 SECONDS EAST 506.16 FEET; THENCE NORTH 88 DEGREES 05 MINUTES 36 SECONDS EAST 88.00 FEET TO THE PLACE OF BEGINNING. CONTAINS 40.5 ACRES.

DESCRIPTION FOR FRANKLIN PARCEL 41–18–361–400–019:

THAT PART OF SECTION 36, T6N, R11W, AND THAT PART OF THE SW 1/4, SECTION 31, T6N, R10W, CITY OF KENTWOOD, KENT COUNTY, MICHIGAN, DESCRIBED AS: COMMENCING AT THE SOUTH 1/4 CORNER OF SAID SECTION 36; THENCE S89°53'00"E 544.57 FEET ALONG THE SOUTH LINE OF THE SE 1/4, SECTION 36 TO THE PLACE OF BEGINNING; THENCE N00°00'30"E 2864.85 FEET; THENCE S47°00'00"E 261.33 FEET; THENCE N59°32'00"E 600.00 FEET; THENCE NORTHEASTERLY 282.48 FEET ALONG A 650.00 FOOT RADIUS CURVE TO THE RIGHT, THE CHORD OF WHICH BEARS N71°59'00"E 280.26 FEET; THENCE N84°26'00"E 185.95 FEET TO THE WESTERLY LINE OF HIGHWAY M–37 (BROADMOOR AVENUE) RELOCATED 1993; THENCE S30°27'59"E 2109.64 FEET ALONG SAID WESTERLY LINE; THENCE S01°37'08"W 106.32 FEET TO THE WESTERLY LINE OF PATTERSON AVENUE; THENCE SOUTHWESTERLY 480.93 FEET ALONG THE WESTERLY LINE OF PATTERSON AVENUE ON A 532.29 FOOT RADIUS CURVE TO THE LEFT, THE CHORD OF WHICH BEARS S24°04'43"W 464.74 FEET; THENCE S01°48'18"E 751.21 FEET ALONG SAID WESTERLY LINE TO THE SOUTH LINE, SE 1/4, SECTION 36; THENCE N89°53'00"W 2061.00 FEET ALONG SAID SOUTH LINE TO THE PLACE OF BEGINNING.

THIS PARCEL CONTAINS 126.99 ACRES, INCLUDING R.O.W. FOR 60TH STREET.

DESCRIPTION FOR STEELCASE PARCEL 41–18–36–400–020:

THAT PART OF SECTION 36, T6N, R11W, CITY OF KENTWOOD, KENT COUNTY, MICHIGAN, DESCRIBED AS: BEGINNING AT THE SOUTH 1/4 CORNER OF SAID SECTION 36; THENCE N90°00'00"W 1972.93 FEET ALONG THE SOUTH LINE, SW 1/4, SECTION 36 TO A POINT WHICH IS S90°00'00"E 660.00 FEET FROM THE SW CORNER OF SAID SECTION; THENCE N00°00'00"E 469.00 FEET; THENCE N81°12'15"W 194.43 FEET; THENCE S77°33'30"W 61.43 FEET; THENCE S61°35'00"W 474.19 FEET TO THE WEST LINE, SW 1/4, SECTION 36; THENCE N02°01'30"W 1065.98 FEET ALONG SAID WEST LINE; THENCE S89°55'36"E 2635.79 FEET ALONG THE NORTH LINE OF THE SOUTH 1/2 OF SAID SW 1/4 TO THE N–S 1/4 LINE, SECTION 36; THENCE N01°54'24"W 1322.51 ALONG SAID N–S 1/4 LINE TO THE CENTER OF SAID SECTION; THENCE N01°54'24"W 972.39 FEET ALONG SAID N–S 1/4 LINE; THENCE NORTHEASTERLY 105.26 FEET ALONG A 400.00 FOOT RADIUS CURVE TO THE LEFT, THE CHORD OF WHICH BEARS N65°58'18"E 104.96 FEET; THENCE S32°23'00"E 410.00 FEET; THENCE SOUTHEASTERLY 242.24 FEET ALONG A 485.00 FOOT RADIUS CURVE TO THE LEFT, THE CHORD OF WHICH BEARS S46°41'30"E 239.73 FEET; THENCE S61°00'00"E 209.53 FEET; THENCE S41°00'00"W 138.63 FEET; THENCE S47°00'00"E 113.67 FEET; THENCE S00°00'30"W 2864.85 FEET TO THE SOUTH LINE, SE 1/4, SECTION 36; THENCE N89°53'00"W 544.57 FEET ALONG SAID SOUTH LINE TO THE PLACE OF BEGINNING.

CONTAINS 119.44 ACRES.

DESCRIPTION FOR STEELCASE PARCEL 41–13–361–100–50:

PART OF THE WEST 1/2 OF SECTION 36, TOWN 6 NORTH, RANGE 11 WEST, CITY OF KENTWOOD, KENT COUNTY, MICHIGAN, DESCRIBED AS: COMMENCING AT NORTH 1/4 CORNER; THENCE WEST ALONG NORTH SECTION LINE TO A POINT 1107.67 FEET NORTH 89 DEGREES 57 MINUTES 07 SECONDS EAST ALONG NORTH SECTION LINE FROM NORTHWEST CORNER OF SECTION; THENCE SOUTH 2 DEGREES 21 MINUTES 05 SECONDS EAST TO SOUTH LINE OF THE NORTH 3/8 OF THE WEST 1/4 OF THE NORTHWEST 1/4, EXTENDED EAST; THENCE WEST ALONG SAID EXTENDED SOUTH LINE TO THE WEST SECTION LINE; THENCE SOUTH TO THE NORTHWEST CORNER OF THE SOUTH 660 FEET OF THE NORTHWEST 1/4; THENCE EAST ALONG THE NORTH LINE OF SAID SOUTH 660 FEET TO THE EAST LINE OF THE WEST 264 FEET OF THE NORTHWEST 1/4; THENCE SOUTH ALONG SAID EAST LINE TO NORTH LINE OF THE SOUTH 330 FEET OF THE NORTHWEST 1/4; THENCE WEST ALONG SAID NORTH LINE TO WEST SECTION LINE; THENCE SOUTH ALONG WEST SECTION LINE TO THE NORTH LINE OF THE SOUTH 165 FEET OF THE NORTHWEST 1/4; THENCE EAST ALONG SAID NORTH LINE TO THE EAST LINE OF THE WEST 320 FEET OF THE NORTHWEST 1/4; THENCE SOUTH ALONG SAID EAST LINE TO EAST AND WEST 1/4 LINE; THENCE WEST TO WEST 1/4 CORNER; THENCE SOUTH TO THE SOUTHWEST CORNER OF THE NORTH 1/2 OF THE SOUTHWEST 1/4; THENCE EAST TO SOUTHEAST CORNER OF THE NORTH 1/2 OF THE SOUTHWEST 1/4; THENCE NORTH ALONG NORTH AND SOUTH 1/4 LINE TO BEGINNING, EXCEPT THE NORTH 50.0 FEET THEREOF.

ALSO EXCEPT:
COMMENCING 1174.43 FEET SOUTH 01 DEGREES 54 MINUTES 24 SECONDS EAST ALONG NORTH AND SOUTH 1/4 LINE FROM NORTH 1/4 CORNER; THENCE SOUTH 01 DEGREES 54 MINUTES 24 SECONDS EAST ALONG NORTH AND SOUTH 1/4 LINE 493.01 FEET; THENCE WESTERLY 192.74 FEET ON A 400.0 FEET RADIUS CURVE TO THE RIGHT LONG CHORD BEARS SOUTH 87 DEGREES 18 MINUTES 52 SECONDS WEST 190.88 FEET; THENCE NORTH 09 DEGREES 49 MINUTES 07 SECONDS EAST 506.16 FEET; THENCE NORTH 88 DEGREES 05 MINUTES 36 SECONDS EAST 88.0 FEET TO THE POINT OF BEGINNING, SECTION 36, TOWN 6 NORTH, RANGE 11 WEST.

CONTAINS 208.8 ACRES.

ftc&h

engineers
scientists
architects
constructors

fishbeck, thompson, carr & huber, inc.
www.ftch.com

Steelcase Truck Garage
Kentwood, Michigan

Kentwood Site Plan

REVISIONS

11/21/2022	REVISION NO. 5
11/16/2022	REVISION NO. 4
3/6/2017	REVISION NO. 3
3/6/2014	REVISION NO. 2
2/27/2014	REVISION NO. 2
2/20/2014	REVISION NO. 1
2/19/2014	DRAFT REVIEW

Drawn By DKU
Designer ASM
Reviewer ASM
Manager ASM

Hard copy is intended to be 30"x42" when plotted. Scale(s) indicated and graphic quality may not be accurate for any other size.

PROJECT NO.
221628

SHEET NO.
1

52^{ND} STREET DEVELOPMENTS TRAFFIC STUDY

Prepared for:
City of Kentwood

Prepared by

SPALDING DEDECKER
Engineers | Surveyors
905 South Blvd. East | Rochester Hills, Michigan 48307
(248) 844-5400 | www.sda-eng.com

SPALDING DEDECKER

52ND STREET DEVELOPMENTS
TRAFFIC STUDY

Prepared for:
City of Kentwood
November 21, 2022

List of Figures

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A. Executive Summary

1. Report Overview

A 25.2 acre parcel of land located off 52nd Street between E Paris Avenue and Broadmoor Avenue is to be developed with three varying land uses. These potential land uses include a motor freight terminal, a contractor's yard, and a vehicle repair for commercial trucks. Each land use, if implemented, will contribute additional traffic volume to the existing 52nd Street traffic. The property is located in a mostly industrial area of Kentwood, MI. Included with this development will be three new curb cut openings accessing 52nd Street. The property is bound by 52nd Street to the north, Swoboda to the west, Steelcase to the south, and the Steelcase driveway entrance to the east. For the purposes of this study, a full build out year of 2025 was used with a five-year post development time of 2030 included as well. The intent of this report is to evaluate the effects of the proposed traffic from the development on the existing public traffic network.

The intersection of 52nd Street and E Paris Avenue currently operates at an acceptable level of service during the morning and afternoon peak hours and will continue to operate at acceptable levels in the future 2030 no build scenario except for the northbound left turn movement. The growth in traffic from current numbers to the 2030 future background numbers will cause this turning movement to degrade to a Level of Service that is below and acceptable level. The addition of traffic generated by the three developments will not negatively impact operations at the intersection.

The intersection of 52nd Street and Broadmoor Avenue currently operates at an acceptable level of service during the morning and afternoon peak hours and will continue to operate at acceptable levels in the future 2030 no build scenario. The addition of traffic generated by the three developments will not negatively impact operations at the intersection.

The proposed developments were analyzed using three different scenarios based on the potential land uses for each parcel. The scenarios analyzed include a maximum impact scenario, a minimum impact scenario, and a scenario using a mix of land uses that will reflect the most likely build out configuration. A right-turn lane guideline was assessed at this location per MDOT Traffic and Safety Note 604A and resulted in warranted radius improvements. Per the operational results of these driveways, a full width turn lane is not required. The three proposed driveways were found to have an insignificant impact on traffic on 52nd Street.

Figure 1: Study Area

B. Introduction

1. Background and Objectives

The developments are a repurposing of a parcel of land that has historically been owned and operated by Steelcase. The parcel will be divided into three separate parcels, each with potentially different land uses. The parcels will be built out over time based on the demand in the area; with an anticipated full build-out of the developments by 2025. Each parcel will be accessed by individual driveways that will provide access off 52nd Street. Along the 52nd Street corridor there are two signalized intersections within the study area: 52nd Street at E Paris Avenue and 52nd Street at Broadmoor Avenue.

Spalding DeDecker was retained to perform a traffic study to:

a. Evaluate existing traffic operations.
b. Evaluate future traffic operations and identify traffic impacts.
c. Develop and evaluate background traffic volumes as a comparison.
d. Evaluate the need for deceleration lanes for the proposed driveways.

C. Study Methodology

To evaluate current and future traffic operations, traffic volume data must be collected, additional site traffic quantified, background traffic determined, and various scenarios analyzed. Below is a summary of the methodology and assumptions applied in this study.

1. Data Collection

Turning movement counts were collected at the following intersections for the morning and afternoon peak hours on Thursday, October 20, 2022.

a. 52nd Street/E Paris Avenue
b. 52nd Street/Lacks Trim Systems west driveway entrance
c. 52nd Street/Lacks Trim Systems East driveway entrance
d. 52nd Street/The existing Steelcase driveway entrance
e. 52nd Street/Broadmoor Avenue

The intersections and driveways in this study were analyzed utilizing Synchro and SimTraffic software in accordance with the methodologies published in the most recent edition of the Highway Capacity Manual[1]. Levels of service were determined for the base year 2022.

2. Trip Generation

This 25.2 acre development will be subdivided into three parcels of various acreages anticipated to be constructed over multiple years with a full build-out of the development by 2025. There currently are no confirmed tenants to determine the number of employees for trip generation; however, proposed parcel and building areas have been provided. For purposes of determining the trip generation, the provided building areas were used as the independent variable in the trip generation calculations. Trips were estimated using the Institute of Transportation Engineers (ITE) Trip Generation 10th edition. Two of the parcels were determined to be best suited under the Industrial Park (ITE Code 130) and the Construction Equipment Rental Store (ITE Code 811) and the fitted curve equations for weekday peak hours of the adjacent street traffic were used to calculate trips.

Since the Institute of Transportation Engineers Trip Generation Manual, 11th Edition does not contain an appropriate equivalent land use for the motor freight terminal, a traffic analysis for a similar development was used to determine the trip generation. This additional study references the City of San Diego Municipal Code Land Development Code Trip Generation Manual (2003). The difference in the land use area between the studied site and the proposed site was calculated to determine the predicted trips generated. Please see Section 4.1 (p.43) of the appended 2020 traffic study in Appendix C for a discussion of its trip generation methodology for a trucking storage facility. Since the motor freight terminal has the most impact for trip generation compared to the other two land uses and considering the majority of likely tenants will be categorized with this zoning classification under the City of Kentwood zoning ordinance, this land use was assumed for all three parcels when developing a maximum impact scenario analysis.

---

[1] Highway Capacity Manual 6th Edition, Transportation Research Board, 2016.

Trip Generation						
Land Use	ITE Code	ITE Code Name	Independent Variable	IV Number	Trips Generated AM[1]	Trips Generated PM[1]
Vehicle Repair, Major	130	Industrial Park	sqft	40340	14	14
Contractor's Yard	811[2]	Construction Equipment Rental Store	sqft	16912	16	20
Motor Freight Terminal[3]			Acre	8	58	52
Total					**88**	**86**

[1]Numbers collected from itetripgen.org

[2]AM peak hour data was not available for this land use. It was assumed that there would be a 25% difference between AM and PM peak hours. This was determined by comparing related land uses.

[3]Trips genereated for this land were taken from a traffic analysis performed by a similar development that used the City of San Diego Municipal Code Land Development Code Trip Generation Manual (2003).

Table 1: Trip Generation Calculations

The following assumptions were implemented in determining the trip distribution for the proposed development.

- New trips were distributed based on existing traffic patterns for entering and existing vehicles at intersections bordering the study area. These intersections included 52nd Street and E Paris Avenue and 52nd Street and Broadmoor Avenue.
- The vehicle repair, major land use that was provided was assumed to be equivalent to the industrial park (ITE Code 130) ITE land use. The ITE land use was chosen based on the description that has been attached. The automobile care center (ITE Code 942) land use was not used as an equivalent as this land use focuses more on passenger vehicle services such as a dealership or auto parts store, which provides a different trip generation profile than a land use that services commercial trucking related activities. The industrial park (ITE Code 130) land use was determined to be a more comparable representation of how this development would be used.
- The contractor's yard land use that was provided was assumed to be equivalent to the construction equipment rental store (ITE Code 811) ITE land use. The ITE land use was chosen based on the description that has been attached.

A more detailed explanation for how the trip generations were determined can be found in the appended traffic volume memo in Appendix C.

3. Background Traffic Growth

Background traffic is considered as the existing volume of traffic unrelated to the site. As populations in an area grow, the traffic is expected to grow over time with that increase in population. To determine a baseline traffic volume to analyze future operations, a growth factor is applied to the existing traffic volume in determining future traffic volumes to evaluate if any operational decreases are incidental to existing traffic or directly attributable to traffic generated by the site. Historic traffic data was obtained from the Michigan Department of Transportation online Transportation Data Management System along the corridor within the study area. A growth factor of 0.63 percent was obtained by averaging the historical growth rates of six data points within or near the study area.

4. Analysis Scenarios

Four different scenarios were analyzed for the 52nd Street study area. The four scenarios include a no build condition that only analyzes future traffic growth plus the following:

- Maximum impact scenario that assumes all three proposed developments will have maximum number of trips generated.
- Minimum impact scenario that assumes all three proposed developments will have a minimum number of trips generated.
- Mix scenario that reflects the most likely build conditions.

a. 2022 Existing Conditions
    i. AM Peak Hour 2022 Volumes
    ii. PM Peak Hour 2022 Volumes
b. 2025 No Build Conditions
    i. AM Peak Hour 2022 Volumes with Background Growth Factor Applied
    ii. PM Peak Hour 2022 Volumes with Background Growth Factor Applied
c. 2025 Maximum Impact Scenario
    i. AM Peak Hour 2022 Volumes with Background Growth Factor Applied and Additional Site Traffic Applied
    ii. PM Peak Hour 2022 Volumes with Background Growth Factor Applied and Additional Site Traffic Applied
d. 2025 Minimum Impact Scenario
    i. AM Peak Hour 2022 Volumes with Background Growth Factor Applied and Additional Site Traffic Applied
    ii. PM Peak Hour 2022 Volumes with Background Growth Factor Applied and Additional Site Traffic Applied
e. 2025 Mixed Land Use Scenario
    i. AM Peak Hour 2022 Volumes with Background Growth Factor Applied and Additional Site Traffic Applied
    ii. PM Peak Hour 2022 Volumes with Background Growth Factor Applied and Additional Site Traffic Applied
f. 2030 No Build Conditions
    i. AM Peak Hour 2022 Volumes with Background Growth Factor Applied
    ii. PM Peak Hour 2022 Volumes with Background Growth Factor Applied
g. 2030 Maximum Impact Scenario
    i. AM Peak Hour 2022 Volumes with Background Growth Factor Applied and Additional Site Traffic Applied
    ii. PM Peak Hour 2022 Volumes with Background Growth Factor Applied and Additional Site Traffic Applied
h. 2030 Minimum Impact Scenario
    i. AM Peak Hour 2022 Volumes with Background Growth Factor Applied and Additional Site Traffic Applied
    ii. PM Peak Hour 2022 Volumes with Background Growth Factor Applied and Additional Site Traffic Applied
i. 2030 Mixed Land Use Scenario
    i. AM Peak Hour 2022 Volumes with Background Growth Factor Applied and Additional Site Traffic Applied
    ii. PM Peak Hour 2022 Volumes with Background Growth Factor Applied and Additional Site Traffic Applied

D. Existing Conditions

1. Roadway Geometry

a. 52nd Street is a five-lane undivided roadway with two lanes in each direction and a center left turn lane. The roadway is signed at 50 mph.
b. E Paris Avenue is a five-lane undivided roadway with two lanes in each direction and a center left turn lane. The roadway is signed at 45 mph.
c. Broadmoor Avenue is a four-lane divided roadway with two lanes in each direction and median left turn lanes. The roadway is signed at 55 mph.

E. Proposed Site Plan

The proposed development will be accessed via three driveways. Each driveway will be located off 52nd Street on the north side of the development. The driveways will service each parcel individually.

Figure 2: Proposed Overall Site Plan

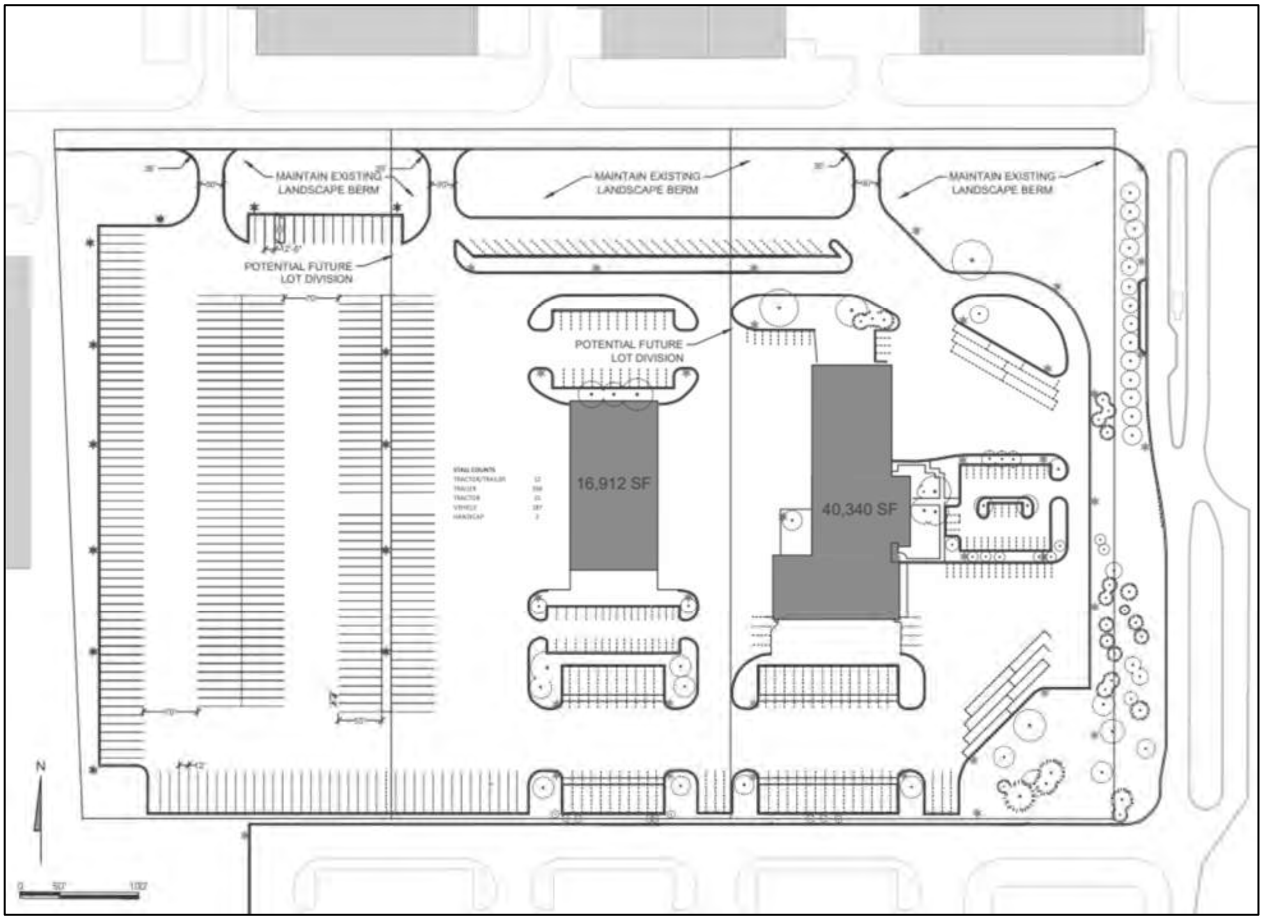


Figure 3: Detailed Site Plan

F. Operational Assessment

1. Level of Service Analysis

A Level of Service (LOS) is a qualitative measure that describes the operational conditions within a traffic stream and at intersections and the perception of these conditions by the drivers. There are six Levels of Service set forth in the Highway Capacity Manual[2], ranging from A (highest LOS) through F (lowest LOS). For signalized and unsignalized intersections, the Levels of Service, letter value is assigned based on control delay per vehicle in seconds. LOS and control delay are calculated for all movements in a signalized intersection and only the movements which have some traffic control (stop or yield) assigned to them at an unsignalized intersection. The following distribution is used to assign Levels of Service, with descriptions. Synchro reports detailing LOS for each intersection are included in Appendix B. LOS D or better is generally considered acceptable for peak hours of traffic under urban peak hour conditions.

[2] Highway Capacity Manual 6th Edition, Transportation Research Board, 2016.

Level of Service	*Expected Delay at Intersection*	*Delay per Vehicle (sec)*	
		Signalized Intersection	**Unsignalized Intersection**
A	Very Low Delay	< 10	< 10
B	Short Traffic Delays	> 10 > 20	> 10 > 15
C	No. Vehicles Stopping is Significant	> 20 > 35	> 15 > 25
D	Influence of Congestion Noticeable	> 35 > 55	> 25 > 35
E	Limit of Acceptable Delay	> 55 > 80	> 35 > 50
F	Over-Saturated	> 80	> 50

Table 2: Levels of Service and Control Delay

Overall, the intersection of 52nd Street and E Paris Avenue operates at an acceptable level of service during the morning and afternoon peak hours. With current conditions, the intersection will continue to operate at acceptable levels of service for project 2030 traffic levels, except for the northbound left turning movement, which will degrade to a LOS E due to the anticipated growth of traffic volume. The maximum impact 2030 build-out scenario for this intersection was shown to operate at acceptable levels of service except for the same turning movment previously mentrioned under existing conditions. The northbound left turning movement is not impacted by additional trips generated from the proposed land uses.

The intersection of 52nd Street and Broadmoor Avenue currently operates at a LOS A during the monring and afternoon peak hours and will continue to do so with projected 2030 traffic volumes given the existing conditions. The maximum impact 2030 build-out scenario for this intersection was shown to continue to operate at acceptable levels of service.

Since driveways are proposed where there currently is no access, the impact of these driveways was analyzed in addition to the intersections. The maximum impact scenario that provides the most potential trip generation was shown to have little impact on the flow of traffic on 52nd Street. All movements at the locations of each of the driveways, including the traffic movements for the existing driveways on the north side of 52nd Street, were shown to operate at a LOS C or better. Compared to the 2030 no-build scenario, there was very little change in delay experienced by road users.

G. Conclusions and Recommendations

1. Conclusions

The signalized intersections of 52nd Street and E Paris Avenue and 52nd Street and Broadmoor Avenue currently operate at acceptable levels of service during the morning and afternoon peak hours and will continue to operate at acceptable levels in 2030. There is one turning movement, the northbound left turn at E Paris Avenue, which will operate below an acceptable level of service due to the projected growth in traffic volumes over time. It was determined that the trips generated from the proposed developments do not have an impact on this turning movement.

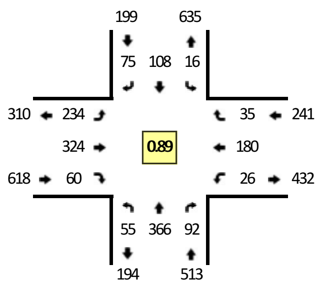
The addition of the traffic generated by the three proposed developments will not negatively impact operations at the signalized intersections under all three potential land use scenarios that were analyzed. Additionally, it was found that the additional access points for the parcels off 52nd Street will not have a negative impact on the roadway traffic. Due to the low impact that the proposed driveways will have on the 52nd Street traffic, it is not necessary for deceleration lanes to be constructed. The data shows that even when analyzing the maximum impact scenario, the vehicles slowing to turn on to the properties will not cause delays to occur for through traffic.

APPENDIX A

TRAFFIC COUNT DATA

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: E Paris Ave SE -- 52nd St SE | **QC JOB #:** 15979201
CITY/STATE: Kentwood, MI | **DATE:** Thu, Oct 20 2022



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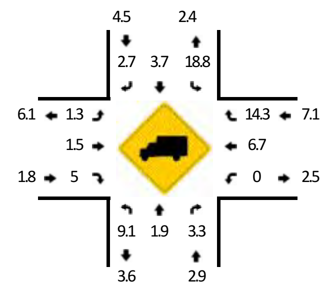
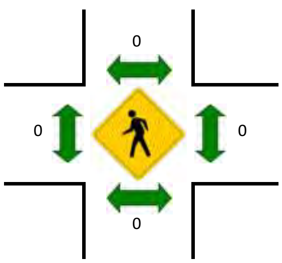
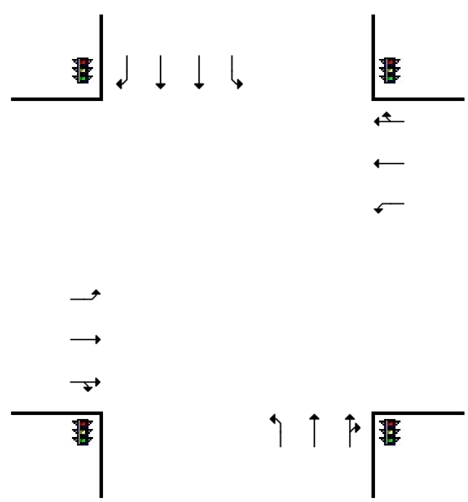
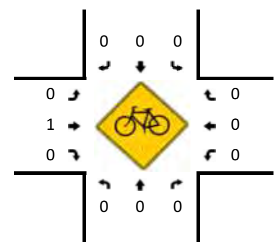
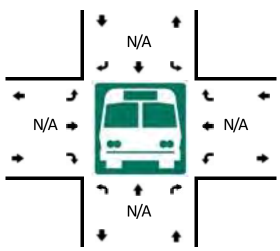
Peak 15-Min: 7:45 AM -- 8:00 AM

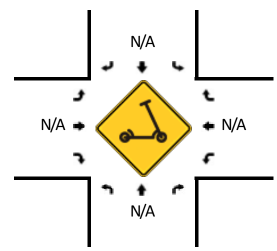












15-Min Count Period Beginning At	E Paris Ave SE (Northbound)				E Paris Ave SE (Southbound)				52nd St SE (Eastbound)				52nd St SE (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	14	44	19	0	8	44	22	0	34	34	11	0	10	54	8	0	302	
7:15 AM	11	71	24	0	4	29	15	0	48	71	16	0	5	55	6	0	355	
7:30 AM	15	103	21	0	2	29	18	0	54	88	12	0	6	29	8	0	385	
7:45 AM	13	110	26	0	1	20	16	0	67	94	15	0	7	60	11	0	440	1482
8:00 AM	16	82	21	0	9	30	26	0	65	71	17	0	8	36	10	0	391	1571
8:15 AM	8	69	13	0	4	30	14	0	54	65	18	0	8	29	13	0	325	1541
8:30 AM	17	68	14	0	5	38	14	0	28	58	17	0	11	35	9	0	314	1470
8:45 AM	28	100	14	0	2	66	17	0	42	49	44	0	11	29	11	0	413	1443

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	52	440	104	0	4	80	64	0	268	376	60	0	28	240	44	0	1760
Heavy Trucks	8	12	4		4	0	8		4	12	4		0	8	8		72
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 11/15/2022 5:18 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak — Method for determining peak hour: Total Entering Volume

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CITY/STATE: Kentwood, MI — **DATE:** Wed, Oct 19 2022

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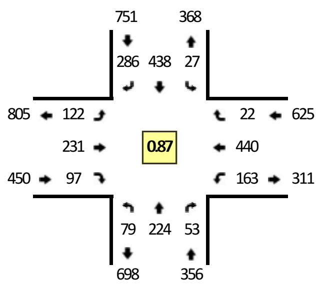
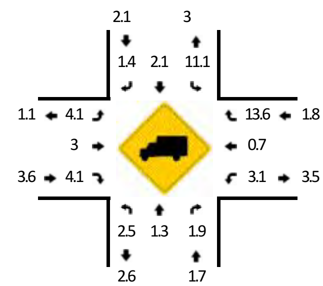
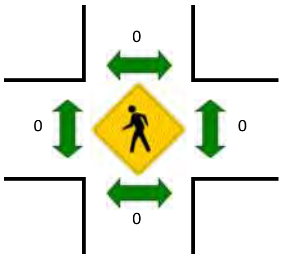
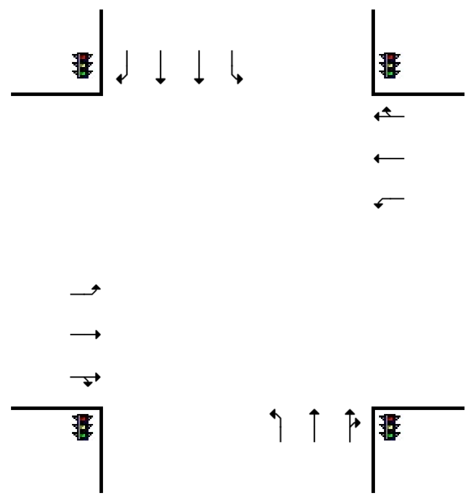
Peak 15-Min: 5:00 PM -- 5:15 PM

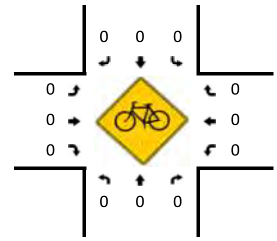


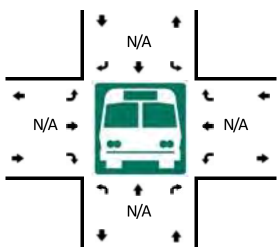


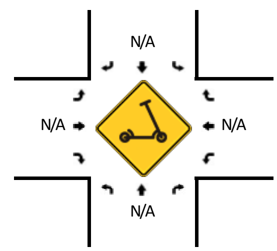
Quality Counts
DATA THAT DRIVES COMMUNITIES











15-Min Count Period Beginning At	E Paris Ave SE (Northbound)				E Paris Ave SE (Southbound)				52nd St SE (Eastbound)				52nd St SE (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	44	62	15	0	6	84	68	0	35	43	25	0	32	89	14	0	517	
4:15 PM	14	45	5	0	6	77	56	0	28	54	12	0	29	79	11	0	416	
4:30 PM	23	66	12	0	7	101	84	0	29	55	20	0	37	94	4	0	532	
4:45 PM	21	64	12	0	7	98	48	0	32	60	21	0	35	93	9	0	500	1965
5:00 PM	24	56	17	0	5	136	86	0	37	62	28	0	47	128	4	0	630	2078
5:15 PM	11	38	12	0	8	103	68	0	24	54	28	0	44	125	5	0	520	2182
5:30 PM	28	51	15	0	11	85	64	0	25	54	30	0	36	88	2	0	489	2139
5:45 PM	9	52	16	0	5	66	49	0	20	59	27	0	27	54	8	0	392	2031

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	96	224	68	0	20	544	344	0	148	248	112	0	188	512	16	0	2520
Heavy Trucks	0	0	0		4	4	4		8	8	0		8	4	4		44
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 11/15/2022 5:19 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: Lacks Trim Systems West Dwy -- 52nd St SE | **QC JOB #:** 15979203
CITY/STATE: Kentwood, MI | **DATE:** Thu, Oct 20 2022

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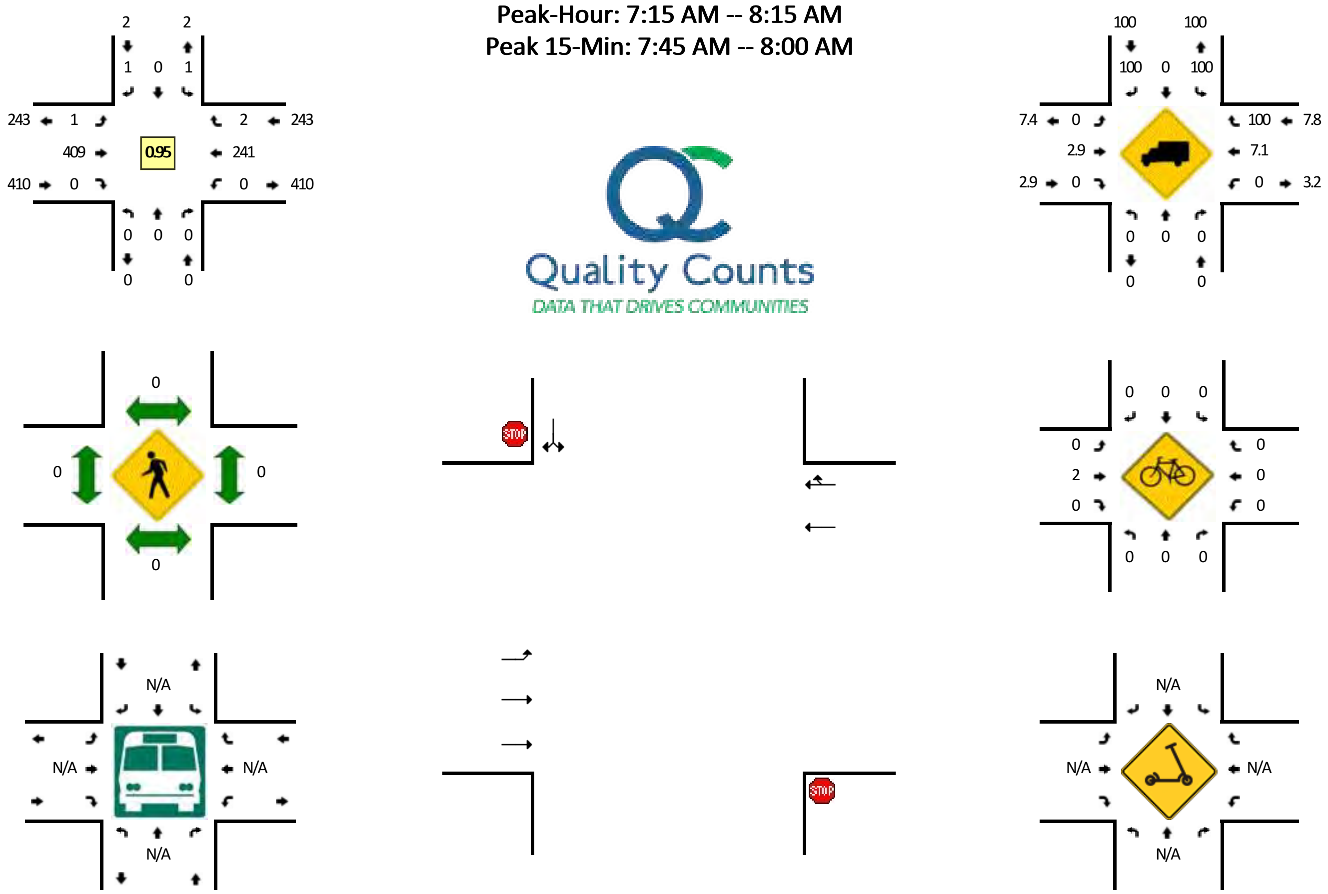
Peak 15-Min: 7:45 AM -- 8:00 AM



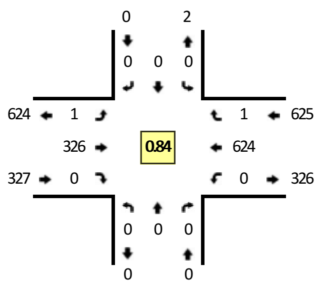
15-Min Count Period Beginning At	Lacks Trim Systems West Dwy (Northbound)				Lacks Trim Systems West Dwy (Southbound)				52nd St SE (Eastbound)				52nd St SE (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	0	62	0	0	0	82	1	0	145	
7:15 AM	0	0	0	0	0	0	1	0	0	93	0	0	0	63	1	0	158	
7:30 AM	0	0	0	0	1	0	0	0	0	113	0	0	0	48	0	0	162	
7:45 AM	0	0	0	0	0	0	0	0	0	106	0	0	0	66	0	0	172	637
8:00 AM	0	0	0	0	0	0	0	0	0	97	0	1	0	64	1	0	163	655
8:15 AM	0	0	0	0	1	0	1	0	0	83	0	1	0	57	0	0	143	640
8:30 AM	0	0	0	0	0	0	0	0	0	73	0	0	0	54	0	0	127	605
8:45 AM	0	0	0	0	1	0	0	0	0	74	0	0	0	43	0	0	118	551

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	0	424	0	0	0	264	0	0	688
Heavy Trucks	0	0	0		0	0	0		0	24	0		0	16	0		40
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	4	0		0	0	0		4
Scooters																	

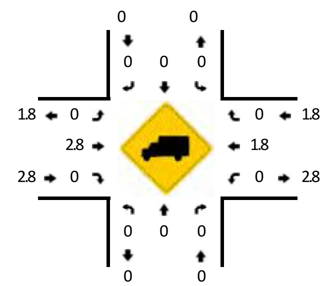
Comments:

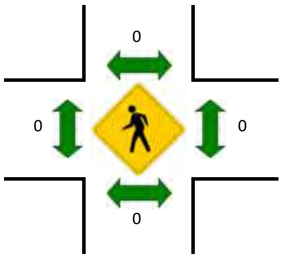
Report generated on 11/15/2022 5:18 AM
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

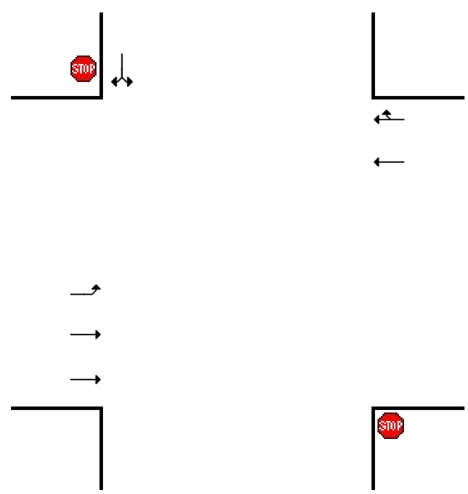
LOCATION: Lacks Trim Systems West Dwy -- 52nd St SE
QC JOB #: 15979204
CITY/STATE: Kentwood, MI
DATE: Wed, Oct 19 2022

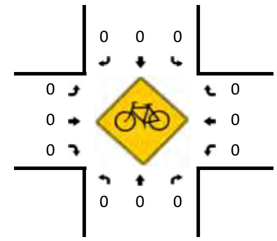


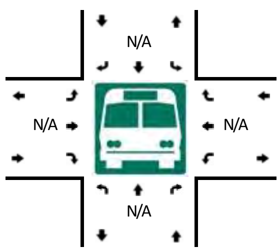
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

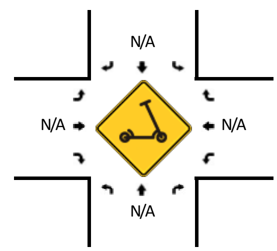












15-Min Count Period Beginning At	Lacks Trim Systems West Dwy (Northbound)				Lacks Trim Systems West Dwy (Southbound)				52nd St SE (Eastbound)				52nd St SE (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	0	0	0	0	0	66	0	0	0	138	0	0	204	
4:15 PM	0	0	0	0	0	0	0	0	0	64	0	0	0	117	0	0	181	
4:30 PM	0	0	0	0	0	0	0	0	0	76	0	0	0	154	0	0	230	
4:45 PM	0	0	0	0	0	0	0	0	0	78	0	0	0	129	0	0	207	822
5:00 PM	0	0	0	0	0	0	0	0	1	101	0	0	0	179	1	0	282	900
5:15 PM	0	0	0	0	0	0	0	0	0	71	0	0	0	162	0	0	233	952
5:30 PM	0	0	0	0	1	0	1	0	0	78	0	0	0	116	0	0	196	918
5:45 PM	0	0	0	0	0	0	0	0	0	77	0	0	0	97	0	0	174	885

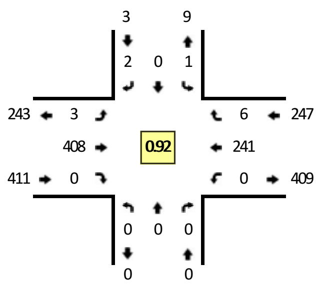
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	4	404	0	0	0	716	4	0	1128
Heavy Trucks	0	0	0		0	0	0		0	12	0		0	16	0		28
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

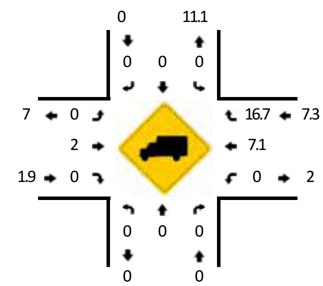
Comments:

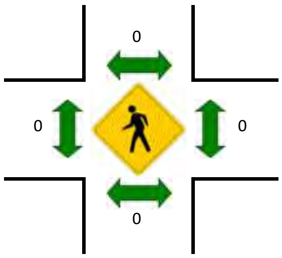
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

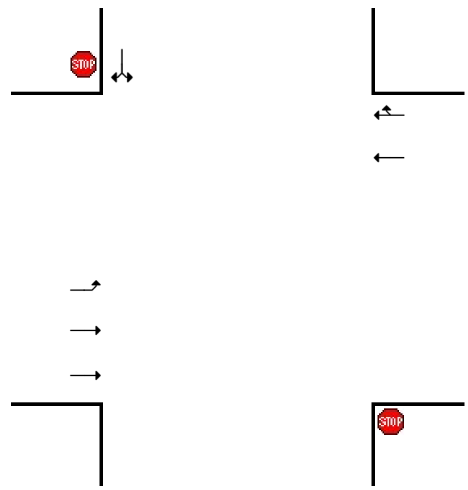
LOCATION: Lacks Trim Systems East Dwy -- 52nd St SE | **QC JOB #:** 15979205
CITY/STATE: Kentwood, MI | **DATE:** Thu, Oct 20 2022

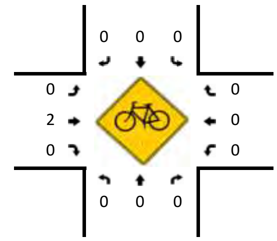
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

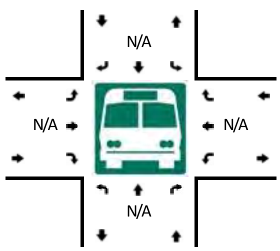


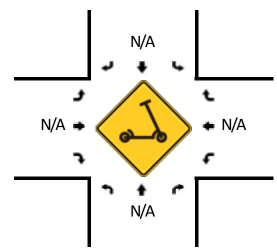












15-Min Count Period Beginning At	Lacks Trim Systems East Dwy (Northbound)				Lacks Trim Systems East Dwy (Southbound)				52nd St SE (Eastbound)				52nd St SE (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	0	0	0	0	0	0	0	1	57	0	0	0	74	1	0	133	
7:15 AM	0	0	0	0	1	0	0	0	0	89	0	0	0	64	2	0	156	
7:30 AM	0	0	0	0	0	0	0	0	0	116	0	0	0	47	1	0	164	
7:45 AM	0	0	0	0	0	0	2	0	3	109	0	0	0	64	2	0	180	633
8:00 AM	0	0	0	0	0	0	0	0	0	94	0	0	0	66	1	0	161	661
8:15 AM	0	0	0	0	0	0	0	0	0	78	0	0	0	54	0	0	132	637
8:30 AM	0	0	0	0	0	0	0	0	0	72	0	0	0	54	1	0	127	600
8:45 AM	0	0	0	0	1	0	0	0	0	74	0	0	0	47	2	0	124	544

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	8	0	12	436	0	0	0	256	8	0	720
Heavy Trucks	0	0	0		0	0	0		0	16	0		0	8	0		24
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	4	0		0	0	0		4
Scooters																	

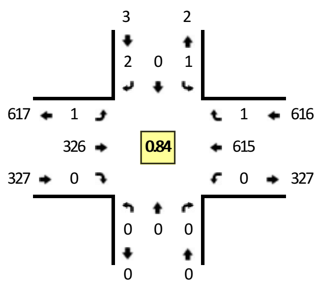
Comments:

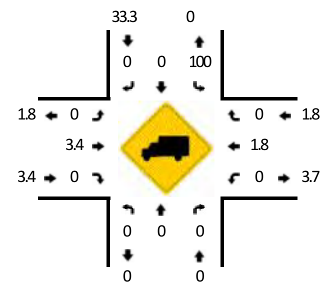
Report generated on 11/15/2022 5:18 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

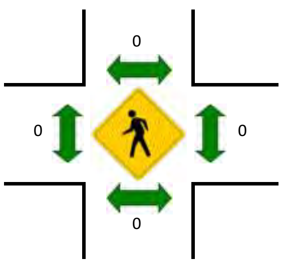
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

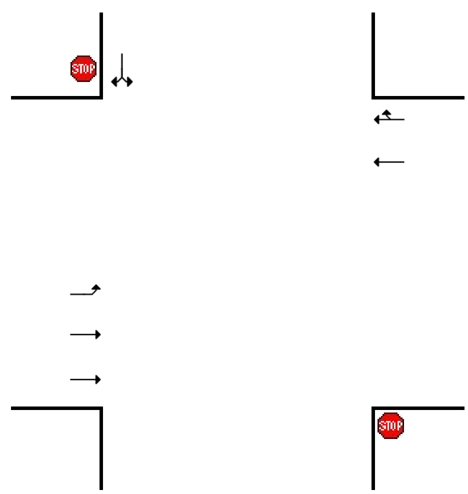
LOCATION: Lacks Trim Systems East Dwy -- 52nd St SE | **QC JOB #:** 15979206
CITY/STATE: Kentwood, MI | **DATE:** Wed, Oct 19 2022

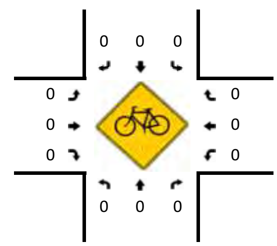
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

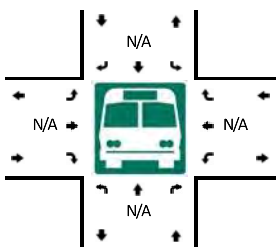


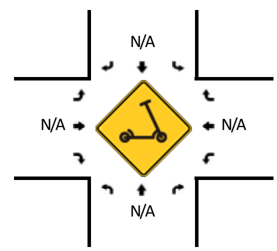












15-Min Count Period Beginning At	Lacks Trim Systems East Dwy (Northbound)				Lacks Trim Systems East Dwy (Southbound)				52nd St SE (Eastbound)				52nd St SE (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	0	0	0	1	0	0	0	0	73	0	0	0	148	0	0	222	
4:15 PM	0	0	0	0	0	0	0	0	0	70	0	0	0	110	0	0	180	
4:30 PM	0	0	0	0	1	0	0	0	0	76	0	0	0	155	0	0	232	
4:45 PM	0	0	0	0	0	0	2	0	0	76	0	0	0	123	0	0	201	835
5:00 PM	0	0	0	0	0	0	0	0	1	98	0	0	0	182	1	0	282	895
5:15 PM	0	0	0	0	0	0	0	0	0	76	0	0	0	155	0	0	231	946
5:30 PM	0	0	0	0	0	0	0	0	0	79	0	0	0	111	0	0	190	904
5:45 PM	0	0	0	0	0	0	1	0	1	74	0	0	0	89	0	0	165	868

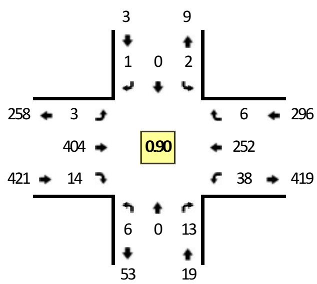
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	0	0	0	0	0	0	4	392	0	0	0	728	4	0	1128
Heavy Trucks	0	0	0		0	0	0		0	12	0		0	20	0		32
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

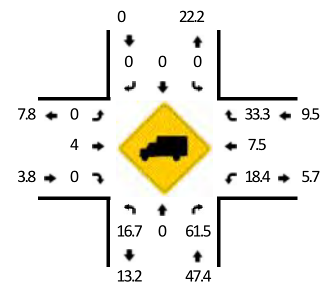
Comments:

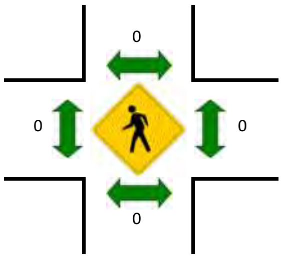
Report generated on 11/15/2022 5:19 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

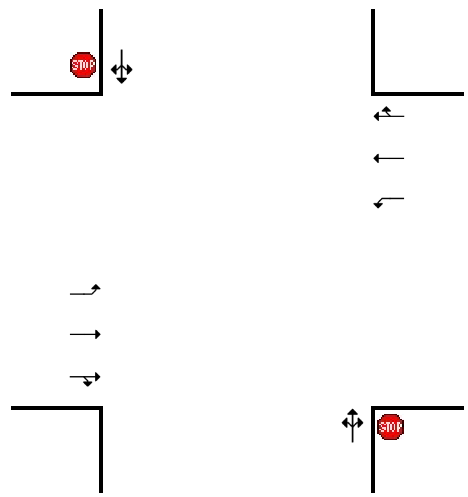
LOCATION: Steelcase Dwy -- 52nd St SE
QC JOB #: 15979207
CITY/STATE: Kentwood, MI
DATE: Thu, Oct 20 2022

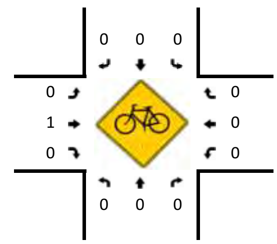
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

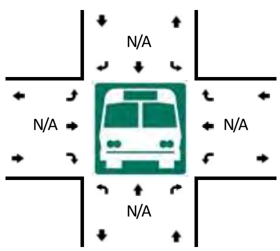


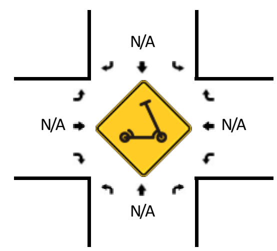












15-Min Count Period Beginning At	Steelcase Dwy (Northbound)				Steelcase Dwy (Southbound)				52nd St SE (Eastbound)				52nd St SE (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	3	0	6	1	0	0	0	0	0	60	3	0	11	83	2	0	169	
7:15 AM	1	0	3	0	0	0	0	0	1	93	4	0	8	64	2	0	176	
7:30 AM	0	0	4	1	0	0	0	0	0	105	2	0	7	52	0	0	171	
7:45 AM	3	0	2	0	0	0	1	0	1	112	4	0	12	70	1	0	206	722
8:00 AM	1	0	4	0	2	0	0	0	1	94	4	0	11	66	3	0	186	739
8:15 AM	1	0	4	0	2	0	0	0	0	76	5	0	12	57	3	0	160	723
8:30 AM	4	0	8	0	1	0	0	0	0	72	3	0	10	57	0	0	155	707
8:45 AM	4	0	7	0	1	0	0	0	0	67	2	0	8	45	2	0	136	637

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	0	8	0	0	0	4	0	4	448	16	0	48	280	4	0	824
Heavy Trucks	0	0	4		0	0	0		0	28	0		12	16	0		60
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

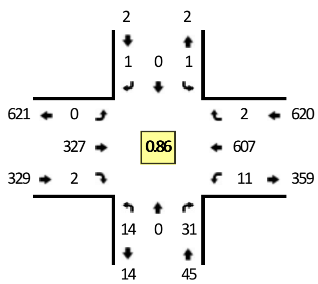
Comments:

Report generated on 11/15/2022 5:18 AM
SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

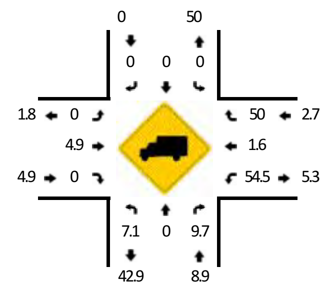
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

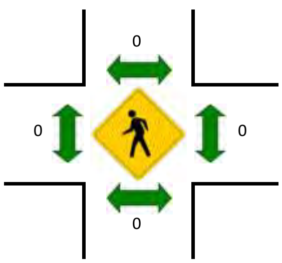
LOCATION: Steelcase Dwy -- 52nd St SE | **QC JOB #:** 15979208

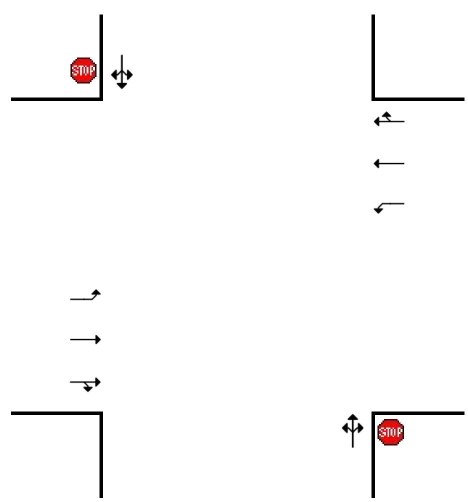
CITY/STATE: Kentwood, MI | **DATE:** Wed, Oct 19 2022

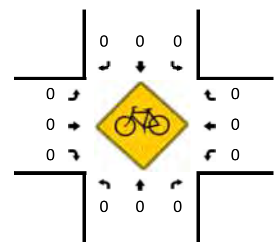


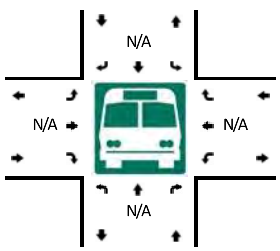
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

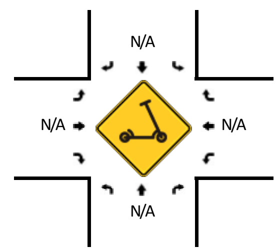












15-Min Count Period Beginning At	Steelcase Dwy (Northbound)				Steelcase Dwy (Southbound)				52nd St SE (Eastbound)				52nd St SE (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	8	0	15	0	1	0	2	0	0	69	1	0	3	134	0	0	233	
4:15 PM	5	0	9	0	1	0	0	0	0	64	2	0	3	109	0	0	193	
4:30 PM	2	0	7	0	0	0	0	0	0	75	1	0	4	146	0	0	235	
4:45 PM	7	0	9	0	1	0	1	0	0	83	1	0	3	123	1	0	229	890
5:00 PM	3	0	8	1	0	0	0	0	0	97	0	0	2	177	1	0	289	946
5:15 PM	1	0	7	0	0	0	0	0	0	72	0	0	2	161	0	0	243	996
5:30 PM	2	0	1	1	0	0	0	0	0	80	0	0	1	111	0	0	196	957
5:45 PM	0	0	6	0	0	0	2	0	1	78	0	0	5	93	1	0	186	914

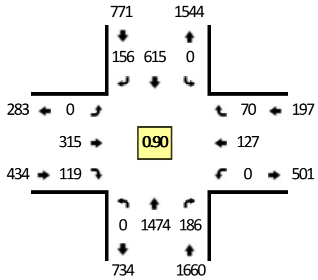
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	0	32	4	0	0	0	0	0	388	0	0	8	708	4	0	1156
Heavy Trucks	0	0	4		0	0	0		0	16	0		0	16	4		40
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

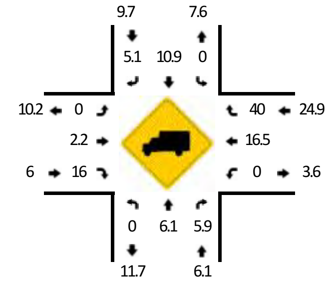
Report generated on 11/15/2022 5:19 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

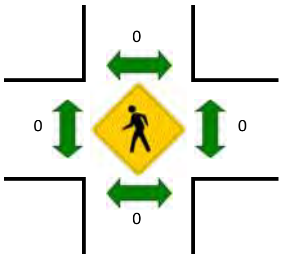
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

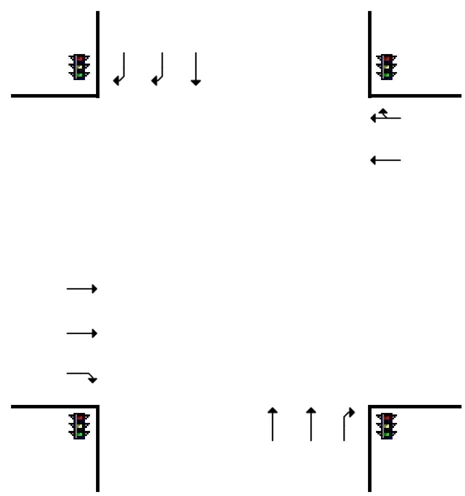
LOCATION: Broadmoor Ave SE -- 52nd St SE | **QC JOB #:** 15979209
CITY/STATE: Kentwood, MI | **DATE:** Thu, Oct 20 2022

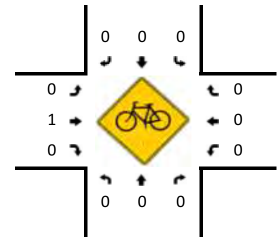


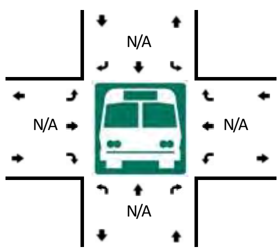
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

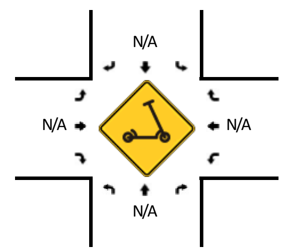












15-Min Count Period Beginning At	Broadmoor Ave SE (Northbound)				Broadmoor Ave SE (Southbound)				52nd St SE (Eastbound)				52nd St SE (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	350	37	0	0	150	48	0	0	37	26	0	0	45	15	0	708	
7:15 AM	0	344	32	0	0	149	47	0	0	65	35	0	0	25	17	0	714	
7:30 AM	0	378	44	0	0	136	39	0	0	78	35	0	0	20	11	0	741	
7:45 AM	0	391	69	0	0	167	36	0	0	100	22	0	0	42	21	0	848	3011
8:00 AM	0	361	41	0	0	163	34	0	0	72	27	0	0	40	21	0	759	3062
8:15 AM	0	327	31	0	0	149	32	0	0	59	28	0	0	39	11	0	676	3024
8:30 AM	0	329	33	0	0	148	29	0	0	61	25	0	0	26	13	0	664	2947
8:45 AM	0	297	33	0	0	128	23	0	0	55	23	0	0	29	16	0	604	2703

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	1564	276	0	0	668	144	0	0	400	88	0	0	168	84	0	3392
Heavy Trucks	0	112	16		0	64	12		0	16	16		0	12	36		284
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	4	0		0	0	0		4
Scooters																	

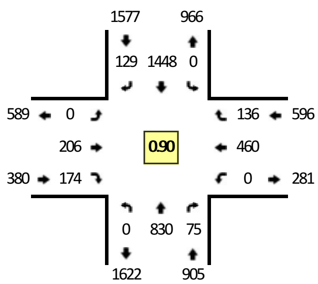
Comments:

Report generated on 11/15/2022 5:18 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

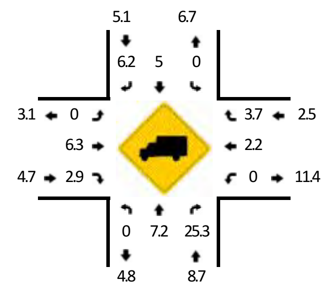
LOCATION: Broadmoor Ave SE -- 52nd St SE | **QC JOB #:** 15979210

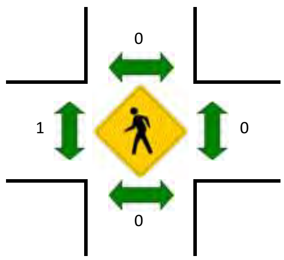
CITY/STATE: Kentwood, MI | **DATE:** Wed, Oct 19 2022

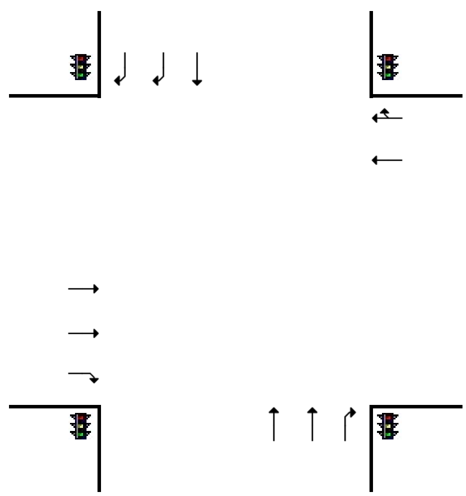


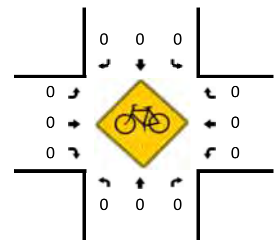
Peak-Hour: 4:30 PM -- 5:30 PM

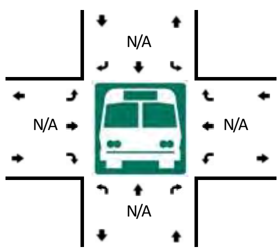
Peak 15-Min: 5:00 PM -- 5:15 PM

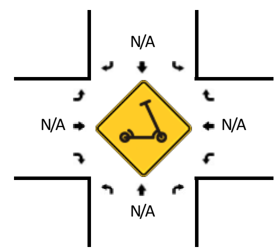












15-Min Count Period Beginning At	Broadmoor Ave SE (Northbound)				Broadmoor Ave SE (Southbound)				52nd St SE (Eastbound)				52nd St SE (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	222	16	0	0	314	38	0	0	52	49	0	0	82	29	0	802	
4:15 PM	0	205	12	0	0	320	31	0	0	46	45	0	0	79	22	0	760	
4:30 PM	0	180	24	0	0	338	31	0	0	48	41	0	0	121	29	0	812	
4:45 PM	0	196	16	0	0	381	31	0	0	50	44	0	0	88	26	0	832	3206
5:00 PM	0	214	18	0	0	386	32	0	0	65	51	0	0	141	53	0	960	3364
5:15 PM	0	240	17	0	0	343	35	0	0	43	38	0	0	110	28	0	854	3458
5:30 PM	0	231	13	0	0	308	18	0	0	55	29	0	0	88	35	0	777	3423
5:45 PM	0	216	16	0	0	251	29	0	0	53	37	0	0	56	21	0	679	3270

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	856	72	0	0	1544	128	0	0	260	204	0	0	564	212	0	3840
Heavy Trucks	0	76	8		0	60	4		0	20	4		0	12	4		188
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 11/15/2022 5:19 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

APPENDIX B

Synchro Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	315	0	0	127	70	0	1474	186	0	0	0
Future Volume (veh/h)	0	315	0	0	127	70	0	1474	186	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	354	0	0	163	90	0	1638	207			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1400	735	0	0	0			
Arrive On Green	0.00	1.00	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	1937	976		0				
Grp Volume(v), veh/h	0	354	0	0	127	126		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1369						
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.8	0.9						
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.8	0.9						
Prop In Lane	0.00		0.00	0.00		0.71						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1030						
V/C Ratio(X)	0.00	0.14	0.00	0.00	0.11	0.12						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1030						
HCM Platoon Ratio	1.00	1.33	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	1.2	1.2						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.2	0.2						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.1	0.1						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.1	0.0	0.0	1.4	1.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		354			253							
Approach Delay, s/veh		0.1			1.4							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.0				2.9				
Green Ext Time (p_c), s				2.0				1.3				

Intersection Summary			
HCM 6th Ctrl Delay			0.7
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	315	119	0	127	0	0	0	0	0	615	156
Future Volume (veh/h)	0	315	119	0	127	0	0	0	0	0	615	156
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	354	134	0	163	0				0	647	164
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	0.25	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	354	134	0	163	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	1.0	0.9	0.0	1.5	0.0						
Cycle Q Clear(g_c), s	0.0	1.0	0.9	0.0	1.5	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.14	0.12	0.00	0.07	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.2	0.0	3.9	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.2	0.0	0.1	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.0	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	1.4	0.0	4.0	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		488			163							
Approach Delay, s/veh		1.4			4.0							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.0				3.5				
Green Ext Time (p_c), s				2.4				0.8				

Intersection Summary				
HCM 6th Ctrl Delay			2.0	
HCM 6th LOS			A	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	409	241	2	1	1
Future Vol, veh/h	0	409	241	2	1	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	92	92	60	60
Heavy Vehicles, %	6	6	7	7	0	0
Mvmt Flow	0	454	262	2	2	2

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	264	0	-	0	490	132
Stage 1	-	-	-	-	263	-
Stage 2	-	-	-	-	227	-
Critical Hdwy	4.22	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.26	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1268	-	-	-	512	899
Stage 1	-	-	-	-	763	-
Stage 2	-	-	-	-	795	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1268	-	-	-	512	899
Mov Cap-2 Maneuver	-	-	-	-	589	-
Stage 1	-	-	-	-	763	-
Stage 2	-	-	-	-	795	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1268	-	-	-	712
HCM Lane V/C Ratio	-	-	-	-	0.005
HCM Control Delay (s)	0	-	-	-	10.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection						
Int Delay, s/veh	0.1					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	3	408	241	6	1	2
Future Vol, veh/h	3	408	241	6	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	92	92	60	60
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	3	458	262	7	2	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	269	0	-	0	501	135
Stage 1	-	-	-	-	266	-
Stage 2	-	-	-	-	235	-
Critical Hdwy	4.18	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.24	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1277	-	-	-	504	895
Stage 1	-	-	-	-	760	-
Stage 2	-	-	-	-	788	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1277	-	-	-	503	895
Mov Cap-2 Maneuver	-	-	-	-	582	-
Stage 1	-	-	-	-	758	-
Stage 2	-	-	-	-	788	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1277	-	-	-	759
HCM Lane V/C Ratio	0.003	-	-	-	0.007
HCM Control Delay (s)	7.8	-	-	-	9.8
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	234	324	60	26	180	35	55	366	92	16	108	75
Future Volume (veh/h)	234	324	60	26	180	35	55	366	92	16	108	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	266	368	68	34	234	45	64	426	107	21	140	97
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	641	1703	312	527	1639	310	388	891	222	226	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1091	2976	545	915	2864	542	1116	2752	685	844	3441	1535
Grp Volume(v), veh/h	266	217	219	34	138	141	64	267	266	21	140	97
Grp Sat Flow(s),veh/h/ln	1091	1763	1758	915	1706	1699	1116	1735	1703	844	1721	1535
Q Serve(g_s), s	18.4	7.3	7.5	2.3	4.6	4.7	5.2	15.1	15.3	2.5	3.5	5.6
Cycle Q Clear(g_c), s	23.1	7.3	7.5	9.8	4.6	4.7	8.8	15.1	15.3	17.8	3.5	5.6
Prop In Lane	1.00		0.31	1.00		0.32	1.00		0.40	1.00		1.00
Lane Grp Cap(c), veh/h	641	1009	1006	527	977	972	388	562	551	226	1114	497
V/C Ratio(X)	0.41	0.21	0.22	0.06	0.14	0.15	0.16	0.48	0.48	0.09	0.13	0.20
Avail Cap(c_a), veh/h	641	1009	1006	527	977	972	388	562	551	226	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.6	12.7	12.8	15.2	12.2	12.2	32.2	33.1	33.1	40.3	29.1	29.8
Incr Delay (d2), s/veh	2.0	0.5	0.5	0.2	0.3	0.3	0.9	2.9	3.0	0.8	0.2	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	2.8	2.8	0.5	1.7	1.7	1.5	6.5	6.5	0.6	1.4	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.6	13.2	13.3	15.4	12.5	12.5	33.1	35.9	36.1	41.1	29.4	30.7
LnGrp LOS	B	B	B	B	B	B	C	D	D	D	C	C
Approach Vol, veh/h		702			313			597			258	
Approach Delay, s/veh		15.6			12.8			35.7			30.8	
Approach LOS		B			B			D			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		17.3		25.1		19.8		11.8				
Green Ext Time (p_c), s		3.0		3.7		1.1		1.6				
Intersection Summary												
HCM 6th Ctrl Delay			23.7									
HCM 6th LOS			C									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	404	14	38	252	6	5	0	13	2	0	1
Future Vol, veh/h	3	404	14	38	252	6	5	0	13	2	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	3	449	16	43	283	7	6	0	14	3	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	290	0	0	465	0	0	691	839	233	604	844	145
Stage 1	-	-	-	-	-	-	463	463	-	373	373	-
Stage 2	-	-	-	-	-	-	228	376	-	231	471	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	1233	-	-	1045	-	-	295	266	711	386	302	882
Stage 1	-	-	-	-	-	-	499	515	-	625	622	-
Stage 2	-	-	-	-	-	-	700	567	-	757	563	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1233	-	-	1045	-	-	285	255	711	366	289	882
Mov Cap-2 Maneuver	-	-	-	-	-	-	285	255	-	366	289	-
Stage 1	-	-	-	-	-	-	498	514	-	624	596	-
Stage 2	-	-	-	-	-	-	670	544	-	740	562	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.1	12.5	13
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	502	1233	-	-	1045	-	-	455
HCM Lane V/C Ratio	0.04	0.003	-	-	0.041	-	-	0.011
HCM Control Delay (s)	12.5	7.9	-	-	8.6	-	-	13
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	206	0	0	460	136	0	830	75	0	0	0
Future Volume (veh/h)	0	206	0	0	460	136	0	830	75	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1811	0	0	1856	1856	0	1767	1767			
Adj Flow Rate, veh/h	0	251	0	0	597	177	0	943	85			
Peak Hour Factor	0.82	0.82	0.82	0.77	0.77	0.77	0.88	0.88	0.88			
Percent Heavy Veh, %	0	6	0	0	3	3	0	9	9			
Cap, veh/h	0	2590	0	0	2019	597	0	0	0			
Arrive On Green	0.00	0.75	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3622	0	0	2775	793		0				
Grp Volume(v), veh/h	0	251	0	0	392	382		0.0				
Grp Sat Flow(s),veh/h/ln	0	1721	0	0	1763	1713						
Q Serve(g_s), s	0.0	0.7	0.0	0.0	2.5	2.6						
Cycle Q Clear(g_c), s	0.0	0.7	0.0	0.0	2.5	2.6						
Prop In Lane	0.00		0.00	0.00		0.46						
Lane Grp Cap(c), veh/h	0	2590	0	0	1327	1289						
V/C Ratio(X)	0.00	0.10	0.00	0.00	0.30	0.30						
Avail Cap(c_a), veh/h	0	2590	0	0	1327	1289						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	1.2	0.0	0.0	1.4	1.4						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.6	0.6						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.2	0.2						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	0.0	0.0	2.0	2.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		251			774							
Approach Delay, s/veh		1.3			2.0							
Approach LOS		A			A							
Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.7				4.6				
Green Ext Time (p_c), s				1.4				4.4				

Intersection Summary	
HCM 6th Ctrl Delay	1.8
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	206	174	0	460	0	0	0	0	0	1448	129
Future Volume (veh/h)	0	206	174	0	460	0	0	0	0	0	1448	129
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	0	1856	0				0	1841	1841
Adj Flow Rate, veh/h	0	251	212	0	597	0				0	1540	137
Peak Hour Factor	0.82	0.82	0.82	0.77	0.77	0.77				0.94	0.94	0.94
Percent Heavy Veh, %	0	6	6	0	3	0				0	4	4
Cap, veh/h	0	2590	1155	0	2654	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	1.00	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3532	1535	0	3711	0					0	
Grp Volume(v), veh/h	0	251	212	0	597	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1721	1535	0	1763	0						
Q Serve(g_s), s	0.0	0.7	1.4	0.0	0.0	0.0						
Cycle Q Clear(g_c), s	0.0	0.7	1.4	0.0	0.0	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2590	1155	0	2654	0						
V/C Ratio(X)	0.00	0.10	0.18	0.00	0.22	0.00						
Avail Cap(c_a), veh/h	0	2590	1155	0	2654	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.3	0.0	0.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.3	0.0	0.2	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.1	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	1.6	0.0	0.2	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		463			597							
Approach Delay, s/veh		1.4			0.2							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.4				2.0				
Green Ext Time (p_c), s				2.1				3.6				

Intersection Summary			
HCM 6th Ctrl Delay			0.7
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	326	624	1	0	0
Future Vol, veh/h	1	326	624	1	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	80	80	87	87	60	60
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	1	408	717	1	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	718	0	-	0	924	359
Stage 1	-	-	-	-	718	-
Stage 2	-	-	-	-	206	-
Critical Hdwy	4.18	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.24	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	866	-	-	-	272	643
Stage 1	-	-	-	-	449	-
Stage 2	-	-	-	-	814	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	866	-	-	-	272	643
Mov Cap-2 Maneuver	-	-	-	-	370	-
Stage 1	-	-	-	-	449	-
Stage 2	-	-	-	-	814	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	866	-	-	-	-
HCM Lane V/C Ratio	0.001	-	-	-	-
HCM Control Delay (s)	9.2	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0.1					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	1	326	615	1	1	2
Future Vol, veh/h	1	326	615	1	1	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	84	84	60	60
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	1	393	732	1	2	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	733	0	-	0	932	367
Stage 1	-	-	-	-	733	-
Stage 2	-	-	-	-	199	-
Critical Hdwy	4.18	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.24	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	854	-	-	-	269	636
Stage 1	-	-	-	-	442	-
Stage 2	-	-	-	-	821	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	854	-	-	-	269	636
Mov Cap-2 Maneuver	-	-	-	-	366	-
Stage 1	-	-	-	-	442	-
Stage 2	-	-	-	-	821	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	12.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	854	-	-	-	510
HCM Lane V/C Ratio	0.001	-	-	-	0.01
HCM Control Delay (s)	9.2	-	-	-	12.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	122	231	97	163	440	22	79	224	53	27	438	286
Future Volume (veh/h)	122	231	97	163	440	22	79	224	53	27	438	286
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1856	1856	1856	1900	1900	1900	1870	1870	1870
Adj Flow Rate, veh/h	137	260	109	187	506	25	90	255	60	33	528	345
Peak Hour Factor	0.89	0.89	0.89	0.87	0.87	0.87	0.88	0.88	0.88	0.83	0.83	0.83
Percent Heavy Veh, %	4	4	4	3	3	3	0	0	0	2	2	2
Cap, veh/h	487	1387	566	581	1957	97	192	943	218	333	1151	513
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	859	2423	988	1005	3419	169	645	2911	673	1065	3554	1585
Grp Volume(v), veh/h	137	186	183	187	260	271	90	156	159	33	528	345
Grp Sat Flow(s),veh/h/ln	859	1749	1663	1005	1763	1825	645	1805	1779	1065	1777	1585
Q Serve(g_s), s	11.7	6.2	6.5	13.4	9.1	9.1	15.8	7.8	8.1	2.9	14.4	23.0
Cycle Q Clear(g_c), s	20.8	6.2	6.5	19.9	9.1	9.1	30.2	7.8	8.1	11.0	14.4	23.0
Prop In Lane	1.00		0.59	1.00		0.09	1.00		0.38	1.00		1.00
Lane Grp Cap(c), veh/h	487	1001	952	581	1009	1045	192	584	576	333	1151	513
V/C Ratio(X)	0.28	0.19	0.19	0.32	0.26	0.26	0.47	0.27	0.28	0.10	0.46	0.67
Avail Cap(c_a), veh/h	487	1001	952	581	1009	1045	192	584	576	333	1151	513
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.3	12.5	12.6	17.4	13.1	13.1	44.8	30.6	30.7	34.8	32.8	35.7
Incr Delay (d2), s/veh	1.4	0.4	0.5	1.5	0.6	0.6	8.1	1.1	1.2	0.6	1.3	6.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	2.4	2.3	3.1	3.5	3.6	2.9	3.5	3.5	0.8	6.2	9.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	19.8	12.9	13.0	18.8	13.7	13.7	52.9	31.7	31.9	35.4	34.2	42.6
LnGrp LOS	B	B	B	B	B	B	D	C	C	D	C	D
Approach Vol, veh/h		506			718			405			906	
Approach Delay, s/veh		14.8			15.1			36.5			37.4	
Approach LOS		B			B			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		32.2		22.8		25.0		21.9				
Green Ext Time (p_c), s		1.4		3.0		3.9		3.8				
Intersection Summary												
HCM 6th Ctrl Delay			26.4									
HCM 6th LOS			C									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	327	2	11	607	2	13	0	31	1	0	1
Future Vol, veh/h	0	327	2	11	607	2	13	0	31	1	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	79	79	79	78	78	78	60	60	60
Heavy Vehicles, %	5	5	5	3	3	3	9	9	9	0	0	0
Mvmt Flow	0	394	2	14	768	3	17	0	40	2	0	2

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	771	0	0	396	0	0	807	1194	198	995	1194	386
Stage 1	-	-	-	-	-	-	395	395	-	798	798	-
Stage 2	-	-	-	-	-	-	412	799	-	197	396	-
Critical Hdwy	4.2	-	-	4.16	-	-	7.68	6.68	7.08	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.68	5.68	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.68	5.68	-	6.5	5.5	-
Follow-up Hdwy	2.25	-	-	2.23	-	-	3.59	4.09	3.39	3.5	4	3.3
Pot Cap-1 Maneuver	820	-	-	1152	-	-	261	175	789	202	188	618
Stage 1	-	-	-	-	-	-	583	586	-	350	401	-
Stage 2	-	-	-	-	-	-	569	380	-	792	607	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	820	-	-	1152	-	-	258	173	789	190	186	618
Mov Cap-2 Maneuver	-	-	-	-	-	-	258	173	-	190	186	-
Stage 1	-	-	-	-	-	-	583	586	-	350	396	-
Stage 2	-	-	-	-	-	-	561	375	-	752	607	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	13.3	17.5
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	491	820	-	-	1152	-	-	291
HCM Lane V/C Ratio	0.115	-	-	-	0.012	-	-	0.011
HCM Control Delay (s)	13.3	0	-	-	8.2	-	-	17.5
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	324	0	0	131	72	0	1512	191	0	0	0
Future Volume (veh/h)	0	324	0	0	131	72	0	1512	191	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	364	0	0	168	92	0	1680	212			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1403	732	0	0	0			
Arrive On Green	0.00	1.00	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	1942	972		0				
Grp Volume(v), veh/h	0	364	0	0	130	130		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1369						
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.9	0.9						
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.9	0.9						
Prop In Lane	0.00		0.00	0.00		0.71						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1031						
V/C Ratio(X)	0.00	0.14	0.00	0.00	0.12	0.13						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1031						
HCM Platoon Ratio	1.00	1.33	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	1.2	1.2						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.2	0.3						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.1	0.1						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.1	0.0	0.0	1.4	1.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		364			260							
Approach Delay, s/veh		0.1			1.4							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.0				2.9				
Green Ext Time (p_c), s				2.1				1.3				

Intersection Summary		
HCM 6th Ctrl Delay		0.7
HCM 6th LOS		A

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	324	123	0	131	0	0	0	0	0	631	160
Future Volume (veh/h)	0	324	123	0	131	0	0	0	0	0	631	160
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	364	138	0	168	0				0	664	168
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	0.25	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	364	138	0	168	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	1.1	0.9	0.0	1.6	0.0						
Cycle Q Clear(g_c), s	0.0	1.1	0.9	0.0	1.6	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.14	0.12	0.00	0.08	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.2	0.0	3.9	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.2	0.0	0.1	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.0	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	1.4	0.0	4.0	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		502			168							
Approach Delay, s/veh		1.4			4.0							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.1				3.6				
Green Ext Time (p_c), s				2.5				0.9				

Intersection Summary		
HCM 6th Ctrl Delay		2.0
HCM 6th LOS		A

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	420	248	3	2	2
Future Vol, veh/h	0	420	248	3	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	92	92	60	60
Heavy Vehicles, %	6	6	7	7	0	0
Mvmt Flow	0	467	270	3	3	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	273	0	-	0	506	137
Stage 1	-	-	-	-	272	-
Stage 2	-	-	-	-	234	-
Critical Hdwy	4.22	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.26	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1259	-	-	-	501	893
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	789	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1259	-	-	-	501	893
Mov Cap-2 Maneuver	-	-	-	-	581	-
Stage 1	-	-	-	-	755	-
Stage 2	-	-	-	-	789	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1259	-	-	-	704
HCM Lane V/C Ratio	-	-	-	-	0.009
HCM Control Delay (s)	0	-	-	-	10.2
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	419	248	7	2	3
Future Vol, veh/h	4	419	248	7	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	92	92	60	60
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	4	471	270	8	3	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	278	0	-	0	518	139
Stage 1	-	-	-	-	274	-
Stage 2	-	-	-	-	244	-
Critical Hdwy	4.18	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.24	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1267	-	-	-	492	890
Stage 1	-	-	-	-	753	-
Stage 2	-	-	-	-	780	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1267	-	-	-	491	890
Mov Cap-2 Maneuver	-	-	-	-	573	-
Stage 1	-	-	-	-	751	-
Stage 2	-	-	-	-	780	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1267	-	-	-	729
HCM Lane V/C Ratio	0.004	-	-	-	0.011
HCM Control Delay (s)	7.9	-	-	-	10
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	333	62	27	185	36	57	376	95	17	111	77
Future Volume (veh/h)	240	333	62	27	185	36	57	376	95	17	111	77
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	273	378	70	35	240	47	66	437	110	22	144	100
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	636	1702	312	520	1634	315	385	891	222	221	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1084	2974	546	905	2854	550	1109	2750	687	833	3441	1535
Grp Volume(v), veh/h	273	223	225	35	142	145	66	274	273	22	144	100
Grp Sat Flow(s),veh/h/ln	1084	1763	1757	905	1706	1697	1109	1735	1702	833	1721	1535
Q Serve(g_s), s	19.3	7.6	7.7	2.4	4.7	4.9	5.5	15.5	15.8	2.7	3.6	5.8
Cycle Q Clear(g_c), s	24.2	7.6	7.7	10.1	4.7	4.9	9.1	15.5	15.8	18.4	3.6	5.8
Prop In Lane	1.00		0.31	1.00		0.32	1.00		0.40	1.00		1.00
Lane Grp Cap(c), veh/h	636	1009	1006	520	977	971	385	562	551	221	1114	497
V/C Ratio(X)	0.43	0.22	0.22	0.07	0.15	0.15	0.17	0.49	0.49	0.10	0.13	0.20
Avail Cap(c_a), veh/h	636	1009	1006	520	977	971	385	562	551	221	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	17.9	12.8	12.8	15.3	12.2	12.2	32.4	33.2	33.3	40.7	29.2	29.9
Incr Delay (d2), s/veh	2.1	0.5	0.5	0.2	0.3	0.3	1.0	3.0	3.2	0.9	0.2	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	2.9	2.9	0.5	1.8	1.8	1.5	6.7	6.7	0.6	1.5	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.0	13.3	13.3	15.6	12.5	12.6	33.3	36.2	36.4	41.6	29.4	30.8
LnGrp LOS	B	B	B	B	B	B	C	D	D	D	C	C
Approach Vol, veh/h		721			322			613			266	
Approach Delay, s/veh		15.8			12.9			36.0			31.0	
Approach LOS		B			B			D			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		17.8		26.2		20.4		12.1				
Green Ext Time (p_c), s		3.1		3.8		1.1		1.7				
Intersection Summary												
HCM 6th Ctrl Delay			23.9									
HCM 6th LOS			C									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	415	15	39	259	7	6	0	14	3	0	2
Future Vol, veh/h	4	415	15	39	259	7	6	0	14	3	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	4	461	17	44	291	8	7	0	16	5	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	299	0	0	478	0	0	712	865	239	622	869	150
Stage 1	-	-	-	-	-	-	478	478	-	383	383	-
Stage 2	-	-	-	-	-	-	234	387	-	239	486	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	1224	-	-	1033	-	-	284	256	705	375	292	876
Stage 1	-	-	-	-	-	-	488	506	-	617	616	-
Stage 2	-	-	-	-	-	-	694	560	-	749	554	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1224	-	-	1033	-	-	273	244	705	354	279	876
Mov Cap-2 Maneuver	-	-	-	-	-	-	273	244	-	354	279	-
Stage 1	-	-	-	-	-	-	487	504	-	615	590	-
Stage 2	-	-	-	-	-	-	662	536	-	730	552	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.1	12.9	12.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	478	1224	-	-	1033	-	-	465
HCM Lane V/C Ratio	0.046	0.004	-	-	0.042	-	-	0.018
HCM Control Delay (s)	12.9	8	-	-	8.6	-	-	12.9
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	378	0	0	145	72	0	1512	191	0	0	0
Future Volume (veh/h)	0	378	0	0	145	72	0	1512	191	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	425	0	0	186	92	0	1680	212			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1454	689	0	0	0			
Arrive On Green	0.00	1.00	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	2008	916		0				
Grp Volume(v), veh/h	0	425	0	0	139	139		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1380						
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.9	1.0						
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.9	1.0						
Prop In Lane	0.00		0.00	0.00		0.66						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1038						
V/C Ratio(X)	0.00	0.17	0.00	0.00	0.13	0.13						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1038						
HCM Platoon Ratio	1.00	1.33	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	1.2	1.2						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.2	0.3						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.1	0.1						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.1	0.0	0.0	1.5	1.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		425			278							
Approach Delay, s/veh		0.1			1.5							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.0				3.0				
Green Ext Time (p_c), s				2.5				1.4				

Intersection Summary			
HCM 6th Ctrl Delay			0.7
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	378	133	0	145	0	0	0	0	0	631	177
Future Volume (veh/h)	0	378	133	0	145	0	0	0	0	0	631	177
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	425	149	0	186	0				0	664	186
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	0.25	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	425	149	0	186	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	1.3	1.0	0.0	1.8	0.0						
Cycle Q Clear(g_c), s	0.0	1.3	1.0	0.0	1.8	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.17	0.13	0.00	0.08	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.3	1.2	0.0	4.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.2	0.0	0.1	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.0	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.4	1.5	0.0	4.1	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		574			186							
Approach Delay, s/veh		1.4			4.1							
Approach LOS		A			A							
Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.3				3.8				
Green Ext Time (p_c), s				2.9				1.0				
Intersection Summary												
HCM 6th Ctrl Delay			2.1									
HCM 6th LOS			A									

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	455	12	11	280	3	16	0	19	2	0	2
Future Vol, veh/h	0	455	12	11	280	3	16	0	19	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	6	6	2	2	7	7	2	2	2	0	2	0
Mvmt Flow	0	506	13	12	304	3	17	0	21	3	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	307	0	0	519	0	0	689	844	260	583	849	154
Stage 1	-	-	-	-	-	-	513	513	-	330	330	-
Stage 2	-	-	-	-	-	-	176	331	-	253	519	-
Critical Hdwy	4.22	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.26	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	1222	-	-	1043	-	-	332	298	739	400	296	871
Stage 1	-	-	-	-	-	-	512	534	-	663	644	-
Stage 2	-	-	-	-	-	-	809	644	-	735	531	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1222	-	-	1043	-	-	328	294	739	386	292	871
Mov Cap-2 Maneuver	-	-	-	-	-	-	328	294	-	386	292	-
Stage 1	-	-	-	-	-	-	512	534	-	663	636	-
Stage 2	-	-	-	-	-	-	797	636	-	714	531	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	13.3	11.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	470	1222	-	-	1043	-	-	535
HCM Lane V/C Ratio	0.081	-	-	-	0.011	-	-	0.012
HCM Control Delay (s)	13.3	0	-	-	8.5	-	-	11.8
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	459	13	12	272	7	18	0	20	2	0	3
Future Vol, veh/h	4	459	13	12	272	7	18	0	20	2	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	4	4	2	2	3	3	2	2	2	0	2	0
Mvmt Flow	4	516	14	13	296	8	20	0	22	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	304	0	0	530	0	0	705	861	265	592	864	152
Stage 1	-	-	-	-	-	-	531	531	-	326	326	-
Stage 2	-	-	-	-	-	-	174	330	-	266	538	-
Critical Hdwy	4.18	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.24	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	1239	-	-	1033	-	-	323	292	733	394	291	873
Stage 1	-	-	-	-	-	-	500	524	-	666	647	-
Stage 2	-	-	-	-	-	-	811	644	-	722	521	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1239	-	-	1033	-	-	317	287	733	378	286	873
Mov Cap-2 Maneuver	-	-	-	-	-	-	317	287	-	378	286	-
Stage 1	-	-	-	-	-	-	499	522	-	664	639	-
Stage 2	-	-	-	-	-	-	796	636	-	698	519	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.4	13.8	11.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	452	1239	-	-	1033	-	-	573
HCM Lane V/C Ratio	0.091	0.004	-	-	0.013	-	-	0.015
HCM Control Delay (s)	13.8	7.9	-	-	8.5	-	-	11.4
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0

Intersection						
Int Delay, s/veh	0.8					
Movement	**EBT**	**EBR**	**WBL**	**WBT**	**NBL**	**NBR**
Lane Configurations						
Traffic Vol, veh/h	465	16	14	284	19	30
Future Vol, veh/h	465	16	14	284	19	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	505	17	15	309	21	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	522	0	699	261
Stage 1	-	-	-	-	514	-
Stage 2	-	-	-	-	185	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1041	-	374	738
Stage 1	-	-	-	-	565	-
Stage 2	-	-	-	-	828	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1041	-	369	738
Mov Cap-2 Maneuver	-	-	-	-	461	-
Stage 1	-	-	-	-	565	-
Stage 2	-	-	-	-	816	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	11.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	599	-	-	1041	-
HCM Lane V/C Ratio	0.089	-	-	0.015	-
HCM Control Delay (s)	11.6	-	-	8.5	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	368	62	33	219	44	57	376	105	17	111	79
Future Volume (veh/h)	240	368	62	33	219	44	57	376	105	17	111	79
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	273	418	70	43	284	57	66	437	122	22	144	103
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	599	1731	288	498	1625	322	384	869	241	216	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1031	3025	503	872	2840	562	1106	2684	743	823	3441	1535
Grp Volume(v), veh/h	273	242	246	43	169	172	66	281	278	22	144	103
Grp Sat Flow(s),veh/h/ln	1031	1763	1765	872	1706	1695	1106	1735	1692	823	1721	1535
Q Serve(g_s), s	21.0	8.3	8.5	3.2	5.7	5.9	5.5	16.0	16.3	2.7	3.6	5.9
Cycle Q Clear(g_c), s	26.9	8.3	8.5	11.6	5.7	5.9	9.1	16.0	16.3	19.0	3.6	5.9
Prop In Lane	1.00		0.28	1.00		0.33	1.00		0.44	1.00		1.00
Lane Grp Cap(c), veh/h	599	1009	1010	498	977	970	384	562	548	216	1114	497
V/C Ratio(X)	0.46	0.24	0.24	0.09	0.17	0.18	0.17	0.50	0.51	0.10	0.13	0.21
Avail Cap(c_a), veh/h	599	1009	1010	498	977	970	384	562	548	216	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.8	13.0	13.0	15.9	12.4	12.4	32.4	33.4	33.5	41.1	29.2	30.0
Incr Delay (d2), s/veh	2.5	0.6	0.6	0.3	0.4	0.4	1.0	3.2	3.3	0.9	0.2	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	3.2	3.2	0.6	2.1	2.2	1.5	6.9	6.9	0.6	1.5	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.3	13.5	13.6	16.2	12.8	12.8	33.4	36.5	36.8	42.1	29.4	30.9
LnGrp LOS	C	B	B	B	B	B	C	D	D	D	C	C
Approach Vol, veh/h		761			384			625			269	
Approach Delay, s/veh		16.3			13.2			36.3			31.0	
Approach LOS		B			B			D			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		18.3		28.9		21.0		13.6				
Green Ext Time (p_c), s		3.2		4.2		1.1		2.1				

Intersection Summary			
HCM 6th Ctrl Delay			23.8
HCM 6th LOS			C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	489	15	39	290	7	6	0	14	3	0	2
Future Vol, veh/h	4	489	15	39	290	7	6	0	14	3	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	4	543	17	44	326	8	7	0	16	5	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	334	0	0	560	0	0	811	982	280	698	986	167
Stage 1	-	-	-	-	-	-	560	560	-	418	418	-
Stage 2	-	-	-	-	-	-	251	422	-	280	568	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	1187	-	-	960	-	-	239	216	661	331	250	854
Stage 1	-	-	-	-	-	-	433	462	-	588	594	-
Stage 2	-	-	-	-	-	-	677	539	-	709	510	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1187	-	-	960	-	-	229	205	661	311	238	854
Mov Cap-2 Maneuver	-	-	-	-	-	-	229	205	-	311	238	-
Stage 1	-	-	-	-	-	-	432	461	-	586	567	-
Stage 2	-	-	-	-	-	-	643	514	-	690	508	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1	14	13.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	422	1187	-	-	960	-	-	417
HCM Lane V/C Ratio	0.053	0.004	-	-	0.046	-	-	0.02
HCM Control Delay (s)	14	8	-	-	8.9	-	-	13.8
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	332	0	0	136	72	0	1512	191	0	0	0
Future Volume (veh/h)	0	332	0	0	136	72	0	1512	191	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	373	0	0	174	92	0	1680	212			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1421	717	0	0	0			
Arrive On Green	0.00	1.00	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	1965	953		0				
Grp Volume(v), veh/h	0	373	0	0	133	133		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1373						
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.9	1.0						
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.9	1.0						
Prop In Lane	0.00		0.00	0.00		0.69						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1033						
V/C Ratio(X)	0.00	0.15	0.00	0.00	0.12	0.13						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1033						
HCM Platoon Ratio	1.00	1.33	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	1.2	1.2						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.2	0.3						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.1	0.1						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.1	0.0	0.0	1.4	1.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		373			266							
Approach Delay, s/veh		0.1			1.5							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.0				3.0				
Green Ext Time (p_c), s				2.1				1.3				

Intersection Summary			
HCM 6th Ctrl Delay			0.7
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	332	124	0	136	0	0	0	0	0	631	166
Future Volume (veh/h)	0	332	124	0	136	0	0	0	0	0	631	166
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	373	139	0	174	0				0	664	175
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	0.25	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	373	139	0	174	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	1.1	0.9	0.0	1.6	0.0						
Cycle Q Clear(g_c), s	0.0	1.1	0.9	0.0	1.6	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.15	0.12	0.00	0.08	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.2	0.0	4.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.2	0.0	0.1	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.0	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.4	1.4	0.0	4.0	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		512			174							
Approach Delay, s/veh		1.4			4.0							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.1				3.6				
Green Ext Time (p_c), s				2.6				0.9				

Intersection Summary			
HCM 6th Ctrl Delay			2.0
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	431	5	4	251	3	2	0	3	2	0	2
Future Vol, veh/h	0	431	5	4	251	3	2	0	3	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	6	6	2	2	7	7	2	2	2	0	2	0
Mvmt Flow	0	479	5	4	273	3	2	0	3	3	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	276	0	0	484	0	0	627	766	242	523	767	138
Stage 1	-	-	-	-	-	-	482	482	-	283	283	-
Stage 2	-	-	-	-	-	-	145	284	-	240	484	-
Critical Hdwy	4.22	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.26	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	1255	-	-	1075	-	-	368	331	759	441	331	891
Stage 1	-	-	-	-	-	-	534	552	-	706	676	-
Stage 2	-	-	-	-	-	-	843	675	-	748	550	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1255	-	-	1075	-	-	365	330	759	438	330	891
Mov Cap-2 Maneuver	-	-	-	-	-	-	365	330	-	438	330	-
Stage 1	-	-	-	-	-	-	534	552	-	706	673	-
Stage 2	-	-	-	-	-	-	837	672	-	745	550	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	11.9	11.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	530	1255	-	-	1075	-	-	587
HCM Lane V/C Ratio	0.01	-	-	-	0.004	-	-	0.011
HCM Control Delay (s)	11.9	0	-	-	8.4	-	-	11.2
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection												
Int Delay, s/veh	0.3											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	428	5	4	254	7	2	0	3	2	0	3
Future Vol, veh/h	4	428	5	4	254	7	2	0	3	2	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	4	4	2	2	3	3	2	2	2	0	2	0
Mvmt Flow	4	481	5	4	276	8	2	0	3	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	284	0	0	486	0	0	638	784	243	537	782	142
Stage 1	-	-	-	-	-	-	492	492	-	288	288	-
Stage 2	-	-	-	-	-	-	146	292	-	249	494	-
Critical Hdwy	4.18	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.24	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	1261	-	-	1073	-	-	361	323	758	431	324	886
Stage 1	-	-	-	-	-	-	527	546	-	701	672	-
Stage 2	-	-	-	-	-	-	842	670	-	739	545	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1261	-	-	1073	-	-	357	321	758	427	322	886
Mov Cap-2 Maneuver	-	-	-	-	-	-	357	321	-	427	322	-
Stage 1	-	-	-	-	-	-	525	544	-	699	669	-
Stage 2	-	-	-	-	-	-	834	667	-	733	543	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	12	10.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	523	1261	-	-	1073	-	-	620
HCM Lane V/C Ratio	0.01	0.004	-	-	0.004	-	-	0.013
HCM Control Delay (s)	12	7.9	-	-	8.4	-	-	10.9
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	429	5	4	274	3	7
Future Vol, veh/h	429	5	4	274	3	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	466	5	4	298	3	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	471	0	626	236
Stage 1	-	-	-	-	469	-
Stage 2	-	-	-	-	157	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1087	-	416	766
Stage 1	-	-	-	-	596	-
Stage 2	-	-	-	-	855	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1087	-	414	766
Mov Cap-2 Maneuver	-	-	-	-	495	-
Stage 1	-	-	-	-	596	-
Stage 2	-	-	-	-	852	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	658	-	-	1087	-
HCM Lane V/C Ratio	0.017	-	-	0.004	-
HCM Control Delay (s)	10.6	-	-	8.3	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	345	62	28	188	37	57	376	98	17	111	78
Future Volume (veh/h)	240	345	62	28	188	37	57	376	98	17	111	78
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	273	392	70	36	244	48	66	437	114	22	144	101
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	632	1713	303	512	1632	316	385	883	228	219	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1079	2993	530	893	2852	552	1108	2728	706	830	3441	1535
Grp Volume(v), veh/h	273	230	232	36	144	148	66	277	274	22	144	101
Grp Sat Flow(s),veh/h/ln	1079	1763	1760	893	1706	1697	1108	1735	1699	830	1721	1535
Q Serve(g_s), s	19.4	7.8	8.0	2.5	4.8	5.0	5.5	15.7	15.9	2.7	3.6	5.8
Cycle Q Clear(g_c), s	24.4	7.8	8.0	10.5	4.8	5.0	9.1	15.7	15.9	18.6	3.6	5.8
Prop In Lane	1.00		0.30	1.00		0.33	1.00		0.42	1.00		1.00
Lane Grp Cap(c), veh/h	632	1009	1007	512	977	971	385	562	550	219	1114	497
V/C Ratio(X)	0.43	0.23	0.23	0.07	0.15	0.15	0.17	0.49	0.50	0.10	0.13	0.20
Avail Cap(c_a), veh/h	632	1009	1007	512	977	971	385	562	550	219	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.0	12.9	12.9	15.5	12.2	12.2	32.4	33.3	33.3	40.9	29.2	29.9
Incr Delay (d2), s/veh	2.1	0.5	0.5	0.3	0.3	0.3	1.0	3.1	3.2	0.9	0.2	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	3.0	3.0	0.5	1.8	1.8	1.5	6.8	6.8	0.6	1.5	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.1	13.4	13.4	15.7	12.5	12.6	33.4	36.3	36.6	41.8	29.4	30.9
LnGrp LOS	C	B	B	B	B	B	C	D	D	D	C	C
Approach Vol, veh/h		735			328			617			267	
Approach Delay, s/veh		15.9			12.9			36.1			31.0	
Approach LOS		B			B			D			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		17.9		26.4		20.6		12.5				
Green Ext Time (p_c), s		3.2		3.9		1.1		1.7				
Intersection Summary												
HCM 6th Ctrl Delay			23.9									
HCM 6th LOS			C									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	430	15	39	270	7	6	0	14	3	0	2
Future Vol, veh/h	4	430	15	39	270	7	6	0	14	3	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	4	478	17	44	303	8	7	0	16	5	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	311	0	0	495	0	0	735	894	248	642	898	156
Stage 1	-	-	-	-	-	-	495	495	-	395	395	-
Stage 2	-	-	-	-	-	-	240	399	-	247	503	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	1211	-	-	1017	-	-	273	246	695	363	281	868
Stage 1	-	-	-	-	-	-	476	497	-	607	608	-
Stage 2	-	-	-	-	-	-	688	553	-	741	545	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1211	-	-	1017	-	-	262	235	695	342	268	868
Mov Cap-2 Maneuver	-	-	-	-	-	-	262	235	-	342	268	-
Stage 1	-	-	-	-	-	-	475	496	-	605	582	-
Stage 2	-	-	-	-	-	-	656	529	-	722	543	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.1	13.1	13.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	465	1211	-	-	1017	-	-	451
HCM Lane V/C Ratio	0.048	0.004	-	-	0.043	-	-	0.018
HCM Control Delay (s)	13.1	8	-	-	8.7	-	-	13.1
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	353	62	29	214	39	57	376	101	78	111	17
Future Volume (veh/h)	240	353	62	29	214	39	57	376	101	78	111	17
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	273	401	70	38	278	51	66	437	117	101	144	22
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	607	1720	298	507	1652	299	409	878	233	218	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1043	3004	520	886	2886	522	1191	2711	720	827	3441	1535
Grp Volume(v), veh/h	273	234	237	38	163	166	66	278	276	101	144	22
Grp Sat Flow(s),veh/h/ln	1043	1763	1762	886	1706	1702	1191	1735	1696	827	1721	1535
Q Serve(g_s), s	20.6	8.0	8.1	2.7	5.5	5.7	5.1	15.8	16.1	13.7	3.6	1.2
Cycle Q Clear(g_c), s	26.2	8.0	8.1	10.8	5.5	5.7	8.7	15.8	16.1	29.8	3.6	1.2
Prop In Lane	1.00		0.30	1.00		0.31	1.00		0.42	1.00		1.00
Lane Grp Cap(c), veh/h	607	1009	1008	507	977	974	409	562	549	218	1114	497
V/C Ratio(X)	0.45	0.23	0.24	0.07	0.17	0.17	0.16	0.50	0.50	0.46	0.13	0.04
Avail Cap(c_a), veh/h	607	1009	1008	507	977	974	409	562	549	218	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.6	12.9	12.9	15.6	12.4	12.4	32.2	33.3	33.4	45.4	29.2	28.4
Incr Delay (d2), s/veh	2.4	0.5	0.5	0.3	0.4	0.4	0.8	3.1	3.3	6.9	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	3.1	3.1	0.6	2.0	2.1	1.5	6.9	6.8	3.1	1.5	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.0	13.4	13.5	15.9	12.7	12.8	33.1	36.4	36.6	52.3	29.4	28.5
LnGrp LOS	C	B	B	B	B	B	C	D	D	D	C	C
Approach Vol, veh/h		744			367			620			267	
Approach Delay, s/veh		16.2			13.1			36.2			38.0	
Approach LOS		B			B			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		18.1		28.2		31.8		12.8				
Green Ext Time (p_c), s		3.1		4.0		0.8		2.0				
Intersection Summary												
HCM 6th Ctrl Delay			24.7									
HCM 6th LOS			C									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	344	127	0	139	0	0	0	0	0	631	170
Future Volume (veh/h)	0	344	127	0	139	0	0	0	0	0	631	170
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	387	143	0	178	0				0	664	179
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	0.25	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	387	143	0	178	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	1.1	0.9	0.0	1.7	0.0						
Cycle Q Clear(g_c), s	0.0	1.1	0.9	0.0	1.7	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.15	0.12	0.00	0.08	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.2	0.0	4.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.2	0.0	0.1	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.0	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.4	1.4	0.0	4.0	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		530			178							
Approach Delay, s/veh		1.4			4.0							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.1				3.7				
Green Ext Time (p_c), s				2.7				0.9				

Intersection Summary		
HCM 6th Ctrl Delay		2.1
HCM 6th LOS		A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	378	0	0	145	72	0	1512	191	0	0	0
Future Volume (veh/h)	0	378	0	0	145	72	0	1512	191	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	425	0	0	186	92	0	1680	212			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1454	689	0	0	0			
Arrive On Green	0.00	1.00	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	2008	916		0				
Grp Volume(v), veh/h	0	425	0	0	139	139		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1380						
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.9	1.0						
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.9	1.0						
Prop In Lane	0.00		0.00	0.00		0.66						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1038						
V/C Ratio(X)	0.00	0.17	0.00	0.00	0.13	0.13						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1038						
HCM Platoon Ratio	1.00	1.33	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	1.2	1.2						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.2	0.3						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.1	0.1						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.1	0.0	0.0	1.5	1.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		425			278							
Approach Delay, s/veh		0.1			1.5							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.0				3.0				
Green Ext Time (p_c), s				2.5				1.4				

Intersection Summary			
HCM 6th Ctrl Delay			0.7
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	344	127	0	139	0	0	0	0	0	631	170
Future Volume (veh/h)	0	344	127	0	139	0	0	0	0	0	631	170
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	387	143	0	178	0				0	664	179
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	0.25	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	387	143	0	178	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	1.1	0.9	0.0	1.7	0.0						
Cycle Q Clear(g_c), s	0.0	1.1	0.9	0.0	1.7	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.15	0.12	0.00	0.08	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.2	0.0	4.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.2	0.0	0.1	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.0	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.4	1.4	0.0	4.0	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		530			178							
Approach Delay, s/veh		1.4			4.0							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.1				3.7				
Green Ext Time (p_c), s				2.7				0.9				

Intersection Summary				
HCM 6th Ctrl Delay			2.1	
HCM 6th LOS			A	

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	435	12	11	266	3	16	0	19	2	0	2
Future Vol, veh/h	0	435	12	11	266	3	16	0	19	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	6	6	2	2	7	7	2	2	2	0	2	0
Mvmt Flow	0	483	13	12	289	3	17	0	21	3	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	292	0	0	496	0	0	659	806	248	557	811	146
Stage 1	-	-	-	-	-	-	490	490	-	315	315	-
Stage 2	-	-	-	-	-	-	169	316	-	242	496	-
Critical Hdwy	4.22	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.26	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	1238	-	-	1064	-	-	349	314	752	417	312	881
Stage 1	-	-	-	-	-	-	529	547	-	676	654	-
Stage 2	-	-	-	-	-	-	816	654	-	746	544	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1238	-	-	1064	-	-	345	311	752	402	309	881
Mov Cap-2 Maneuver	-	-	-	-	-	-	345	311	-	402	309	-
Stage 1	-	-	-	-	-	-	529	547	-	676	647	-
Stage 2	-	-	-	-	-	-	804	647	-	726	544	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	13	11.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	489	1238	-	-	1064	-	-	552
HCM Lane V/C Ratio	0.078	-	-	-	0.011	-	-	0.012
HCM Control Delay (s)	13	0	-	-	8.4	-	-	11.6
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	446	6	6	275	7	2	0	2	2	0	3
Future Vol, veh/h	4	446	6	6	275	7	2	0	2	2	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	4	4	2	2	3	3	2	2	2	0	2	0
Mvmt Flow	4	501	7	7	299	8	2	0	2	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	307	0	0	508	0	0	677	834	254	576	833	154
Stage 1	-	-	-	-	-	-	513	513	-	317	317	-
Stage 2	-	-	-	-	-	-	164	321	-	259	516	-
Critical Hdwy	4.18	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.24	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	1236	-	-	1053	-	-	339	302	745	405	303	871
Stage 1	-	-	-	-	-	-	512	534	-	674	653	-
Stage 2	-	-	-	-	-	-	822	650	-	729	533	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1236	-	-	1053	-	-	335	299	745	401	300	871
Mov Cap-2 Maneuver	-	-	-	-	-	-	335	299	-	401	300	-
Stage 1	-	-	-	-	-	-	510	532	-	672	648	-
Stage 2	-	-	-	-	-	-	812	645	-	725	531	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	12.9	11.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	462	1236	-	-	1053	-	-	593
HCM Lane V/C Ratio	0.009	0.004	-	-	0.006	-	-	0.014
HCM Control Delay (s)	12.9	7.9	-	-	8.4	-	-	11.2
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection						
Int Delay, s/veh	0.7					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↱		↰	↑↑	Y	
Traffic Vol, veh/h	446	5	4	281	19	24
Future Vol, veh/h	446	5	4	281	19	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	485	5	4	305	21	26

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	490	0	649	245
Stage 1	-	-	-	-	488	-
Stage 2	-	-	-	-	161	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1070	-	402	755
Stage 1	-	-	-	-	583	-
Stage 2	-	-	-	-	851	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1070	-	400	755
Mov Cap-2 Maneuver	-	-	-	-	484	-
Stage 1	-	-	-	-	583	-
Stage 2	-	-	-	-	848	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.4
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	605	-	-	1070	-
HCM Lane V/C Ratio	0.077	-	-	0.004	-
HCM Control Delay (s)	11.4	-	-	8.4	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	240	353	62	29	214	39	57	376	101	17	111	78
Future Volume (veh/h)	240	353	62	29	214	39	57	376	101	17	111	78
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	273	401	70	38	278	51	66	437	117	22	144	101
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	607	1720	298	507	1652	299	385	878	233	218	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1043	3004	520	886	2886	522	1108	2711	720	827	3441	1535
Grp Volume(v), veh/h	273	234	237	38	163	166	66	278	276	22	144	101
Grp Sat Flow(s),veh/h/ln	1043	1763	1762	886	1706	1702	1108	1735	1696	827	1721	1535
Q Serve(g_s), s	20.6	8.0	8.1	2.7	5.5	5.7	5.5	15.8	16.1	2.7	3.6	5.8
Cycle Q Clear(g_c), s	26.2	8.0	8.1	10.8	5.5	5.7	9.1	15.8	16.1	18.8	3.6	5.8
Prop In Lane	1.00		0.30	1.00		0.31	1.00		0.42	1.00		1.00
Lane Grp Cap(c), veh/h	607	1009	1008	507	977	974	385	562	549	218	1114	497
V/C Ratio(X)	0.45	0.23	0.24	0.07	0.17	0.17	0.17	0.50	0.50	0.10	0.13	0.20
Avail Cap(c_a), veh/h	607	1009	1008	507	977	974	385	562	549	218	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.6	12.9	12.9	15.6	12.4	12.4	32.4	33.3	33.4	41.0	29.2	29.9
Incr Delay (d2), s/veh	2.4	0.5	0.5	0.3	0.4	0.4	1.0	3.1	3.3	0.9	0.2	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.0	3.1	3.1	0.6	2.0	2.1	1.5	6.9	6.8	0.6	1.5	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.0	13.4	13.5	15.9	12.7	12.8	33.4	36.4	36.6	41.9	29.4	30.9
LnGrp LOS	C	B	B	B	B	B	C	D	D	D	C	C
Approach Vol, veh/h		744			367			620			267	
Approach Delay, s/veh		16.2			13.1			36.2			31.0	
Approach LOS		B			B			D			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	46.0	76.3	46.0	76.3
Change Period (Y+Rc), s	* 6.4	* 6.3	* 6.4	* 6.3
Max Green Setting (Gmax), s	* 40	* 70	* 40	* 49
Max Q Clear Time (g_c+I1), s	18.1	28.2	20.8	12.8
Green Ext Time (p_c), s	3.2	4.0	1.1	2.0

Intersection Summary	
HCM 6th Ctrl Delay	23.8
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	464	15	39	277	7	6	0	14	3	0	2
Future Vol, veh/h	4	464	15	39	277	7	6	0	14	3	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	4	516	17	44	311	8	7	0	16	5	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	319	0	0	533	0	0	777	940	267	669	944	160
Stage 1	-	-	-	-	-	-	533	533	-	403	403	-
Stage 2	-	-	-	-	-	-	244	407	-	266	541	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	1202	-	-	984	-	-	254	230	674	347	264	863
Stage 1	-	-	-	-	-	-	450	476	-	601	603	-
Stage 2	-	-	-	-	-	-	684	548	-	722	524	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1202	-	-	984	-	-	244	219	674	327	251	863
Mov Cap-2 Maneuver	-	-	-	-	-	-	244	219	-	327	251	-
Stage 1	-	-	-	-	-	-	449	475	-	599	576	-
Stage 2	-	-	-	-	-	-	651	523	-	703	522	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.1	13.6	13.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	441	1202	-	-	984	-	-	435
HCM Lane V/C Ratio	0.05	0.004	-	-	0.045	-	-	0.019
HCM Control Delay (s)	13.6	8	-	-	8.8	-	-	13.4
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↱			↑↑	↱			
Traffic Volume (veh/h)	0	212	0	0	472	140	0	852	77	0	0	0
Future Volume (veh/h)	0	212	0	0	472	140	0	852	77	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1811	0	0	1856	1856	0	1767	1767			
Adj Flow Rate, veh/h	0	259	0	0	613	182	0	968	88			
Peak Hour Factor	0.82	0.82	0.82	0.77	0.77	0.77	0.88	0.88	0.88			
Percent Heavy Veh, %	0	6	0	0	3	3	0	9	9			
Cap, veh/h	0	2590	0	0	2018	598	0	0	0			
Arrive On Green	0.00	0.75	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3622	0	0	2774	795		0				
Grp Volume(v), veh/h	0	259	0	0	403	392		0.0				
Grp Sat Flow(s),veh/h/ln	0	1721	0	0	1763	1713						
Q Serve(g_s), s	0.0	0.7	0.0	0.0	2.6	2.6						
Cycle Q Clear(g_c), s	0.0	0.7	0.0	0.0	2.6	2.6						
Prop In Lane	0.00		0.00	0.00		0.46						
Lane Grp Cap(c), veh/h	0	2590	0	0	1327	1289						
V/C Ratio(X)	0.00	0.10	0.00	0.00	0.30	0.30						
Avail Cap(c_a), veh/h	0	2590	0	0	1327	1289						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	1.2	0.0	0.0	1.4	1.4						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.6	0.6						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.2	0.2						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	0.0	0.0	2.0	2.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		259			795							
Approach Delay, s/veh		1.3			2.0							
Approach LOS		A			A							
Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.7				4.6				
Green Ext Time (p_c), s				1.4				4.5				

Intersection Summary	
HCM 6th Ctrl Delay	1.8
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	212	179	0	472	0	0	0	0	0	1486	133
Future Volume (veh/h)	0	212	179	0	472	0	0	0	0	0	1486	133
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	0	1856	0				0	1841	1841
Adj Flow Rate, veh/h	0	259	218	0	613	0				0	1581	141
Peak Hour Factor	0.82	0.82	0.82	0.77	0.77	0.77				0.94	0.94	0.94
Percent Heavy Veh, %	0	6	6	0	3	0				0	4	4
Cap, veh/h	0	2590	1155	0	2654	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	1.00	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3532	1535	0	3711	0					0	
Grp Volume(v), veh/h	0	259	218	0	613	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1721	1535	0	1763	0						
Q Serve(g_s), s	0.0	0.7	1.5	0.0	0.0	0.0						
Cycle Q Clear(g_c), s	0.0	0.7	1.5	0.0	0.0	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2590	1155	0	2654	0						
V/C Ratio(X)	0.00	0.10	0.19	0.00	0.23	0.00						
Avail Cap(c_a), veh/h	0	2590	1155	0	2654	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.3	0.0	0.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.4	0.0	0.2	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.1	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	1.6	0.0	0.2	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		477			613							
Approach Delay, s/veh		1.4			0.2							
Approach LOS		A			A							
Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.5				2.0				
Green Ext Time (p_c), s				2.1				3.8				
Intersection Summary												
HCM 6th Ctrl Delay			0.7									
HCM 6th LOS			A									

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection						
Int Delay, s/veh	0					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	335	640	2	0	0
Future Vol, veh/h	2	335	640	2	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	80	80	87	87	60	60
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	3	419	736	2	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	738	0	-	0	953	369
Stage 1	-	-	-	-	737	-
Stage 2	-	-	-	-	216	-
Critical Hdwy	4.18	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.24	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	851	-	-	-	261	634
Stage 1	-	-	-	-	439	-
Stage 2	-	-	-	-	805	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	851	-	-	-	260	634
Mov Cap-2 Maneuver	-	-	-	-	359	-
Stage 1	-	-	-	-	437	-
Stage 2	-	-	-	-	805	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	851	-	-	-	-
HCM Lane V/C Ratio	0.003	-	-	-	-
HCM Control Delay (s)	9.2	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0.1					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	335	631	2	2	3
Future Vol, veh/h	2	335	631	2	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	84	84	60	60
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	2	404	751	2	3	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	753	0	-	0	958	377
Stage 1	-	-	-	-	752	-
Stage 2	-	-	-	-	206	-
Critical Hdwy	4.18	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.24	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	840	-	-	-	259	626
Stage 1	-	-	-	-	432	-
Stage 2	-	-	-	-	814	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	840	-	-	-	258	626
Mov Cap-2 Maneuver	-	-	-	-	356	-
Stage 1	-	-	-	-	431	-
Stage 2	-	-	-	-	814	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	12.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	840	-	-	-	480
HCM Lane V/C Ratio	0.003	-	-	-	0.017
HCM Control Delay (s)	9.3	-	-	-	12.6
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	237	100	168	452	23	82	230	55	28	450	294
Future Volume (veh/h)	126	237	100	168	452	23	82	230	55	28	450	294
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1856	1856	1856	1900	1900	1900	1870	1870	1870
Adj Flow Rate, veh/h	142	266	112	193	520	26	93	261	62	34	542	354
Peak Hour Factor	0.89	0.89	0.89	0.87	0.87	0.87	0.88	0.88	0.88	0.83	0.83	0.83
Percent Heavy Veh, %	4	4	4	3	3	3	0	0	0	2	2	2
Cap, veh/h	479	1385	568	575	1956	98	186	941	219	329	1151	513
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	847	2419	992	997	3417	171	631	2905	678	1057	3554	1585
Grp Volume(v), veh/h	142	190	188	193	268	278	93	160	163	34	542	354
Grp Sat Flow(s),veh/h/ln	847	1749	1662	997	1763	1825	631	1805	1778	1057	1777	1585
Q Serve(g_s), s	12.4	6.4	6.7	14.2	9.4	9.4	16.9	8.1	8.3	3.0	14.9	23.8
Cycle Q Clear(g_c), s	21.8	6.4	6.7	20.8	9.4	9.4	31.7	8.1	8.3	11.4	14.9	23.8
Prop In Lane	1.00		0.60	1.00		0.09	1.00		0.38	1.00		1.00
Lane Grp Cap(c), veh/h	479	1001	951	575	1009	1044	186	584	576	329	1151	513
V/C Ratio(X)	0.30	0.19	0.20	0.34	0.27	0.27	0.50	0.27	0.28	0.10	0.47	0.69
Avail Cap(c_a), veh/h	479	1001	951	575	1009	1044	186	584	576	329	1151	513
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.7	12.5	12.6	17.6	13.2	13.2	45.7	30.7	30.8	35.0	33.0	36.0
Incr Delay (d2), s/veh	1.6	0.4	0.5	1.6	0.6	0.6	9.2	1.2	1.2	0.6	1.4	7.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	2.4	2.4	3.3	3.6	3.7	3.0	3.6	3.6	0.8	6.4	9.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.3	13.0	13.1	19.2	13.8	13.8	54.9	31.8	32.0	35.6	34.4	43.4
LnGrp LOS	C	B	B	B	B	B	D	C	C	D	C	D
Approach Vol, veh/h		520			739			416			930	
Approach Delay, s/veh		15.0			15.2			37.1			37.9	
Approach LOS		B			B			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		33.7		23.8		25.8		22.8				
Green Ext Time (p_c), s		1.2		3.1		3.9		3.9				

Intersection Summary		
HCM 6th Ctrl Delay		26.7
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	336	3	12	623	3	14	0	32	2	0	2
Future Vol, veh/h	0	336	3	12	623	3	14	0	32	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	79	79	79	78	78	78	60	60	60
Heavy Vehicles, %	5	5	5	3	3	3	9	9	9	0	0	0
Mvmt Flow	0	405	4	15	789	4	18	0	41	3	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	793	0	0	409	0	0	832	1230	205	1024	1230	397
Stage 1	-	-	-	-	-	-	407	407	-	821	821	-
Stage 2	-	-	-	-	-	-	425	823	-	203	409	-
Critical Hdwy	4.2	-	-	4.16	-	-	7.68	6.68	7.08	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.68	5.68	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.68	5.68	-	6.5	5.5	-
Follow-up Hdwy	2.25	-	-	2.23	-	-	3.59	4.09	3.39	3.5	4	3.3
Pot Cap-1 Maneuver	804	-	-	1139	-	-	250	167	780	192	179	608
Stage 1	-	-	-	-	-	-	573	578	-	339	391	-
Stage 2	-	-	-	-	-	-	559	370	-	786	600	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	804	-	-	1139	-	-	246	165	780	180	177	608
Mov Cap-2 Maneuver	-	-	-	-	-	-	246	165	-	180	177	-
Stage 1	-	-	-	-	-	-	573	578	-	339	386	-
Stage 2	-	-	-	-	-	-	549	365	-	745	600	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	13.8	18.3
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	470	804	-	-	1139	-	-	278
HCM Lane V/C Ratio	0.125	-	-	-	0.013	-	-	0.024
HCM Control Delay (s)	13.8	0	-	-	8.2	-	-	18.3
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↱			↑↑	↱			
Traffic Volume (veh/h)	0	252	0	0	488	140	0	852	77	0	0	0
Future Volume (veh/h)	0	252	0	0	488	140	0	852	77	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	283	0	0	626	179	0	947	86			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1696	484	0	0	0			
Arrive On Green	0.00	1.00	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	2330	643		0				
Grp Volume(v), veh/h	0	283	0	0	407	398		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1429						
Q Serve(g_s), s	0.0	0.0	0.0	0.0	3.4	3.4						
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	3.4	3.4						
Prop In Lane	0.00		0.00	0.00		0.45						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1075						
V/C Ratio(X)	0.00	0.11	0.00	0.00	0.37	0.37						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1075						
HCM Platoon Ratio	1.00	1.33	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	1.5	1.5						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.9	1.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.3	0.3						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.1	0.0	0.0	2.5	2.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		283			805							
Approach Delay, s/veh		0.1			2.5							
Approach LOS		A			A							
Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.0				5.4				
Green Ext Time (p_c), s				1.6				4.7				
Intersection Summary												
HCM 6th Ctrl Delay			1.9									
HCM 6th LOS			A									

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
6: 52nd St & Broadmoor Ave SB 11/18/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	252	186	0	488	0	0	0	0	0	1486	152
Future Volume (veh/h)	0	252	186	0	488	0	0	0	0	0	1486	152
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	283	209	0	626	0				0	1564	160
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	1.00	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	283	209	0	626	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	0.8	1.4	0.0	0.0	0.0						
Cycle Q Clear(g_c), s	0.0	0.8	1.4	0.0	0.0	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.11	0.18	0.00	0.28	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.3	0.0	0.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.4	0.0	0.3	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.1	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	1.6	0.0	0.3	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		492			626							
Approach Delay, s/veh		1.4			0.3							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.4				2.0				
Green Ext Time (p_c), s				2.2				4.0				

Intersection Summary		
HCM 6th Ctrl Delay		0.8
HCM 6th LOS		A

Notes
User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	374	14	12	661	2	12	0	14	0	0	0
Future Vol, veh/h	2	374	14	12	661	2	12	0	14	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	6	6	2	2	7	7	2	2	2	0	2	0
Mvmt Flow	2	416	15	13	718	2	13	0	15	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	720	0	0	431	0	0	813	1174	216	957	1180	360
Stage 1	-	-	-	-	-	-	428	428	-	745	745	-
Stage 2	-	-	-	-	-	-	385	746	-	212	435	-
Critical Hdwy	4.22	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.26	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	851	-	-	1125	-	-	270	190	789	215	189	642
Stage 1	-	-	-	-	-	-	575	583	-	377	419	-
Stage 2	-	-	-	-	-	-	610	419	-	776	579	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	851	-	-	1125	-	-	267	187	789	209	186	642
Mov Cap-2 Maneuver	-	-	-	-	-	-	267	187	-	209	186	-
Stage 1	-	-	-	-	-	-	574	582	-	376	414	-
Stage 2	-	-	-	-	-	-	603	414	-	759	578	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	14.3	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	415	851	-	-	1125	-	-	-
HCM Lane V/C Ratio	0.068	0.003	-	-	0.012	-	-	-
HCM Control Delay (s)	14.3	9.2	-	-	8.2	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	373	15	13	651	2	13	0	15	2	0	3
Future Vol, veh/h	2	373	15	13	651	2	13	0	15	2	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	4	4	2	2	3	3	2	2	2	0	2	0
Mvmt Flow	2	419	16	14	708	2	14	0	16	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	710	0	0	435	0	0	813	1169	218	951	1176	355
Stage 1	-	-	-	-	-	-	431	431	-	737	737	-
Stage 2	-	-	-	-	-	-	382	738	-	214	439	-
Critical Hdwy	4.18	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.24	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	872	-	-	1121	-	-	270	192	786	217	190	647
Stage 1	-	-	-	-	-	-	573	581	-	381	423	-
Stage 2	-	-	-	-	-	-	612	422	-	774	576	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	872	-	-	1121	-	-	265	189	786	210	187	647
Mov Cap-2 Maneuver	-	-	-	-	-	-	265	189	-	210	187	-
Stage 1	-	-	-	-	-	-	572	580	-	380	418	-
Stage 2	-	-	-	-	-	-	600	417	-	756	575	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	14.5	15.4
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	411	872	-	-	1121	-	-	353
HCM Lane V/C Ratio	0.074	0.003	-	-	0.013	-	-	0.024
HCM Control Delay (s)	14.5	9.1	-	-	8.3	-	-	15.4
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	372	18	16	658	14	28
Future Vol, veh/h	372	18	16	658	14	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	404	20	17	715	15	30

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	424	0	806	212
Stage 1	-	-	-	-	414	-
Stage 2	-	-	-	-	392	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1132	-	320	793
Stage 1	-	-	-	-	635	-
Stage 2	-	-	-	-	652	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1132	-	315	793
Mov Cap-2 Maneuver	-	-	-	-	435	-
Stage 1	-	-	-	-	635	-
Stage 2	-	-	-	-	642	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	11.2
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	622	-	-	1132	-
HCM Lane V/C Ratio	0.073	-	-	0.015	-
HCM Control Delay (s)	11.2	-	-	8.2	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	277	100	172	475	29	82	230	66	28	450	296
Future Volume (veh/h)	126	277	100	172	475	29	82	230	66	28	450	296
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	143	315	114	223	617	38	95	267	77	36	584	384
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	424	1460	518	529	1869	115	164	865	244	307	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	772	2550	905	921	3266	201	567	2670	755	1004	3441	1535
Grp Volume(v), veh/h	143	216	213	223	322	333	95	172	172	36	584	384
Grp Sat Flow(s),veh/h/ln	772	1763	1693	921	1706	1760	567	1735	1690	1004	1721	1535
Q Serve(g_s), s	14.7	7.3	7.5	19.1	12.2	12.2	20.1	9.1	9.4	3.4	16.9	27.6
Cycle Q Clear(g_c), s	26.9	7.3	7.5	26.7	12.2	12.2	37.0	9.1	9.4	12.8	16.9	27.6
Prop In Lane	1.00		0.53	1.00		0.11	1.00		0.45	1.00		1.00
Lane Grp Cap(c), veh/h	424	1009	969	529	977	1007	164	562	547	307	1114	497
V/C Ratio(X)	0.34	0.21	0.22	0.42	0.33	0.33	0.58	0.31	0.32	0.12	0.52	0.77
Avail Cap(c_a), veh/h	424	1009	969	529	977	1007	164	562	547	307	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.9	12.7	12.8	19.3	13.8	13.8	48.7	31.0	31.1	36.0	33.7	37.3
Incr Delay (d2), s/veh	2.1	0.5	0.5	2.5	0.9	0.9	14.1	1.4	1.5	0.8	1.8	11.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	2.8	2.8	4.1	4.5	4.7	3.4	3.9	3.9	0.9	7.0	11.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.0	13.2	13.3	21.8	14.7	14.7	62.8	32.4	32.6	36.7	35.4	48.4
LnGrp LOS	C	B	B	C	B	B	E	C	C	D	D	D
Approach Vol, veh/h		572			878			439			1004	
Approach Delay, s/veh		15.7			16.5			39.1			40.4	
Approach LOS		B			B			D			D	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		39.0		28.9		29.6		28.7				
Green Ext Time (p_c), s		0.2		3.5		3.6		4.7				

Intersection Summary			
HCM 6th Ctrl Delay			28.1
HCM 6th LOS			C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	399	3	12	658	3	14	0	32	2	0	2
Future Vol, veh/h	0	399	3	12	658	3	14	0	32	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	0	443	3	13	739	3	16	0	36	3	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	742	0	0	446	0	0	841	1213	223	989	1213	371
Stage 1	-	-	-	-	-	-	445	445	-	767	767	-
Stage 2	-	-	-	-	-	-	396	768	-	222	446	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	829	-	-	1063	-	-	227	154	722	204	183	632
Stage 1	-	-	-	-	-	-	512	525	-	365	414	-
Stage 2	-	-	-	-	-	-	550	364	-	766	577	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	829	-	-	1063	-	-	224	152	722	192	181	632
Mov Cap-2 Maneuver	-	-	-	-	-	-	224	152	-	192	181	-
Stage 1	-	-	-	-	-	-	512	525	-	365	409	-
Stage 2	-	-	-	-	-	-	540	360	-	728	577	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	14.5	17.5
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	431	829	-	-	1063	-	-	295
HCM Lane V/C Ratio	0.119	-	-	-	0.013	-	-	0.023
HCM Control Delay (s)	14.5	0	-	-	8.4	-	-	17.5
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	249	100	169	455	24	82	230	58	295	450	28
Future Volume (veh/h)	126	249	100	169	455	24	82	230	58	295	450	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	143	283	114	219	591	31	95	267	67	383	584	36
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	440	1414	556	548	1888	99	204	893	220	312	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	796	2471	972	948	3299	173	785	2759	680	1013	3441	1535
Grp Volume(v), veh/h	143	200	197	219	305	317	95	166	168	383	584	36
Grp Sat Flow(s),veh/h/ln	796	1763	1681	948	1706	1765	785	1735	1704	1013	1721	1535
Q Serve(g_s), s	14.0	6.7	6.9	17.8	11.4	11.4	13.7	8.8	9.0	30.6	16.9	2.0
Cycle Q Clear(g_c), s	25.4	6.7	6.9	24.7	11.4	11.4	30.6	8.8	9.0	39.6	16.9	2.0
Prop In Lane	1.00		0.58	1.00		0.10	1.00		0.40	1.00		1.00
Lane Grp Cap(c), veh/h	440	1009	962	548	977	1010	204	562	552	312	1114	497
V/C Ratio(X)	0.32	0.20	0.20	0.40	0.31	0.31	0.46	0.30	0.30	1.23	0.52	0.07
Avail Cap(c_a), veh/h	440	1009	962	548	977	1010	204	562	552	312	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.2	12.6	12.7	18.7	13.6	13.6	46.1	30.9	31.0	48.8	33.7	28.6
Incr Delay (d2), s/veh	2.0	0.4	0.5	2.2	0.8	0.8	7.4	1.3	1.4	127.5	1.8	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	2.5	2.5	3.9	4.2	4.4	3.0	3.7	3.8	20.4	7.0	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	13.1	13.2	20.8	14.5	14.4	53.6	32.3	32.4	176.2	35.4	28.9
LnGrp LOS	C	B	B	C	B	B	D	C	C	F	D	C
Approach Vol, veh/h		540			841			429			1003	
Approach Delay, s/veh		15.5			16.1			37.0			89.0	
Approach LOS		B			B			D			F	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		32.6		27.4		41.6		26.7				
Green Ext Time (p_c), s		1.3		3.3		0.0		4.5				
Intersection Summary												
HCM 6th Ctrl Delay			45.2									
HCM 6th LOS			D									

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑						↑↑	↱
Traffic Volume (veh/h)	0	220	180	0	477	0	0	0	0	0	1486	139
Future Volume (veh/h)	0	220	180	0	477	0	0	0	0	0	1486	139
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	247	202	0	612	0				0	1564	146
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	1.00	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	247	202	0	612	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	0.7	1.4	0.0	0.0	0.0						
Cycle Q Clear(g_c), s	0.0	0.7	1.4	0.0	0.0	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.10	0.18	0.00	0.28	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.3	0.0	0.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.3	0.0	0.3	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.1	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	1.6	0.0	0.3	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		449			612							
Approach Delay, s/veh		1.4			0.3							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.4				2.0				
Green Ext Time (p_c), s				2.0				3.9				

Intersection Summary			
HCM 6th Ctrl Delay			0.8
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	220	0	0	477	140	0	852	77	0	0	0
Future Volume (veh/h)	0	220	0	0	477	140	0	852	77	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	247	0	0	612	179	0	947	86			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1686	492	0	0	0			
Arrive On Green	0.00	0.75	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	2317	654		0				
Grp Volume(v), veh/h	0	247	0	0	401	390		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1427						
Q Serve(g_s), s	0.0	0.7	0.0	0.0	3.3	3.4						
Cycle Q Clear(g_c), s	0.0	0.7	0.0	0.0	3.3	3.4						
Prop In Lane	0.00		0.00	0.00		0.46						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1074						
V/C Ratio(X)	0.00	0.10	0.00	0.00	0.36	0.36						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1074						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	1.2	0.0	0.0	1.5	1.5						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.9	1.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.3	0.3						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	0.0	0.0	2.4	2.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		247			791							
Approach Delay, s/veh		1.3			2.5							
Approach LOS		A			A							
Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.7				5.4				
Green Ext Time (p_c), s				1.3				4.6				
Intersection Summary												
HCM 6th Ctrl Delay			2.2									
HCM 6th LOS			A									

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
6: 52nd St & Broadmoor Ave SB 11/18/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	220	180	0	477	0	0	0	0	0	1486	139
Future Volume (veh/h)	0	220	180	0	477	0	0	0	0	0	1486	139
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	247	202	0	612	0				0	1564	146
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	1.00	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	247	202	0	612	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	0.7	1.4	0.0	0.0	0.0						
Cycle Q Clear(g_c), s	0.0	0.7	1.4	0.0	0.0	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.10	0.18	0.00	0.28	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.3	0.0	0.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.3	0.0	0.3	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.1	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	1.6	0.0	0.3	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		449			612							
Approach Delay, s/veh		1.4			0.3							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.4				2.0				
Green Ext Time (p_c), s				2.0				3.9				

Intersection Summary			
HCM 6th Ctrl Delay			0.8
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	346	5	4	643	2	2	0	3	0	0	0
Future Vol, veh/h	2	346	5	4	643	2	2	0	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	6	6	2	2	7	7	2	2	2	0	2	0
Mvmt Flow	2	384	5	4	699	2	2	0	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	701	0	0	389	0	0	749	1100	195	904	1101	351
Stage 1	-	-	-	-	-	-	391	391	-	708	708	-
Stage 2	-	-	-	-	-	-	358	709	-	196	393	-
Critical Hdwy	4.22	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.26	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	866	-	-	1166	-	-	300	211	814	235	211	651
Stage 1	-	-	-	-	-	-	605	606	-	396	436	-
Stage 2	-	-	-	-	-	-	633	435	-	793	604	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	866	-	-	1166	-	-	299	210	814	233	210	651
Mov Cap-2 Maneuver	-	-	-	-	-	-	299	210	-	233	210	-
Stage 1	-	-	-	-	-	-	604	605	-	395	435	-
Stage 2	-	-	-	-	-	-	631	434	-	788	603	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	12.6	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	482	866	-	-	1166	-	-	-
HCM Lane V/C Ratio	0.011	0.003	-	-	0.004	-	-	-
HCM Control Delay (s)	12.6	9.2	-	-	8.1	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	344	5	4	637	2	2	0	3	2	0	3
Future Vol, veh/h	2	344	5	4	637	2	2	0	3	2	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	4	4	2	2	3	3	2	2	2	0	2	0
Mvmt Flow	2	387	5	4	692	2	2	0	3	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	694	0	0	392	0	0	748	1096	196	899	1097	347
Stage 1	-	-	-	-	-	-	394	394	-	701	701	-
Stage 2	-	-	-	-	-	-	354	702	-	198	396	-
Critical Hdwy	4.18	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.24	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	884	-	-	1163	-	-	301	212	812	237	212	655
Stage 1	-	-	-	-	-	-	602	604	-	400	439	-
Stage 2	-	-	-	-	-	-	636	439	-	791	602	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	884	-	-	1163	-	-	297	211	812	235	211	655
Mov Cap-2 Maneuver	-	-	-	-	-	-	297	211	-	235	211	-
Stage 1	-	-	-	-	-	-	601	603	-	399	438	-
Stage 2	-	-	-	-	-	-	629	438	-	786	601	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	12.6	14.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	479	884	-	-	1163	-	-	382
HCM Lane V/C Ratio	0.011	0.003	-	-	0.004	-	-	0.022
HCM Control Delay (s)	12.6	9.1	-	-	8.1	-	-	14.6
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.1

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	345	5	4	646	3	7
Future Vol, veh/h	345	5	4	646	3	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	375	5	4	702	3	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	380	0	737	190
Stage 1	-	-	-	-	378	-
Stage 2	-	-	-	-	359	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1175	-	354	820
Stage 1	-	-	-	-	663	-
Stage 2	-	-	-	-	677	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1175	-	353	820
Mov Cap-2 Maneuver	-	-	-	-	466	-
Stage 1	-	-	-	-	663	-
Stage 2	-	-	-	-	675	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	668	-	-	1175	-
HCM Lane V/C Ratio	0.016	-	-	0.004	-
HCM Control Delay (s)	10.5	-	-	8.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

HCM 6th Signalized Intersection Summary
3: East Paris Ave & 52nd St

11/18/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	249	100	169	455	24	82	230	58	28	450	295
Future Volume (veh/h)	126	249	100	169	455	24	82	230	58	28	450	295
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	143	283	114	219	591	31	95	267	67	36	584	383
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	440	1414	556	548	1888	99	164	893	220	312	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	796	2471	972	948	3299	173	567	2759	680	1013	3441	1535
Grp Volume(v), veh/h	143	200	197	219	305	317	95	166	168	36	584	383
Grp Sat Flow(s),veh/h/ln	796	1763	1681	948	1706	1765	567	1735	1704	1013	1721	1535
Q Serve(g_s), s	14.0	6.7	6.9	17.8	11.4	11.4	20.0	8.8	9.0	3.4	16.9	27.5
Cycle Q Clear(g_c), s	25.4	6.7	6.9	24.7	11.4	11.4	36.9	8.8	9.0	12.4	16.9	27.5
Prop In Lane	1.00		0.58	1.00		0.10	1.00		0.40	1.00		1.00
Lane Grp Cap(c), veh/h	440	1009	962	548	977	1010	164	562	552	312	1114	497
V/C Ratio(X)	0.32	0.20	0.20	0.40	0.31	0.31	0.58	0.30	0.30	0.12	0.52	0.77
Avail Cap(c_a), veh/h	440	1009	962	548	977	1010	164	562	552	312	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.2	12.6	12.7	18.7	13.6	13.6	48.7	30.9	31.0	35.7	33.7	37.3
Incr Delay (d2), s/veh	2.0	0.4	0.5	2.2	0.8	0.8	14.0	1.3	1.4	0.8	1.8	11.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	2.5	2.5	3.9	4.2	4.4	3.4	3.7	3.8	0.9	7.0	11.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.2	13.1	13.2	20.8	14.5	14.4	62.7	32.3	32.4	36.4	35.4	48.3
LnGrp LOS	C	B	B	C	B	B	E	C	C	D	D	D
Approach Vol, veh/h		540			841			429			1003	
Approach Delay, s/veh		15.5			16.1			39.1			40.4	
Approach LOS		B			B			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		38.9		27.4		29.5		26.7				
Green Ext Time (p_c), s		0.2		3.3		3.7		4.5				

Intersection Summary	
HCM 6th Ctrl Delay	28.1
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	351	3	12	634	3	14	0	32	2	0	2
Future Vol, veh/h	0	351	3	12	634	3	14	0	32	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	0	390	3	13	712	3	16	0	36	3	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	715	0	0	393	0	0	774	1133	197	935	1133	358
Stage 1	-	-	-	-	-	-	392	392	-	740	740	-
Stage 2	-	-	-	-	-	-	382	741	-	195	393	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	849	-	-	1114	-	-	255	174	752	223	205	644
Stage 1	-	-	-	-	-	-	553	557	-	379	426	-
Stage 2	-	-	-	-	-	-	561	376	-	794	609	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	849	-	-	1114	-	-	251	172	752	211	203	644
Mov Cap-2 Maneuver	-	-	-	-	-	-	251	172	-	211	203	-
Stage 1	-	-	-	-	-	-	553	557	-	379	421	-
Stage 2	-	-	-	-	-	-	552	371	-	756	609	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	13.6	16.6
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	468	849	-	-	1114	-	-	318
HCM Lane V/C Ratio	0.109	-	-	-	0.012	-	-	0.021
HCM Control Delay (s)	13.6	0	-	-	8.3	-	-	16.6
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	234	0	0	479	140	0	852	77	0	0	0
Future Volume (veh/h)	0	234	0	0	479	140	0	852	77	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	263	0	0	614	179	0	947	86			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1687	491	0	0	0			
Arrive On Green	0.00	0.75	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	2319	652		0				
Grp Volume(v), veh/h	0	263	0	0	401	392		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1427						
Q Serve(g_s), s	0.0	0.7	0.0	0.0	3.4	3.4						
Cycle Q Clear(g_c), s	0.0	0.7	0.0	0.0	3.4	3.4						
Prop In Lane	0.00		0.00	0.00		0.46						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1074						
V/C Ratio(X)	0.00	0.10	0.00	0.00	0.36	0.36						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1074						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	1.2	0.0	0.0	1.5	1.5						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.9	1.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.3	0.3						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	0.0	0.0	2.4	2.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		263			793							
Approach Delay, s/veh		1.3			2.5							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.7				5.4				
Green Ext Time (p_c), s				1.4				4.6				

Intersection Summary			
HCM 6th Ctrl Delay			2.2
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
6: 52nd St & Broadmoor Ave SB

11/18/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	234	183	0	479	0	0	0	0	0	1486	141
Future Volume (veh/h)	0	234	183	0	479	0	0	0	0	0	1486	141
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	263	206	0	614	0				0	1564	148
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	1.00	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	263	206	0	614	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	0.7	1.4	0.0	0.0	0.0						
Cycle Q Clear(g_c), s	0.0	0.7	1.4	0.0	0.0	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.10	0.18	0.00	0.28	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.3	0.0	0.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.3	0.0	0.3	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.1	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	1.6	0.0	0.3	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		469			614							
Approach Delay, s/veh		1.4			0.3							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.4				2.0				
Green Ext Time (p_c), s				2.1				3.9				

Intersection Summary	
HCM 6th Ctrl Delay	0.8
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	344	14	12	659	2	12	0	12	0	0	0
Future Vol, veh/h	2	344	14	12	659	2	12	0	12	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	6	6	2	2	7	7	2	2	2	0	2	0
Mvmt Flow	2	382	15	13	716	2	13	0	13	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	718	0	0	397	0	0	778	1138	199	938	1144	359
Stage 1	-	-	-	-	-	-	394	394	-	743	743	-
Stage 2	-	-	-	-	-	-	384	744	-	195	401	-
Critical Hdwy	4.22	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.26	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	853	-	-	1158	-	-	286	200	809	222	198	643
Stage 1	-	-	-	-	-	-	602	604	-	378	420	-
Stage 2	-	-	-	-	-	-	611	420	-	794	599	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	853	-	-	1158	-	-	283	197	809	216	195	643
Mov Cap-2 Maneuver	-	-	-	-	-	-	283	197	-	216	195	-
Stage 1	-	-	-	-	-	-	601	603	-	377	415	-
Stage 2	-	-	-	-	-	-	604	415	-	779	598	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	14.2	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	419	853	-	-	1158	-	-	-
HCM Lane V/C Ratio	0.062	0.003	-	-	0.011	-	-	-
HCM Control Delay (s)	14.2	9.2	-	-	8.1	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	355	2	3	655	2	7	0	7	2	0	3
Future Vol, veh/h	3	355	2	3	655	2	7	0	7	2	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	4	4	2	2	3	3	2	2	2	0	2	0
Mvmt Flow	3	399	2	3	712	2	8	0	8	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	714	0	0	401	0	0	768	1126	201	925	1126	357
Stage 1	-	-	-	-	-	-	406	406	-	719	719	-
Stage 2	-	-	-	-	-	-	362	720	-	206	407	-
Critical Hdwy	4.18	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.24	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	869	-	-	1154	-	-	291	203	806	227	203	645
Stage 1	-	-	-	-	-	-	593	596	-	390	431	-
Stage 2	-	-	-	-	-	-	629	430	-	782	596	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	869	-	-	1154	-	-	288	202	806	224	202	645
Mov Cap-2 Maneuver	-	-	-	-	-	-	288	202	-	224	202	-
Stage 1	-	-	-	-	-	-	591	594	-	389	430	-
Stage 2	-	-	-	-	-	-	623	429	-	772	594	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	13.8	15
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	424	869	-	-	1154	-	-	368
HCM Lane V/C Ratio	0.036	0.004	-	-	0.003	-	-	0.023
HCM Control Delay (s)	13.8	9.2	-	-	8.1	-	-	15
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	361	3	2	652	14	19
Future Vol, veh/h	361	3	2	652	14	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	392	3	2	709	15	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	395	0	753	198
Stage 1	-	-	-	-	394	-
Stage 2	-	-	-	-	359	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1160	-	346	810
Stage 1	-	-	-	-	650	-
Stage 2	-	-	-	-	677	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1160	-	345	810
Mov Cap-2 Maneuver	-	-	-	-	460	-
Stage 1	-	-	-	-	650	-
Stage 2	-	-	-	-	676	-

Approach	EB		WB		NB
HCM Control Delay, s	0		0		11.2
HCM LOS					B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	612	-	-	1160	-
HCM Lane V/C Ratio	0.059	-	-	0.002	-
HCM Control Delay (s)	11.2	-	-	8.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	126	254	100	170	478	26	82	230	60	28	450	295
Future Volume (veh/h)	126	254	100	170	478	26	82	230	60	28	450	295
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	143	289	114	221	621	34	95	267	70	36	584	383
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	424	1423	549	544	1883	103	164	884	228	310	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	772	2487	959	943	3290	180	567	2731	703	1010	3441	1535
Grp Volume(v), veh/h	143	203	200	221	322	333	95	168	169	36	584	383
Grp Sat Flow(s),veh/h/ln	772	1763	1683	943	1706	1764	567	1735	1699	1010	1721	1535
Q Serve(g_s), s	14.7	6.8	7.1	18.2	12.2	12.2	20.0	8.9	9.2	3.4	16.9	27.5
Cycle Q Clear(g_c), s	26.8	6.8	7.1	25.2	12.2	12.2	36.9	8.9	9.2	12.5	16.9	27.5
Prop In Lane	1.00		0.57	1.00		0.10	1.00		0.41	1.00		1.00
Lane Grp Cap(c), veh/h	424	1009	963	544	977	1010	164	562	550	310	1114	497
V/C Ratio(X)	0.34	0.20	0.21	0.41	0.33	0.33	0.58	0.30	0.31	0.12	0.52	0.77
Avail Cap(c_a), veh/h	424	1009	963	544	977	1010	164	562	550	310	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.9	12.6	12.7	18.8	13.8	13.8	48.7	31.0	31.1	35.8	33.7	37.3
Incr Delay (d2), s/veh	2.1	0.4	0.5	2.2	0.9	0.9	14.0	1.4	1.4	0.8	1.8	11.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	2.6	2.6	4.0	4.5	4.7	3.4	3.8	3.8	0.9	7.0	11.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.0	13.1	13.2	21.1	14.7	14.7	62.7	32.3	32.5	36.5	35.4	48.3
LnGrp LOS	C	B	B	C	B	B	E	C	C	D	D	D
Approach Vol, veh/h		546			876			432			1003	
Approach Delay, s/veh		15.7			16.3			39.1			40.4	
Approach LOS		B			B			D			D	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		38.9		28.8		29.5		27.2				
Green Ext Time (p_c), s		0.2		3.4		3.7		4.7				

Intersection Summary			
HCM 6th Ctrl Delay			28.1
HCM 6th LOS			C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	379	3	12	638	3	14	0	32	2	0	2
Future Vol, veh/h	0	379	3	12	638	3	14	0	32	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	0	421	3	13	717	3	16	0	36	3	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	720	0	0	424	0	0	808	1169	212	956	1169	360
Stage 1	-	-	-	-	-	-	423	423	-	745	745	-
Stage 2	-	-	-	-	-	-	385	746	-	211	424	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	845	-	-	1083	-	-	240	165	735	216	195	642
Stage 1	-	-	-	-	-	-	529	538	-	377	424	-
Stage 2	-	-	-	-	-	-	558	374	-	777	590	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	845	-	-	1083	-	-	237	163	735	204	193	642
Mov Cap-2 Maneuver	-	-	-	-	-	-	237	163	-	204	193	-
Stage 1	-	-	-	-	-	-	529	538	-	377	419	-
Stage 2	-	-	-	-	-	-	548	370	-	739	590	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	14.1	16.9
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	448	845	-	-	1083	-	-	310
HCM Lane V/C Ratio	0.114	-	-	-	0.012	-	-	0.022
HCM Control Delay (s)	14.1	0	-	-	8.4	-	-	16.9
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	334	0	0	135	75	0	1561	197	0	0	0
Future Volume (veh/h)	0	334	0	0	135	75	0	1561	197	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	375	0	0	173	96	0	1734	219			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1396	738	0	0	0			
Arrive On Green	0.00	1.00	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	1932	980		0				
Grp Volume(v), veh/h	0	375	0	0	135	134		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1368						
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.9	1.0						
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.9	1.0						
Prop In Lane	0.00		0.00	0.00		0.72						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1030						
V/C Ratio(X)	0.00	0.15	0.00	0.00	0.12	0.13						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1030						
HCM Platoon Ratio	1.00	1.33	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	1.2	1.2						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.2	0.3						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.1	0.1						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.1	0.0	0.0	1.4	1.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		375			269							
Approach Delay, s/veh		0.1			1.5							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.0				3.0				
Green Ext Time (p_c), s				2.1				1.4				

Intersection Summary			
HCM 6th Ctrl Delay			0.7
HCM 6th LOS			A

Notes
User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	334	126	0	135	0	0	0	0	0	652	166
Future Volume (veh/h)	0	334	126	0	135	0	0	0	0	0	652	166
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	375	142	0	173	0				0	686	175
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	0.25	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	375	142	0	173	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	1.1	0.9	0.0	1.6	0.0						
Cycle Q Clear(g_c), s	0.0	1.1	0.9	0.0	1.6	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.15	0.12	0.00	0.08	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.2	0.0	4.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.2	0.0	0.1	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.0	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.4	1.4	0.0	4.0	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		517			173							
Approach Delay, s/veh		1.4			4.0							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.1				3.6				
Green Ext Time (p_c), s				2.6				0.9				

Intersection Summary			
HCM 6th Ctrl Delay			2.0
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	433	256	3	2	2
Future Vol, veh/h	0	433	256	3	2	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	92	92	60	60
Heavy Vehicles, %	6	6	7	7	0	0
Mvmt Flow	0	481	278	3	3	3

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	281	0	-	0	521	141
Stage 1	-	-	-	-	280	-
Stage 2	-	-	-	-	241	-
Critical Hdwy	4.22	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.26	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1250	-	-	-	490	888
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	783	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1250	-	-	-	490	888
Mov Cap-2 Maneuver	-	-	-	-	572	-
Stage 1	-	-	-	-	748	-
Stage 2	-	-	-	-	783	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1250	-	-	-	696
HCM Lane V/C Ratio	-	-	-	-	0.01
HCM Control Delay (s)	0	-	-	-	10.2
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection						
Int Delay, s/veh	0.2					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	4	432	256	7	2	3
Future Vol, veh/h	4	432	256	7	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	89	89	92	92	60	60
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	4	485	278	8	3	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	286	0	-	0	533	143
Stage 1	-	-	-	-	282	-
Stage 2	-	-	-	-	251	-
Critical Hdwy	4.18	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.24	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1259	-	-	-	482	885
Stage 1	-	-	-	-	747	-
Stage 2	-	-	-	-	774	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1259	-	-	-	481	885
Mov Cap-2 Maneuver	-	-	-	-	566	-
Stage 1	-	-	-	-	745	-
Stage 2	-	-	-	-	774	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1259	-	-	-	722
HCM Lane V/C Ratio	0.004	-	-	-	0.012
HCM Control Delay (s)	7.9	-	-	-	10
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

HCM 6th Signalized Intersection Summary
3: East Paris Ave & 52nd St

11/18/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	248	343	64	28	191	38	59	388	98	17	115	80
Future Volume (veh/h)	248	343	64	28	191	38	59	388	98	17	115	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	282	390	73	36	248	49	69	451	114	22	149	104
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	629	1699	315	511	1631	317	381	890	223	214	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1074	2968	551	892	2849	554	1100	2747	689	819	3441	1535
Grp Volume(v), veh/h	282	230	233	36	147	150	69	283	282	22	149	104
Grp Sat Flow(s),veh/h/ln	1074	1763	1756	892	1706	1697	1100	1735	1702	819	1721	1535
Q Serve(g_s), s	20.4	7.9	8.0	2.5	4.9	5.1	5.8	16.2	16.4	2.7	3.7	6.0
Cycle Q Clear(g_c), s	25.5	7.9	8.0	10.5	4.9	5.1	9.5	16.2	16.4	19.1	3.7	6.0
Prop In Lane	1.00		0.31	1.00		0.33	1.00		0.40	1.00		1.00
Lane Grp Cap(c), veh/h	629	1009	1005	511	977	971	381	562	551	214	1114	497
V/C Ratio(X)	0.45	0.23	0.23	0.07	0.15	0.15	0.18	0.50	0.51	0.10	0.13	0.21
Avail Cap(c_a), veh/h	629	1009	1005	511	977	971	381	562	551	214	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.3	12.9	12.9	15.5	12.2	12.3	32.6	33.4	33.5	41.3	29.2	30.0
Incr Delay (d2), s/veh	2.3	0.5	0.5	0.3	0.3	0.3	1.0	3.2	3.4	1.0	0.2	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	3.0	3.0	0.5	1.8	1.9	1.6	7.0	7.0	0.6	1.5	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.6	13.4	13.4	15.8	12.6	12.6	33.6	36.6	36.9	42.2	29.5	30.9
LnGrp LOS	C	B	B	B	B	B	C	D	D	D	C	C
Approach Vol, veh/h		745			333			634			275	
Approach Delay, s/veh		16.1			12.9			36.4			31.1	
Approach LOS		B			B			D			C	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		18.4		27.5		21.1		12.5				
Green Ext Time (p_c), s		3.2		4.0		1.1		1.8				
Intersection Summary												
HCM 6th Ctrl Delay			24.1									
HCM 6th LOS			C									
Notes												

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	428	15	41	267	7	6	0	14	3	0	2
Future Vol, veh/h	4	428	15	41	267	7	6	0	14	3	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	4	476	17	46	300	8	7	0	16	5	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	308	0	0	493	0	0	735	893	247	642	897	154
Stage 1	-	-	-	-	-	-	493	493	-	396	396	-
Stage 2	-	-	-	-	-	-	242	400	-	246	501	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	1214	-	-	1019	-	-	273	246	696	363	281	871
Stage 1	-	-	-	-	-	-	477	498	-	606	607	-
Stage 2	-	-	-	-	-	-	686	552	-	742	546	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1214	-	-	1019	-	-	262	234	696	342	268	871
Mov Cap-2 Maneuver	-	-	-	-	-	-	262	234	-	342	268	-
Stage 1	-	-	-	-	-	-	476	497	-	604	580	-
Stage 2	-	-	-	-	-	-	653	527	-	723	544	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.1	13.1	13.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	465	1214	-	-	1019	-	-	452
HCM Lane V/C Ratio	0.048	0.004	-	-	0.045	-	-	0.018
HCM Control Delay (s)	13.1	8	-	-	8.7	-	-	13.1
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.1	0	-	-	0.1	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	388	0	0	149	75	0	1561	197	0	0	0
Future Volume (veh/h)	0	388	0	0	149	75	0	1561	197	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	436	0	0	191	96	0	1734	219			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1445	697	0	0	0			
Arrive On Green	0.00	1.00	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	1997	925		0				
Grp Volume(v), veh/h	0	436	0	0	144	143		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1378						
Q Serve(g_s), s	0.0	0.0	0.0	0.0	1.0	1.0						
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	1.0	1.0						
Prop In Lane	0.00		0.00	0.00		0.67						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1037						
V/C Ratio(X)	0.00	0.17	0.00	0.00	0.13	0.14						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1037						
HCM Platoon Ratio	1.00	2.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	1.2	1.2						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.2	0.3						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.0	0.0	0.1	0.1						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.1	0.0	0.0	1.5	1.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		436			287							
Approach Delay, s/veh		0.1			1.5							
Approach LOS		A			A							
Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.0				3.0				
Green Ext Time (p_c), s				2.5				1.5				

Intersection Summary		
HCM 6th Ctrl Delay		0.7
HCM 6th LOS		A

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	388	136	0	149	0	0	0	0	0	652	183
Future Volume (veh/h)	0	388	136	0	149	0	0	0	0	0	652	183
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	436	153	0	191	0				0	686	193
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	0.25	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	436	153	0	191	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	1.3	1.0	0.0	1.8	0.0						
Cycle Q Clear(g_c), s	0.0	1.3	1.0	0.0	1.8	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.17	0.13	0.00	0.09	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.3	1.2	0.0	4.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.2	0.0	0.1	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.1	0.1	0.0	0.0	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.4	1.5	0.0	4.1	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		589			191							
Approach Delay, s/veh		1.4			4.1							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.3				3.8				
Green Ext Time (p_c), s				3.0				1.0				

Intersection Summary			
HCM 6th Ctrl Delay			2.1
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	468	12	11	288	3	16	0	19	2	0	2
Future Vol, veh/h	0	468	12	11	288	3	16	0	19	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	6	6	2	2	7	7	2	2	2	0	2	0
Mvmt Flow	0	520	13	12	313	3	17	0	21	3	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	316	0	0	533	0	0	708	867	267	599	872	158
Stage 1	-	-	-	-	-	-	527	527	-	339	339	-
Stage 2	-	-	-	-	-	-	181	340	-	260	533	-
Critical Hdwy	4.22	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.26	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	1213	-	-	1031	-	-	322	289	731	390	287	866
Stage 1	-	-	-	-	-	-	502	527	-	655	638	-
Stage 2	-	-	-	-	-	-	803	638	-	728	523	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1213	-	-	1031	-	-	318	286	731	376	284	866
Mov Cap-2 Maneuver	-	-	-	-	-	-	318	286	-	376	284	-
Stage 1	-	-	-	-	-	-	502	527	-	655	630	-
Stage 2	-	-	-	-	-	-	791	630	-	707	523	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	13.6	12
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	459	1213	-	-	1031	-	-	524
HCM Lane V/C Ratio	0.083	-	-	-	0.012	-	-	0.013
HCM Control Delay (s)	13.6	0	-	-	8.5	-	-	12
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	472	13	12	280	7	18	0	20	2	0	3
Future Vol, veh/h	4	472	13	12	280	7	18	0	20	2	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	4	4	2	2	3	3	2	2	2	0	2	0
Mvmt Flow	4	530	14	13	304	8	20	0	22	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	312	0	0	544	0	0	723	883	272	607	886	156
Stage 1	-	-	-	-	-	-	545	545	-	334	334	-
Stage 2	-	-	-	-	-	-	178	338	-	273	552	-
Critical Hdwy	4.18	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.24	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	1231	-	-	1021	-	-	314	283	726	384	282	868
Stage 1	-	-	-	-	-	-	490	517	-	659	642	-
Stage 2	-	-	-	-	-	-	806	639	-	715	513	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1231	-	-	1021	-	-	308	278	726	368	277	868
Mov Cap-2 Maneuver	-	-	-	-	-	-	308	278	-	368	277	-
Stage 1	-	-	-	-	-	-	489	515	-	657	634	-
Stage 2	-	-	-	-	-	-	791	631	-	691	511	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.3	14	11.5
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	442	1231	-	-	1021	-	-	562
HCM Lane V/C Ratio	0.093	0.004	-	-	0.013	-	-	0.015
HCM Control Delay (s)	14	7.9	-	-	8.6	-	-	11.5
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.8

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	478	16	14	292	19	30
Future Vol, veh/h	478	16	14	292	19	30
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	520	17	15	317	21	33

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	537	0	718	269
Stage 1	-	-	-	-	529	-
Stage 2	-	-	-	-	189	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1027	-	364	729
Stage 1	-	-	-	-	555	-
Stage 2	-	-	-	-	824	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1027	-	359	729
Mov Cap-2 Maneuver	-	-	-	-	453	-
Stage 1	-	-	-	-	555	-
Stage 2	-	-	-	-	812	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	11.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	590	-	-	1027	-
HCM Lane V/C Ratio	0.09	-	-	0.015	-
HCM Control Delay (s)	11.7	-	-	8.6	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	248	378	64	34	225	46	59	388	108	17	115	82
Future Volume (veh/h)	248	378	64	34	225	46	59	388	108	17	115	82
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	282	430	73	44	292	60	69	451	126	22	149	106
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	592	1727	291	490	1618	328	381	869	241	209	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1021	3018	509	860	2827	573	1098	2683	744	810	3441	1535
Grp Volume(v), veh/h	282	250	253	44	175	177	69	290	287	22	149	106
Grp Sat Flow(s),veh/h/ln	1021	1763	1764	860	1706	1693	1098	1735	1692	810	1721	1535
Q Serve(g_s), s	22.3	8.6	8.8	3.3	6.0	6.1	5.8	16.6	16.9	2.8	3.7	6.1
Cycle Q Clear(g_c), s	28.4	8.6	8.8	12.1	6.0	6.1	9.5	16.6	16.9	19.7	3.7	6.1
Prop In Lane	1.00		0.29	1.00		0.34	1.00		0.44	1.00		1.00
Lane Grp Cap(c), veh/h	592	1009	1010	490	977	969	381	562	548	209	1114	497
V/C Ratio(X)	0.48	0.25	0.25	0.09	0.18	0.18	0.18	0.52	0.52	0.11	0.13	0.21
Avail Cap(c_a), veh/h	592	1009	1010	490	977	969	381	562	548	209	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.3	13.0	13.1	16.1	12.5	12.5	32.6	33.6	33.7	41.7	29.2	30.0
Incr Delay (d2), s/veh	2.7	0.6	0.6	0.4	0.4	0.4	1.0	3.4	3.5	1.0	0.2	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.3	3.3	3.3	0.7	2.2	2.2	1.6	7.2	7.2	0.6	1.5	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.0	13.6	13.7	16.4	12.9	12.9	33.6	37.0	37.2	42.7	29.5	31.0
LnGrp LOS	C	B	B	B	B	B	C	D	D	D	C	C
Approach Vol, veh/h		785			396			646			277	
Approach Delay, s/veh		16.6			13.3			36.7			31.1	
Approach LOS		B			B			D			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		18.9		30.4		21.7		14.1				
Green Ext Time (p_c), s		3.3		4.4		1.1		2.1				

Intersection Summary		
HCM 6th Ctrl Delay		24.1
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	502	15	41	298	7	6	0	14	3	0	2
Future Vol, veh/h	4	502	15	41	298	7	6	0	14	3	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	4	558	17	46	335	8	7	0	16	5	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	343	0	0	575	0	0	835	1010	288	718	1014	172
Stage 1	-	-	-	-	-	-	575	575	-	431	431	-
Stage 2	-	-	-	-	-	-	260	435	-	287	583	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	1177	-	-	948	-	-	229	208	652	320	240	848
Stage 1	-	-	-	-	-	-	424	454	-	578	586	-
Stage 2	-	-	-	-	-	-	669	531	-	702	502	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1177	-	-	948	-	-	219	197	652	300	228	848
Mov Cap-2 Maneuver	-	-	-	-	-	-	219	197	-	300	228	-
Stage 1	-	-	-	-	-	-	423	453	-	576	557	-
Stage 2	-	-	-	-	-	-	634	505	-	683	500	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.1	14.3	14.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	409	1177	-	-	948	-	-	405
HCM Lane V/C Ratio	0.054	0.004	-	-	0.049	-	-	0.021
HCM Control Delay (s)	14.3	8.1	-	-	9	-	-	14.1
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.2	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	342	0	0	140	75	0	1561	197	0	0	0
Future Volume (veh/h)	0	342	0	0	140	75	0	1561	197	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	384	0	0	179	96	0	1734	219			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1413	724	0	0	0			
Arrive On Green	0.00	1.00	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	1954	961		0				
Grp Volume(v), veh/h	0	384	0	0	138	137		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1371						
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.9	1.0						
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.9	1.0						
Prop In Lane	0.00		0.00	0.00		0.70						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1032						
V/C Ratio(X)	0.00	0.15	0.00	0.00	0.13	0.13						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1032						
HCM Platoon Ratio	1.00	1.33	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	1.2	1.2						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.2	0.3						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.1	0.1						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.1	0.0	0.0	1.4	1.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		384			275							
Approach Delay, s/veh		0.1			1.5							
Approach LOS		A			A							
Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.0				3.0				
Green Ext Time (p_c), s				2.2				1.4				
Intersection Summary												
HCM 6th Ctrl Delay			0.7									
HCM 6th LOS			A									

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	342	127	0	140	0	0	0	0	0	652	172
Future Volume (veh/h)	0	342	127	0	140	0	0	0	0	0	652	172
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	384	143	0	179	0				0	686	181
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	0.25	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	384	143	0	179	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	1.1	0.9	0.0	1.7	0.0						
Cycle Q Clear(g_c), s	0.0	1.1	0.9	0.0	1.7	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.15	0.12	0.00	0.08	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.2	0.0	4.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.2	0.0	0.1	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.0	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.4	1.4	0.0	4.0	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		527			179							
Approach Delay, s/veh		1.4			4.0							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.1				3.7				
Green Ext Time (p_c), s				2.7				0.9				

Intersection Summary			
HCM 6th Ctrl Delay			2.1
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	444	5	4	259	3	2	0	3	2	0	2
Future Vol, veh/h	0	444	5	4	259	3	2	0	3	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	6	6	2	2	7	7	2	2	2	0	2	0
Mvmt Flow	0	493	5	4	282	3	2	0	3	3	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	285	0	0	498	0	0	645	789	249	539	790	143
Stage 1	-	-	-	-	-	-	496	496	-	292	292	-
Stage 2	-	-	-	-	-	-	149	293	-	247	498	-
Critical Hdwy	4.22	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.26	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	1246	-	-	1062	-	-	357	321	751	430	321	885
Stage 1	-	-	-	-	-	-	524	544	-	697	670	-
Stage 2	-	-	-	-	-	-	838	669	-	741	543	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1246	-	-	1062	-	-	355	320	751	427	320	885
Mov Cap-2 Maneuver	-	-	-	-	-	-	355	320	-	427	320	-
Stage 1	-	-	-	-	-	-	524	544	-	697	667	-
Stage 2	-	-	-	-	-	-	832	666	-	738	543	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	12	11.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	519	1246	-	-	1062	-	-	576
HCM Lane V/C Ratio	0.01	-	-	-	0.004	-	-	0.012
HCM Control Delay (s)	12	0	-	-	8.4	-	-	11.3
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	441	5	4	262	7	2	0	3	2	0	3
Future Vol, veh/h	4	441	5	4	262	7	2	0	3	2	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	4	4	2	2	3	3	2	2	2	0	2	0
Mvmt Flow	4	496	5	4	285	8	2	0	3	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	293	0	0	501	0	0	658	808	251	553	806	147
Stage 1	-	-	-	-	-	-	507	507	-	297	297	-
Stage 2	-	-	-	-	-	-	151	301	-	256	509	-
Critical Hdwy	4.18	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.24	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	1251	-	-	1059	-	-	350	313	749	420	314	880
Stage 1	-	-	-	-	-	-	516	538	-	693	666	-
Stage 2	-	-	-	-	-	-	836	664	-	732	536	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1251	-	-	1059	-	-	346	311	749	416	312	880
Mov Cap-2 Maneuver	-	-	-	-	-	-	346	311	-	416	312	-
Stage 1	-	-	-	-	-	-	514	536	-	691	663	-
Stage 2	-	-	-	-	-	-	828	661	-	726	534	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	12.1	11
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	511	1251	-	-	1059	-	-	609
HCM Lane V/C Ratio	0.011	0.004	-	-	0.004	-	-	0.014
HCM Control Delay (s)	12.1	7.9	-	-	8.4	-	-	11
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	442	5	4	282	3	7
Future Vol, veh/h	442	5	4	282	3	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	480	5	4	307	3	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	485	0	645	243
Stage 1	-	-	-	-	483	-
Stage 2	-	-	-	-	162	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1074	-	405	758
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	850	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1074	-	403	758
Mov Cap-2 Maneuver	-	-	-	-	486	-
Stage 1	-	-	-	-	586	-
Stage 2	-	-	-	-	847	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	649	-	-	1074	-
HCM Lane V/C Ratio	0.017	-	-	0.004	-
HCM Control Delay (s)	10.6	-	-	8.4	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	248	355	64	29	194	39	59	388	101	17	115	81
Future Volume (veh/h)	248	355	64	29	194	39	59	388	101	17	115	81
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	282	403	73	38	252	51	69	451	117	22	149	105
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	625	1709	307	504	1623	323	381	884	228	213	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1068	2985	536	882	2836	565	1099	2731	703	817	3441	1535
Grp Volume(v), veh/h	282	237	239	38	150	153	69	285	283	22	149	105
Grp Sat Flow(s),veh/h/ln	1068	1763	1759	882	1706	1695	1099	1735	1699	817	1721	1535
Q Serve(g_s), s	20.6	8.1	8.2	2.7	5.0	5.2	5.8	16.3	16.5	2.7	3.7	6.1
Cycle Q Clear(g_c), s	25.8	8.1	8.2	11.0	5.0	5.2	9.5	16.3	16.5	19.3	3.7	6.1
Prop In Lane	1.00		0.30	1.00		0.33	1.00		0.41	1.00		1.00
Lane Grp Cap(c), veh/h	625	1009	1007	504	977	970	381	562	550	213	1114	497
V/C Ratio(X)	0.45	0.23	0.24	0.08	0.15	0.16	0.18	0.51	0.51	0.10	0.13	0.21
Avail Cap(c_a), veh/h	625	1009	1007	504	977	970	381	562	550	213	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	18.4	12.9	12.9	15.7	12.3	12.3	32.6	33.5	33.5	41.4	29.2	30.0
Incr Delay (d2), s/veh	2.3	0.5	0.6	0.3	0.3	0.3	1.0	3.3	3.4	1.0	0.2	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	3.1	3.1	0.6	1.9	1.9	1.6	7.1	7.0	0.6	1.5	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.7	13.5	13.5	15.9	12.6	12.6	33.6	36.7	36.9	42.3	29.5	31.0
LnGrp LOS	C	B	B	B	B	B	C	D	D	D	C	C
Approach Vol, veh/h		758			341			637			276	
Approach Delay, s/veh		16.2			13.0			36.5			31.1	
Approach LOS		B			B			D			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		18.5		27.8		21.3		13.0				
Green Ext Time (p_c), s		3.2		4.1		1.1		1.8				

Intersection Summary			
HCM 6th Ctrl Delay			24.1
HCM 6th LOS			C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	443	15	41	278	7	6	0	14	3	0	2
Future Vol, veh/h	4	443	15	41	278	7	6	0	14	3	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	4	492	17	46	312	8	7	0	16	5	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	320	0	0	509	0	0	757	921	255	662	925	160
Stage 1	-	-	-	-	-	-	509	509	-	408	408	-
Stage 2	-	-	-	-	-	-	248	412	-	254	517	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	1201	-	-	1005	-	-	263	236	687	351	271	863
Stage 1	-	-	-	-	-	-	466	489	-	596	600	-
Stage 2	-	-	-	-	-	-	680	545	-	734	537	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1201	-	-	1005	-	-	252	224	687	330	258	863
Mov Cap-2 Maneuver	-	-	-	-	-	-	252	224	-	330	258	-
Stage 1	-	-	-	-	-	-	465	488	-	594	572	-
Stage 2	-	-	-	-	-	-	646	520	-	715	535	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.1	13.4	13.4
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	453	1201	-	-	1005	-	-	438
HCM Lane V/C Ratio	0.049	0.004	-	-	0.046	-	-	0.019
HCM Control Delay (s)	13.4	8	-	-	8.8	-	-	13.4
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	354	0	0	143	75	0	1561	197	0	0	0
Future Volume (veh/h)	0	354	0	0	143	75	0	1561	197	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	398	0	0	183	96	0	1734	219			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1424	714	0	0	0			
Arrive On Green	0.00	1.00	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	1969	949		0				
Grp Volume(v), veh/h	0	398	0	0	140	139		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1373						
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.9	1.0						
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	0.9	1.0						
Prop In Lane	0.00		0.00	0.00		0.69						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1034						
V/C Ratio(X)	0.00	0.15	0.00	0.00	0.13	0.13						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1034						
HCM Platoon Ratio	1.00	1.33	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	1.2	1.2						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.2	0.3						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.1	0.1						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.1	0.0	0.0	1.5	1.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		398			279							
Approach Delay, s/veh		0.1			1.5							
Approach LOS		A			A							
Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.0				3.0				
Green Ext Time (p_c), s				2.3				1.4				

Intersection Summary	
HCM 6th Ctrl Delay	0.7
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	354	130	0	143	0	0	0	0	0	652	176
Future Volume (veh/h)	0	354	130	0	143	0	0	0	0	0	652	176
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	398	146	0	183	0				0	686	185
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	0.25	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	398	146	0	183	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	1.2	0.9	0.0	1.7	0.0						
Cycle Q Clear(g_c), s	0.0	1.2	0.9	0.0	1.7	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.15	0.13	0.00	0.08	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	0.33	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.2	0.0	4.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.2	0.0	0.1	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.0	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.4	1.4	0.0	4.1	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		544			183							
Approach Delay, s/veh		1.4			4.1							
Approach LOS		A			A							
Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.2				3.7				
Green Ext Time (p_c), s				2.8				0.9				
Intersection Summary												
HCM 6th Ctrl Delay			2.1									
HCM 6th LOS			A									

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	448	12	11	274	3	16	0	19	2	0	2
Future Vol, veh/h	0	448	12	11	274	3	16	0	19	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	6	6	2	2	7	7	2	2	2	0	2	0
Mvmt Flow	0	498	13	12	298	3	17	0	21	3	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	301	0	0	511	0	0	678	830	256	573	835	151
Stage 1	-	-	-	-	-	-	505	505	-	324	324	-
Stage 2	-	-	-	-	-	-	173	325	-	249	511	-
Critical Hdwy	4.22	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.26	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	1228	-	-	1050	-	-	338	304	743	407	302	875
Stage 1	-	-	-	-	-	-	518	539	-	668	648	-
Stage 2	-	-	-	-	-	-	812	648	-	739	535	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1228	-	-	1050	-	-	334	301	743	392	299	875
Mov Cap-2 Maneuver	-	-	-	-	-	-	334	301	-	392	299	-
Stage 1	-	-	-	-	-	-	518	539	-	668	641	-
Stage 2	-	-	-	-	-	-	800	641	-	718	535	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	13.2	11.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	476	1228	-	-	1050	-	-	541
HCM Lane V/C Ratio	0.08	-	-	-	0.011	-	-	0.012
HCM Control Delay (s)	13.2	0	-	-	8.5	-	-	11.7
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	459	6	6	283	7	2	0	2	2	0	3
Future Vol, veh/h	4	459	6	6	283	7	2	0	2	2	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	4	4	2	2	3	3	2	2	2	0	2	0
Mvmt Flow	4	516	7	7	308	8	2	0	2	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	316	0	0	523	0	0	696	858	262	592	857	158
Stage 1	-	-	-	-	-	-	528	528	-	326	326	-
Stage 2	-	-	-	-	-	-	168	330	-	266	531	-
Critical Hdwy	4.18	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.24	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	1227	-	-	1040	-	-	328	293	737	394	293	866
Stage 1	-	-	-	-	-	-	502	526	-	666	647	-
Stage 2	-	-	-	-	-	-	817	644	-	722	524	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1227	-	-	1040	-	-	324	290	737	390	290	866
Mov Cap-2 Maneuver	-	-	-	-	-	-	324	290	-	390	290	-
Stage 1	-	-	-	-	-	-	500	524	-	664	642	-
Stage 2	-	-	-	-	-	-	807	639	-	718	522	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.2	13.1	11.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	450	1227	-	-	1040	-	-	582
HCM Lane V/C Ratio	0.01	0.004	-	-	0.006	-	-	0.014
HCM Control Delay (s)	13.1	7.9	-	-	8.5	-	-	11.3
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	0.7

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	459	5	4	289	19	24
Future Vol, veh/h	459	5	4	289	19	24
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	499	5	4	314	21	26

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	504	0	667	252
Stage 1	-	-	-	-	502	-
Stage 2	-	-	-	-	165	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1057	-	392	748
Stage 1	-	-	-	-	573	-
Stage 2	-	-	-	-	847	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1057	-	390	748
Mov Cap-2 Maneuver	-	-	-	-	475	-
Stage 1	-	-	-	-	573	-
Stage 2	-	-	-	-	844	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	11.5
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	597	-	-	1057	-
HCM Lane V/C Ratio	0.078	-	-	0.004	-
HCM Control Delay (s)	11.5	-	-	8.4	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	248	363	64	30	220	41	59	388	104	17	115	81
Future Volume (veh/h)	248	363	64	30	220	41	59	388	104	17	115	81
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	282	412	73	39	286	53	69	451	121	22	149	105
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	601	1715	302	499	1649	302	381	877	234	211	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	1033	2997	527	875	2881	527	1099	2709	721	814	3441	1535
Grp Volume(v), veh/h	282	241	244	39	168	171	69	287	285	22	149	105
Grp Sat Flow(s),veh/h/ln	1033	1763	1761	875	1706	1701	1099	1735	1696	814	1721	1535
Q Serve(g_s), s	21.8	8.3	8.4	2.8	5.7	5.9	5.8	16.4	16.7	2.8	3.7	6.1
Cycle Q Clear(g_c), s	27.7	8.3	8.4	11.2	5.7	5.9	9.5	16.4	16.7	19.4	3.7	6.1
Prop In Lane	1.00		0.30	1.00		0.31	1.00		0.43	1.00		1.00
Lane Grp Cap(c), veh/h	601	1009	1008	499	977	974	381	562	549	211	1114	497
V/C Ratio(X)	0.47	0.24	0.24	0.08	0.17	0.18	0.18	0.51	0.52	0.10	0.13	0.21
Avail Cap(c_a), veh/h	601	1009	1008	499	977	974	381	562	549	211	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.0	13.0	13.0	15.8	12.4	12.4	32.6	33.5	33.6	41.5	29.2	30.0
Incr Delay (d2), s/veh	2.6	0.6	0.6	0.3	0.4	0.4	1.0	3.3	3.5	1.0	0.2	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	3.2	3.2	0.6	2.1	2.2	1.6	7.1	7.1	0.6	1.5	2.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.6	13.5	13.6	16.1	12.8	12.8	33.6	36.8	37.1	42.5	29.5	31.0
LnGrp LOS	C	B	B	B	B	B	C	D	D	D	C	C
Approach Vol, veh/h		767			378			641			276	
Approach Delay, s/veh		16.5			13.1			36.6			31.1	
Approach LOS		B			B			D			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		18.7		29.7		21.4		13.2				
Green Ext Time (p_c), s		3.3		4.2		1.1		2.0				

Intersection Summary			
HCM 6th Ctrl Delay			24.1
HCM 6th LOS			C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	4	477	15	41	285	7	6	0	14	3	0	2
Future Vol, veh/h	4	477	15	41	285	7	6	0	14	3	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	4	530	17	46	320	8	7	0	16	5	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	328	0	0	547	0	0	799	967	274	689	971	164
Stage 1	-	-	-	-	-	-	547	547	-	416	416	-
Stage 2	-	-	-	-	-	-	252	420	-	273	555	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	1193	-	-	971	-	-	244	221	667	336	255	858
Stage 1	-	-	-	-	-	-	441	469	-	590	595	-
Stage 2	-	-	-	-	-	-	676	540	-	715	516	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1193	-	-	971	-	-	234	210	667	316	242	858
Mov Cap-2 Maneuver	-	-	-	-	-	-	234	210	-	316	242	-
Stage 1	-	-	-	-	-	-	440	468	-	588	567	-
Stage 2	-	-	-	-	-	-	641	515	-	696	514	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.1	13.9	13.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	429	1193	-	-	971	-	-	423
HCM Lane V/C Ratio	0.052	0.004	-	-	0.047	-	-	0.02
HCM Control Delay (s)	13.9	8	-	-	8.9	-	-	13.7
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.2	0	-	-	0.1	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	219	0	0	487	144	0	879	80	0	0	0
Future Volume (veh/h)	0	219	0	0	487	144	0	879	80	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1811	0	0	1856	1856	0	1767	1767			
Adj Flow Rate, veh/h	0	267	0	0	632	187	0	999	91			
Peak Hour Factor	0.82	0.82	0.82	0.77	0.77	0.77	0.88	0.88	0.88			
Percent Heavy Veh, %	0	6	0	0	3	3	0	9	9			
Cap, veh/h	0	2590	0	0	2020	597	0	0	0			
Arrive On Green	0.00	0.75	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3622	0	0	2776	793		0				
Grp Volume(v), veh/h	0	267	0	0	415	404		0.0				
Grp Sat Flow(s),veh/h/ln	0	1721	0	0	1763	1713						
Q Serve(g_s), s	0.0	0.7	0.0	0.0	2.7	2.7						
Cycle Q Clear(g_c), s	0.0	0.7	0.0	0.0	2.7	2.7						
Prop In Lane	0.00		0.00	0.00		0.46						
Lane Grp Cap(c), veh/h	0	2590	0	0	1327	1289						
V/C Ratio(X)	0.00	0.10	0.00	0.00	0.31	0.31						
Avail Cap(c_a), veh/h	0	2590	0	0	1327	1289						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	1.2	0.0	0.0	1.4	1.4						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	0.6	0.6						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.2	0.2						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	0.0	0.0	2.1	2.1						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		267			819							
Approach Delay, s/veh		1.3			2.1							
Approach LOS		A			A							
Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.7				4.7				
Green Ext Time (p_c), s				1.4				4.7				

Intersection Summary		
HCM 6th Ctrl Delay		1.9
HCM 6th LOS		A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	219	185	0	487	0	0	0	0	0	1533	137
Future Volume (veh/h)	0	219	185	0	487	0	0	0	0	0	1533	137
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1811	1811	0	1856	0				0	1841	1841
Adj Flow Rate, veh/h	0	267	226	0	632	0				0	1631	146
Peak Hour Factor	0.82	0.82	0.82	0.77	0.77	0.77				0.94	0.94	0.94
Percent Heavy Veh, %	0	6	6	0	3	0				0	4	4
Cap, veh/h	0	2590	1155	0	2654	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	1.00	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3532	1535	0	3711	0					0	
Grp Volume(v), veh/h	0	267	226	0	632	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1721	1535	0	1763	0						
Q Serve(g_s), s	0.0	0.7	1.5	0.0	0.0	0.0						
Cycle Q Clear(g_c), s	0.0	0.7	1.5	0.0	0.0	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2590	1155	0	2654	0						
V/C Ratio(X)	0.00	0.10	0.20	0.00	0.24	0.00						
Avail Cap(c_a), veh/h	0	2590	1155	0	2654	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.3	0.0	0.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.4	0.0	0.2	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.1	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	1.7	0.0	0.2	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		493			632							
Approach Delay, s/veh		1.5			0.2							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.5				2.0				
Green Ext Time (p_c), s				2.2				3.9				

Intersection Summary			
HCM 6th Ctrl Delay			0.8
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	346	661	2	0	0
Future Vol, veh/h	2	346	661	2	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	80	80	87	87	60	60
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	3	433	760	2	0	0

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	762	0	-	0	984	381
Stage 1	-	-	-	-	761	-
Stage 2	-	-	-	-	223	-
Critical Hdwy	4.18	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.24	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	833	-	-	-	249	623
Stage 1	-	-	-	-	427	-
Stage 2	-	-	-	-	799	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	833	-	-	-	248	623
Mov Cap-2 Maneuver	-	-	-	-	349	-
Stage 1	-	-	-	-	425	-
Stage 2	-	-	-	-	799	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	0
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	833	-	-	-	-
HCM Lane V/C Ratio	0.003	-	-	-	-
HCM Control Delay (s)	9.3	-	-	-	0
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection						
Int Delay, s/veh	0.1					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	2	346	652	2	2	3
Future Vol, veh/h	2	346	652	2	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	83	83	84	84	60	60
Heavy Vehicles, %	4	4	3	3	0	0
Mvmt Flow	2	417	776	2	3	5

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	778	0	-	0	990	389
Stage 1	-	-	-	-	777	-
Stage 2	-	-	-	-	213	-
Critical Hdwy	4.18	-	-	-	6.8	6.9
Critical Hdwy Stg 1	-	-	-	-	5.8	-
Critical Hdwy Stg 2	-	-	-	-	5.8	-
Follow-up Hdwy	2.24	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	822	-	-	-	247	615
Stage 1	-	-	-	-	419	-
Stage 2	-	-	-	-	808	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	822	-	-	-	247	615
Mov Cap-2 Maneuver	-	-	-	-	345	-
Stage 1	-	-	-	-	418	-
Stage 2	-	-	-	-	808	-

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	12.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	822	-	-	-	468
HCM Lane V/C Ratio	0.003	-	-	-	0.018
HCM Control Delay (s)	9.4	-	-	-	12.8
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	245	103	173	466	24	84	238	57	29	464	303
Future Volume (veh/h)	130	245	103	173	466	24	84	238	57	29	464	303
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1856	1856	1856	1900	1900	1900	1870	1870	1870
Adj Flow Rate, veh/h	146	275	116	199	536	28	95	270	65	35	559	365
Peak Hour Factor	0.89	0.89	0.89	0.87	0.87	0.87	0.88	0.88	0.88	0.83	0.83	0.83
Percent Heavy Veh, %	4	4	4	3	3	3	0	0	0	2	2	2
Cap, veh/h	469	1383	569	567	1951	102	180	938	222	323	1151	513
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	833	2417	994	985	3409	178	615	2896	685	1045	3554	1585
Grp Volume(v), veh/h	146	197	194	199	277	287	95	166	169	35	559	365
Grp Sat Flow(s),veh/h/ln	833	1749	1662	985	1763	1824	615	1805	1777	1045	1777	1585
Q Serve(g_s), s	13.2	6.6	6.9	15.0	9.7	9.8	17.9	8.4	8.7	3.2	15.4	24.7
Cycle Q Clear(g_c), s	23.0	6.6	6.9	21.9	9.7	9.8	33.4	8.4	8.7	11.8	15.4	24.7
Prop In Lane	1.00		0.60	1.00		0.10	1.00		0.39	1.00		1.00
Lane Grp Cap(c), veh/h	469	1001	951	567	1009	1044	180	584	575	323	1151	513
V/C Ratio(X)	0.31	0.20	0.20	0.35	0.27	0.28	0.53	0.28	0.29	0.11	0.49	0.71
Avail Cap(c_a), veh/h	469	1001	951	567	1009	1044	180	584	575	323	1151	513
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	19.1	12.6	12.7	18.0	13.3	13.3	46.6	30.8	30.9	35.3	33.2	36.3
Incr Delay (d2), s/veh	1.7	0.4	0.5	1.7	0.7	0.7	10.6	1.2	1.3	0.7	1.5	8.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.6	2.5	2.5	3.4	3.7	3.9	3.2	3.7	3.8	0.8	6.6	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	20.8	13.0	13.1	19.7	13.9	13.9	57.2	32.0	32.2	36.0	34.6	44.5
LnGrp LOS	C	B	B	B	B	B	E	C	C	D	C	D
Approach Vol, veh/h		537			763			430			959	
Approach Delay, s/veh		15.2			15.4			37.6			38.4	
Approach LOS		B			B			D			D	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		35.4		25.0		26.7		23.9				
Green Ext Time (p_c), s		1.0		3.2		3.9		4.0				

Intersection Summary		
HCM 6th Ctrl Delay		27.1
HCM 6th LOS		C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	347	3	12	643	3	14	0	33	2	0	2
Future Vol, veh/h	0	347	3	12	643	3	14	0	33	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	83	83	83	79	79	79	78	78	78	60	60	60
Heavy Vehicles, %	5	5	5	3	3	3	9	9	9	0	0	0
Mvmt Flow	0	418	4	15	814	4	18	0	42	3	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	818	0	0	422	0	0	857	1268	211	1055	1268	409
Stage 1	-	-	-	-	-	-	420	420	-	846	846	-
Stage 2	-	-	-	-	-	-	437	848	-	209	422	-
Critical Hdwy	4.2	-	-	4.16	-	-	7.68	6.68	7.08	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.68	5.68	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.68	5.68	-	6.5	5.5	-
Follow-up Hdwy	2.25	-	-	2.23	-	-	3.59	4.09	3.39	3.5	4	3.3
Pot Cap-1 Maneuver	787	-	-	1127	-	-	240	158	773	183	170	597
Stage 1	-	-	-	-	-	-	563	571	-	328	381	-
Stage 2	-	-	-	-	-	-	550	360	-	779	592	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	787	-	-	1127	-	-	236	156	773	171	168	597
Mov Cap-2 Maneuver	-	-	-	-	-	-	236	156	-	171	168	-
Stage 1	-	-	-	-	-	-	563	571	-	328	376	-
Stage 2	-	-	-	-	-	-	540	355	-	736	592	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	14	18.9
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	461	787	-	-	1127	-	-	266
HCM Lane V/C Ratio	0.131	-	-	-	0.013	-	-	0.025
HCM Control Delay (s)	14	0	-	-	8.2	-	-	18.9
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	259	0	0	503	144	0	879	80	0	0	0
Future Volume (veh/h)	0	259	0	0	503	144	0	879	80	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	291	0	0	645	185	0	977	89			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1694	485	0	0	0			
Arrive On Green	0.00	1.00	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	2328	645		0				
Grp Volume(v), veh/h	0	291	0	0	420	410		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1428						
Q Serve(g_s), s	0.0	0.0	0.0	0.0	3.6	3.6						
Cycle Q Clear(g_c), s	0.0	0.0	0.0	0.0	3.6	3.6						
Prop In Lane	0.00		0.00	0.00		0.45						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1075						
V/C Ratio(X)	0.00	0.11	0.00	0.00	0.38	0.38						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1075						
HCM Platoon Ratio	1.00	1.33	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	0.0	0.0	0.0	1.5	1.5						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	1.0	1.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.3	0.3						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	0.1	0.0	0.0	2.5	2.6						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		291			830							
Approach Delay, s/veh		0.1			2.6							
Approach LOS		A			A							
Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.0				5.6				
Green Ext Time (p_c), s				1.6				4.8				

Intersection Summary	
HCM 6th Ctrl Delay	1.9
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	259	192	0	503	0	0	0	0	0	1533	156
Future Volume (veh/h)	0	259	192	0	503	0	0	0	0	0	1533	156
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	291	216	0	645	0				0	1614	164
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	1.00	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	291	216	0	645	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	0.8	1.5	0.0	0.0	0.0						
Cycle Q Clear(g_c), s	0.0	0.8	1.5	0.0	0.0	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.11	0.19	0.00	0.29	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.3	0.0	0.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.4	0.0	0.3	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.1	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	1.6	0.0	0.3	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		507			645							
Approach Delay, s/veh		1.4			0.3							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.5				2.0				
Green Ext Time (p_c), s				2.3				4.1				

Intersection Summary				
HCM 6th Ctrl Delay			0.8	
HCM 6th LOS			A	

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	385	14	12	682	2	12	0	14	0	0	0
Future Vol, veh/h	2	385	14	12	682	2	12	0	14	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	6	6	2	2	7	7	2	2	2	0	2	0
Mvmt Flow	2	428	15	13	741	2	13	0	15	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	743	0	0	443	0	0	837	1209	222	986	1215	372
Stage 1	-	-	-	-	-	-	440	440	-	768	768	-
Stage 2	-	-	-	-	-	-	397	769	-	218	447	-
Critical Hdwy	4.22	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.26	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	834	-	-	1113	-	-	259	182	782	205	180	631
Stage 1	-	-	-	-	-	-	566	576	-	365	409	-
Stage 2	-	-	-	-	-	-	600	409	-	770	572	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	834	-	-	1113	-	-	256	179	782	199	177	631
Mov Cap-2 Maneuver	-	-	-	-	-	-	256	179	-	199	177	-
Stage 1	-	-	-	-	-	-	565	575	-	364	404	-
Stage 2	-	-	-	-	-	-	593	404	-	753	571	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	14.7	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	401	834	-	-	1113	-	-	-
HCM Lane V/C Ratio	0.07	0.003	-	-	0.012	-	-	-
HCM Control Delay (s)	14.7	9.3	-	-	8.3	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	384	15	13	672	2	13	0	15	2	0	3
Future Vol, veh/h	2	384	15	13	672	2	13	0	15	2	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	4	4	2	2	3	3	2	2	2	0	2	0
Mvmt Flow	2	431	16	14	730	2	14	0	16	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	732	0	0	447	0	0	836	1203	224	979	1210	366
Stage 1	-	-	-	-	-	-	443	443	-	759	759	-
Stage 2	-	-	-	-	-	-	393	760	-	220	451	-
Critical Hdwy	4.18	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.24	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	855	-	-	1110	-	-	260	183	779	207	181	637
Stage 1	-	-	-	-	-	-	564	574	-	369	413	-
Stage 2	-	-	-	-	-	-	603	413	-	768	569	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	855	-	-	1110	-	-	255	180	779	200	178	637
Mov Cap-2 Maneuver	-	-	-	-	-	-	255	180	-	200	178	-
Stage 1	-	-	-	-	-	-	563	573	-	368	408	-
Stage 2	-	-	-	-	-	-	591	408	-	750	568	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.2	14.8	15.9
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	399	855	-	-	1110	-	-	340
HCM Lane V/C Ratio	0.076	0.003	-	-	0.013	-	-	0.025
HCM Control Delay (s)	14.8	9.2	-	-	8.3	-	-	15.9
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	0.1

Intersection	
Int Delay, s/veh	0.5

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	383	18	16	678	14	28
Future Vol, veh/h	383	18	16	678	14	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	416	20	17	737	15	30

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	436	0	829	218
Stage 1	-	-	-	-	426	-
Stage 2	-	-	-	-	403	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1120	-	309	786
Stage 1	-	-	-	-	627	-
Stage 2	-	-	-	-	644	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1120	-	304	786
Mov Cap-2 Maneuver	-	-	-	-	426	-
Stage 1	-	-	-	-	627	-
Stage 2	-	-	-	-	634	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	11.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	613	-	-	1120	-
HCM Lane V/C Ratio	0.074	-	-	0.016	-
HCM Control Delay (s)	11.3	-	-	8.3	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	285	103	177	489	30	84	238	68	29	464	305
Future Volume (veh/h)	130	285	103	177	489	30	84	238	68	29	464	305
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	148	324	117	230	635	39	98	277	79	38	603	396
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	415	1460	518	522	1869	115	158	867	242	301	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	758	2551	904	911	3266	200	550	2677	749	993	3441	1535
Grp Volume(v), veh/h	148	222	219	230	331	343	98	178	178	38	603	396
Grp Sat Flow(s),veh/h/ln	758	1763	1693	911	1706	1760	550	1735	1691	993	1721	1535
Q Serve(g_s), s	15.7	7.5	7.8	20.3	12.6	12.6	21.7	9.4	9.8	3.7	17.6	28.8
Cycle Q Clear(g_c), s	28.4	7.5	7.8	28.1	12.6	12.6	39.3	9.4	9.8	13.4	17.6	28.8
Prop In Lane	1.00		0.53	1.00		0.11	1.00		0.44	1.00		1.00
Lane Grp Cap(c), veh/h	415	1009	969	522	977	1007	158	562	548	301	1114	497
V/C Ratio(X)	0.36	0.22	0.23	0.44	0.34	0.34	0.62	0.32	0.33	0.13	0.54	0.80
Avail Cap(c_a), veh/h	415	1009	969	522	977	1007	158	562	548	301	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.4	12.8	12.8	19.7	13.9	13.9	50.0	31.2	31.3	36.3	33.9	37.7
Incr Delay (d2), s/veh	2.4	0.5	0.5	2.7	0.9	0.9	16.9	1.5	1.6	0.9	1.9	12.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	2.9	2.8	4.4	4.7	4.8	3.6	4.0	4.1	0.9	7.3	12.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.8	13.3	13.4	22.4	14.8	14.8	66.9	32.6	32.8	37.2	35.8	50.2
LnGrp LOS	C	B	B	C	B	B	E	C	C	D	D	D
Approach Vol, veh/h		589			904			454			1037	
Approach Delay, s/veh		16.0			16.7			40.1			41.3	
Approach LOS		B			B			D			D	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		41.3		30.4		30.8		30.1				
Green Ext Time (p_c), s		0.0		3.7		3.5		4.8				

Intersection Summary			
HCM 6th Ctrl Delay			28.7
HCM 6th LOS			C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	410	3	12	678	3	14	0	33	2	0	2
Future Vol, veh/h	0	410	3	12	678	3	14	0	33	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	0	456	3	13	762	3	16	0	37	3	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	765	0	0	459	0	0	865	1249	230	1018	1249	383
Stage 1	-	-	-	-	-	-	458	458	-	790	790	-
Stage 2	-	-	-	-	-	-	407	791	-	228	459	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	812	-	-	1050	-	-	217	146	715	194	175	621
Stage 1	-	-	-	-	-	-	502	518	-	354	404	-
Stage 2	-	-	-	-	-	-	541	355	-	760	570	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	812	-	-	1050	-	-	214	144	715	182	173	621
Mov Cap-2 Maneuver	-	-	-	-	-	-	214	144	-	182	173	-
Stage 1	-	-	-	-	-	-	502	518	-	354	399	-
Stage 2	-	-	-	-	-	-	531	351	-	721	570	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	14.8	18.1
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	421	812	-	-	1050	-	-	281
HCM Lane V/C Ratio	0.124	-	-	-	0.013	-	-	0.024
HCM Control Delay (s)	14.8	0	-	-	8.5	-	-	18.1
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	227	0	0	492	144	0	879	80	0	0	0
Future Volume (veh/h)	0	227	0	0	492	144	0	879	80	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	255	0	0	631	185	0	977	89			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1685	493	0	0	0			
Arrive On Green	0.00	0.75	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	2315	655		0				
Grp Volume(v), veh/h	0	255	0	0	413	403		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1426						
Q Serve(g_s), s	0.0	0.7	0.0	0.0	3.5	3.5						
Cycle Q Clear(g_c), s	0.0	0.7	0.0	0.0	3.5	3.5						
Prop In Lane	0.00		0.00	0.00		0.46						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1074						
V/C Ratio(X)	0.00	0.10	0.00	0.00	0.37	0.38						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1074						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	1.2	0.0	0.0	1.5	1.5						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	1.0	1.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.3	0.3						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	0.0	0.0	2.5	2.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		255			816							
Approach Delay, s/veh		1.3			2.5							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.7				5.5				
Green Ext Time (p_c), s				1.4				4.7				

Intersection Summary	
HCM 6th Ctrl Delay	2.2
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	257	103	174	469	25	84	238	60	304	464	29
Future Volume (veh/h)	130	257	103	174	469	25	84	238	60	304	464	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	148	292	117	226	609	32	98	277	70	395	603	38
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	431	1416	555	541	1888	99	197	892	221	306	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	782	2475	969	938	3298	173	769	2754	684	1001	3441	1535
Grp Volume(v), veh/h	148	206	203	226	315	326	98	173	174	395	603	38
Grp Sat Flow(s),veh/h/ln	782	1763	1681	938	1706	1765	769	1735	1703	1001	1721	1535
Q Serve(g_s), s	15.0	6.9	7.2	18.9	11.8	11.9	14.6	9.1	9.4	30.2	17.6	2.1
Cycle Q Clear(g_c), s	26.8	6.9	7.2	26.1	11.8	11.9	32.2	9.1	9.4	39.6	17.6	2.1
Prop In Lane	1.00		0.58	1.00		0.10	1.00		0.40	1.00		1.00
Lane Grp Cap(c), veh/h	431	1009	962	541	977	1010	197	562	551	306	1114	497
V/C Ratio(X)	0.34	0.20	0.21	0.42	0.32	0.32	0.50	0.31	0.32	1.29	0.54	0.08
Avail Cap(c_a), veh/h	431	1009	962	541	977	1010	197	562	551	306	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.8	12.7	12.7	19.1	13.7	13.7	47.1	31.1	31.2	49.0	33.9	28.7
Incr Delay (d2), s/veh	2.2	0.5	0.5	2.4	0.9	0.8	8.7	1.4	1.5	153.6	1.9	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	2.6	2.6	4.1	4.4	4.5	3.2	3.9	4.0	22.3	7.3	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.9	13.1	13.2	21.4	14.6	14.6	55.8	32.5	32.7	202.5	35.8	29.0
LnGrp LOS	C	B	B	C	B	B	E	C	C	F	D	C
Approach Vol, veh/h		557			867			445			1036	
Approach Delay, s/veh		15.8			16.4			37.7			99.1	
Approach LOS		B			B			D			F	

Timer - Assigned Phs		2		4		6		8
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49
Max Q Clear Time (g_c+I1), s		34.2		28.8		41.6		28.1
Green Ext Time (p_c), s		1.1		3.4		0.0		4.6

Intersection Summary	
HCM 6th Ctrl Delay	49.0
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	227	186	0	492	0	0	0	0	0	1533	143
Future Volume (veh/h)	0	227	186	0	492	0	0	0	0	0	1533	143
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	255	209	0	631	0				0	1614	151
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	1.00	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	255	209	0	631	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	0.7	1.4	0.0	0.0	0.0						
Cycle Q Clear(g_c), s	0.0	0.7	1.4	0.0	0.0	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.10	0.18	0.00	0.29	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.3	0.0	0.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.4	0.0	0.3	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.1	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	1.6	0.0	0.3	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		464			631							
Approach Delay, s/veh		1.4			0.3							
Approach LOS		A			A							
Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.4				2.0				
Green Ext Time (p_c), s				2.1				4.0				

Intersection Summary			
HCM 6th Ctrl Delay			0.8
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	227	0	0	492	144	0	879	80	0	0	0
Future Volume (veh/h)	0	227	0	0	492	144	0	879	80	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	255	0	0	631	185	0	977	89			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1685	493	0	0	0			
Arrive On Green	0.00	0.75	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	2315	655		0				
Grp Volume(v), veh/h	0	255	0	0	413	403		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1426						
Q Serve(g_s), s	0.0	0.7	0.0	0.0	3.5	3.5						
Cycle Q Clear(g_c), s	0.0	0.7	0.0	0.0	3.5	3.5						
Prop In Lane	0.00		0.00	0.00		0.46						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1074						
V/C Ratio(X)	0.00	0.10	0.00	0.00	0.37	0.38						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1074						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	1.2	0.0	0.0	1.5	1.5						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	1.0	1.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.3	0.3						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	0.0	0.0	2.5	2.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		255			816							
Approach Delay, s/veh		1.3			2.5							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.7				5.5				
Green Ext Time (p_c), s				1.4				4.7				

Intersection Summary			
HCM 6th Ctrl Delay			2.2
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	357	5	4	664	2	2	0	3	0	0	0
Future Vol, veh/h	2	357	5	4	664	2	2	0	3	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	6	6	2	2	7	7	2	2	2	0	2	0
Mvmt Flow	2	397	5	4	722	2	2	0	3	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	724	0	0	402	0	0	773	1136	201	934	1137	362
Stage 1	-	-	-	-	-	-	404	404	-	731	731	-
Stage 2	-	-	-	-	-	-	369	732	-	203	406	-
Critical Hdwy	4.22	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.26	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	848	-	-	1153	-	-	289	201	806	224	200	641
Stage 1	-	-	-	-	-	-	594	598	-	384	425	-
Stage 2	-	-	-	-	-	-	623	425	-	786	596	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	848	-	-	1153	-	-	288	200	806	222	199	641
Mov Cap-2 Maneuver	-	-	-	-	-	-	288	200	-	222	199	-
Stage 1	-	-	-	-	-	-	593	597	-	383	424	-
Stage 2	-	-	-	-	-	-	621	424	-	781	595	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	12.8	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	469	848	-	-	1153	-	-	-
HCM Lane V/C Ratio	0.012	0.003	-	-	0.004	-	-	-
HCM Control Delay (s)	12.8	9.3	-	-	8.1	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	355	5	4	658	2	2	0	3	2	0	3
Future Vol, veh/h	2	355	5	4	658	2	2	0	3	2	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	4	4	2	2	3	3	2	2	2	0	2	0
Mvmt Flow	2	399	5	4	715	2	2	0	3	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	717	0	0	404	0	0	772	1131	202	928	1132	359
Stage 1	-	-	-	-	-	-	406	406	-	724	724	-
Stage 2	-	-	-	-	-	-	366	725	-	204	408	-
Critical Hdwy	4.18	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.24	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	867	-	-	1151	-	-	289	202	805	226	202	643
Stage 1	-	-	-	-	-	-	593	596	-	388	429	-
Stage 2	-	-	-	-	-	-	626	428	-	785	595	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	867	-	-	1151	-	-	286	201	805	224	201	643
Mov Cap-2 Maneuver	-	-	-	-	-	-	286	201	-	224	201	-
Stage 1	-	-	-	-	-	-	592	595	-	387	428	-
Stage 2	-	-	-	-	-	-	619	427	-	780	594	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0	12.8	15
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	466	867	-	-	1151	-	-	368
HCM Lane V/C Ratio	0.012	0.003	-	-	0.004	-	-	0.023
HCM Control Delay (s)	12.8	9.2	-	-	8.1	-	-	15
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0	0	-	-	0	-	-	0.1

Intersection						
Int Delay, s/veh	0.1					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	356	5	4	666	3	7
Future Vol, veh/h	356	5	4	666	3	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	387	5	4	724	3	8

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	392	0	760	196
Stage 1	-	-	-	-	390	-
Stage 2	-	-	-	-	370	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1163	-	342	812
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	669	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1163	-	341	812
Mov Cap-2 Maneuver	-	-	-	-	457	-
Stage 1	-	-	-	-	653	-
Stage 2	-	-	-	-	667	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	659	-	-	1163	-
HCM Lane V/C Ratio	0.016	-	-	0.004	-
HCM Control Delay (s)	10.6	-	-	8.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	257	103	174	469	25	84	238	60	29	464	304
Future Volume (veh/h)	130	257	103	174	469	25	84	238	60	29	464	304
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	148	292	117	226	609	32	98	277	70	38	603	395
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	431	1416	555	541	1888	99	158	892	221	306	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	782	2475	969	938	3298	173	551	2754	684	1001	3441	1535
Grp Volume(v), veh/h	148	206	203	226	315	326	98	173	174	38	603	395
Grp Sat Flow(s),veh/h/ln	782	1763	1681	938	1706	1765	551	1735	1703	1001	1721	1535
Q Serve(g_s), s	15.0	6.9	7.2	18.9	11.8	11.9	21.7	9.1	9.4	3.6	17.6	28.7
Cycle Q Clear(g_c), s	26.8	6.9	7.2	26.1	11.8	11.9	39.3	9.1	9.4	13.1	17.6	28.7
Prop In Lane	1.00		0.58	1.00		0.10	1.00		0.40	1.00		1.00
Lane Grp Cap(c), veh/h	431	1009	962	541	977	1010	158	562	551	306	1114	497
V/C Ratio(X)	0.34	0.20	0.21	0.42	0.32	0.32	0.62	0.31	0.32	0.12	0.54	0.79
Avail Cap(c_a), veh/h	431	1009	962	541	977	1010	158	562	551	306	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.8	12.7	12.7	19.1	13.7	13.7	50.0	31.1	31.2	36.1	33.9	37.7
Incr Delay (d2), s/veh	2.2	0.5	0.5	2.4	0.9	0.8	16.9	1.4	1.5	0.8	1.9	12.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	2.6	2.6	4.1	4.4	4.5	3.6	3.9	4.0	0.9	7.3	11.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.9	13.1	13.2	21.4	14.6	14.6	66.9	32.5	32.7	36.9	35.8	50.0
LnGrp LOS	C	B	B	C	B	B	E	C	C	D	D	D
Approach Vol, veh/h		557			867			445			1036	
Approach Delay, s/veh		15.8			16.4			40.1			41.3	
Approach LOS		B			B			D			D	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		41.3		28.8		30.7		28.1				
Green Ext Time (p_c), s		0.0		3.4		3.5		4.6				

Intersection Summary			
HCM 6th Ctrl Delay			28.8
HCM 6th LOS			C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	362	3	12	654	3	14	0	33	2	0	2
Future Vol, veh/h	0	362	3	12	654	3	14	0	33	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	0	402	3	13	735	3	16	0	37	3	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	738	0	0	405	0	0	798	1168	203	964	1168	369
Stage 1	-	-	-	-	-	-	404	404	-	763	763	-
Stage 2	-	-	-	-	-	-	394	764	-	201	405	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	832	-	-	1102	-	-	244	165	745	213	195	634
Stage 1	-	-	-	-	-	-	543	550	-	367	416	-
Stage 2	-	-	-	-	-	-	551	366	-	788	602	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	832	-	-	1102	-	-	241	163	745	201	193	634
Mov Cap-2 Maneuver	-	-	-	-	-	-	241	163	-	201	193	-
Stage 1	-	-	-	-	-	-	543	550	-	367	411	-
Stage 2	-	-	-	-	-	-	542	362	-	749	602	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.1	13.8	17.1
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	459	832	-	-	1102	-	-	305
HCM Lane V/C Ratio	0.114	-	-	-	0.012	-	-	0.022
HCM Control Delay (s)	13.8	0	-	-	8.3	-	-	17.1
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	0.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	241	0	0	494	144	0	879	80	0	0	0
Future Volume (veh/h)	0	241	0	0	494	144	0	879	80	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	0	1796	0	0	1544	1544	0	1781	1781			
Adj Flow Rate, veh/h	0	271	0	0	633	185	0	977	89			
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78	0.90	0.90	0.90			
Percent Heavy Veh, %	0	7	0	0	24	24	0	8	8			
Cap, veh/h	0	2569	0	0	1686	492	0	0	0			
Arrive On Green	0.00	0.75	0.00	0.00	0.75	0.75	0.00	0.00	0.00			
Sat Flow, veh/h	0	3593	0	0	2317	654		0				
Grp Volume(v), veh/h	0	271	0	0	414	404		0.0				
Grp Sat Flow(s),veh/h/ln	0	1706	0	0	1467	1427						
Q Serve(g_s), s	0.0	0.8	0.0	0.0	3.5	3.5						
Cycle Q Clear(g_c), s	0.0	0.8	0.0	0.0	3.5	3.5						
Prop In Lane	0.00		0.00	0.00		0.46						
Lane Grp Cap(c), veh/h	0	2569	0	0	1104	1074						
V/C Ratio(X)	0.00	0.11	0.00	0.00	0.38	0.38						
Avail Cap(c_a), veh/h	0	2569	0	0	1104	1074						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00						
Upstream Filter(I)	0.00	1.00	0.00	0.00	1.00	1.00						
Uniform Delay (d), s/veh	0.0	1.2	0.0	0.0	1.5	1.5						
Incr Delay (d2), s/veh	0.0	0.1	0.0	0.0	1.0	1.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.0	0.3	0.3						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	0.0	0.0	2.5	2.5						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		271			818							
Approach Delay, s/veh		1.3			2.5							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				2.8				5.5				
Green Ext Time (p_c), s				1.5				4.7				

Intersection Summary			
HCM 6th Ctrl Delay			2.2
HCM 6th LOS			A

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	241	189	0	494	0	0	0	0	0	1533	145
Future Volume (veh/h)	0	241	189	0	494	0	0	0	0	0	1533	145
Initial Q (Qb), veh	0	0	0	0	0	0				0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00				1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00				1.00	1.00	1.00
Work Zone On Approach		No			No						No	
Adj Sat Flow, veh/h/ln	0	1796	1796	0	1544	0				0	1752	1752
Adj Flow Rate, veh/h	0	271	212	0	633	0				0	1614	153
Peak Hour Factor	0.89	0.89	0.89	0.78	0.78	0.78				0.95	0.95	0.95
Percent Heavy Veh, %	0	7	7	0	24	0				0	10	10
Cap, veh/h	0	2569	1146	0	2209	0				0	0	0
Arrive On Green	0.00	0.75	0.75	0.00	1.00	0.00				0.00	0.00	0.00
Sat Flow, veh/h	0	3503	1522	0	3089	0					0	
Grp Volume(v), veh/h	0	271	212	0	633	0					0.0	
Grp Sat Flow(s),veh/h/ln	0	1706	1522	0	1467	0						
Q Serve(g_s), s	0.0	0.8	1.4	0.0	0.0	0.0						
Cycle Q Clear(g_c), s	0.0	0.8	1.4	0.0	0.0	0.0						
Prop In Lane	0.00		1.00	0.00		0.00						
Lane Grp Cap(c), veh/h	0	2569	1146	0	2209	0						
V/C Ratio(X)	0.00	0.11	0.19	0.00	0.29	0.00						
Avail Cap(c_a), veh/h	0	2569	1146	0	2209	0						
HCM Platoon Ratio	1.00	1.00	1.00	1.00	2.00	1.00						
Upstream Filter(I)	0.00	1.00	1.00	0.00	1.00	0.00						
Uniform Delay (d), s/veh	0.0	1.2	1.3	0.0	0.0	0.0						
Incr Delay (d2), s/veh	0.0	0.1	0.4	0.0	0.3	0.0						
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0						
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.1	0.0	0.1	0.0						
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	1.3	1.6	0.0	0.3	0.0						
LnGrp LOS	A	A	A	A	A	A						
Approach Vol, veh/h		483			633							
Approach Delay, s/veh		1.4			0.3							
Approach LOS		A			A							

Timer - Assigned Phs				4				8				
Phs Duration (G+Y+Rc), s				36.0				36.0				
Change Period (Y+Rc), s				* 8.9				* 8.9				
Max Green Setting (Gmax), s				* 27				* 27				
Max Q Clear Time (g_c+I1), s				3.4				2.0				
Green Ext Time (p_c), s				2.2				4.0				

Intersection Summary	
HCM 6th Ctrl Delay	0.8
HCM 6th LOS	A

Notes

User approved pedestrian interval to be less than phase max green.

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	355	14	12	680	2	12	0	14	0	0	0
Future Vol, veh/h	2	355	14	12	680	2	12	0	14	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	6	6	2	2	7	7	2	2	2	0	2	0
Mvmt Flow	2	394	15	13	739	2	13	0	15	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	741	0	0	409	0	0	802	1173	205	967	1179	371
Stage 1	-	-	-	-	-	-	406	406	-	766	766	-
Stage 2	-	-	-	-	-	-	396	767	-	201	413	-
Critical Hdwy	4.22	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.26	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	836	-	-	1146	-	-	275	191	802	212	189	632
Stage 1	-	-	-	-	-	-	593	596	-	366	410	-
Stage 2	-	-	-	-	-	-	601	410	-	788	592	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	836	-	-	1146	-	-	272	189	802	206	187	632
Mov Cap-2 Maneuver	-	-	-	-	-	-	272	189	-	206	187	-
Stage 1	-	-	-	-	-	-	592	595	-	365	405	-
Stage 2	-	-	-	-	-	-	594	405	-	771	591	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.1	14.1	0
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	422	836	-	-	1146	-	-	-
HCM Lane V/C Ratio	0.067	0.003	-	-	0.011	-	-	-
HCM Control Delay (s)	14.1	9.3	-	-	8.2	-	-	0
HCM Lane LOS	B	A	-	-	A	-	-	A
HCM 95th %tile Q(veh)	0.2	0	-	-	0	-	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	366	3	3	676	2	7	0	7	2	0	3
Future Vol, veh/h	2	366	3	3	676	2	7	0	7	2	0	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	89	89	92	92	92	92	92	92	92	60	92	60
Heavy Vehicles, %	4	4	2	2	3	3	2	2	2	0	2	0
Mvmt Flow	2	411	3	3	735	2	8	0	8	3	0	5

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	737	0	0	414	0	0	791	1160	207	952	1160	369
Stage 1	-	-	-	-	-	-	417	417	-	742	742	-
Stage 2	-	-	-	-	-	-	374	743	-	210	418	-
Critical Hdwy	4.18	-	-	4.14	-	-	7.54	6.54	6.94	7.5	6.54	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.5	5.54	-
Follow-up Hdwy	2.24	-	-	2.22	-	-	3.52	4.02	3.32	3.5	4.02	3.3
Pot Cap-1 Maneuver	852	-	-	1141	-	-	280	194	799	217	194	634
Stage 1	-	-	-	-	-	-	584	590	-	378	420	-
Stage 2	-	-	-	-	-	-	619	420	-	778	589	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	852	-	-	1141	-	-	277	193	799	214	193	634
Mov Cap-2 Maneuver	-	-	-	-	-	-	277	193	-	214	193	-
Stage 1	-	-	-	-	-	-	583	589	-	377	419	-
Stage 2	-	-	-	-	-	-	613	419	-	769	588	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	14.1	15.4
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	411	852	-	-	1141	-	-	355
HCM Lane V/C Ratio	0.037	0.003	-	-	0.003	-	-	0.023
HCM Control Delay (s)	14.1	9.2	-	-	8.2	-	-	15.4
HCM Lane LOS	B	A	-	-	A	-	-	C
HCM 95th %tile Q(veh)	0.1	0	-	-	0	-	-	0.1

Intersection						
Int Delay, s/veh	0.3					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	372	3	2	672	14	19
Future Vol, veh/h	372	3	2	672	14	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	100	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	404	3	2	730	15	21

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	407	0	775	204
Stage 1	-	-	-	-	406	-
Stage 2	-	-	-	-	369	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1148	-	335	803
Stage 1	-	-	-	-	641	-
Stage 2	-	-	-	-	670	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1148	-	334	803
Mov Cap-2 Maneuver	-	-	-	-	451	-
Stage 1	-	-	-	-	641	-
Stage 2	-	-	-	-	669	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	11.3
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	603	-	-	1148	-
HCM Lane V/C Ratio	0.059	-	-	0.002	-
HCM Control Delay (s)	11.3	-	-	8.1	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.2	-	-	0	-

HCM 6th Signalized Intersection Summary
3: East Paris Ave & 52nd St

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	130	262	103	175	492	27	84	238	62	29	464	304
Future Volume (veh/h)	130	262	103	175	492	27	84	238	62	29	464	304
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1856	1856	1856	1796	1796	1796	1826	1826	1826	1811	1811	1811
Adj Flow Rate, veh/h	148	298	117	227	639	35	98	277	72	38	603	395
Peak Hour Factor	0.88	0.88	0.88	0.77	0.77	0.77	0.86	0.86	0.86	0.77	0.77	0.77
Percent Heavy Veh, %	3	3	3	7	7	7	5	5	5	6	6	6
Cap, veh/h	415	1425	547	537	1883	103	158	886	226	305	1114	497
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.32	0.32	0.32	0.32	0.32	0.32
Sat Flow, veh/h	758	2490	956	933	3290	180	551	2736	698	999	3441	1535
Grp Volume(v), veh/h	148	209	206	227	331	343	98	174	175	38	603	395
Grp Sat Flow(s),veh/h/ln	758	1763	1683	933	1706	1764	551	1735	1700	999	1721	1535
Q Serve(g_s), s	15.7	7.0	7.3	19.2	12.6	12.6	21.7	9.2	9.5	3.6	17.6	28.7
Cycle Q Clear(g_c), s	28.4	7.0	7.3	26.5	12.6	12.6	39.3	9.2	9.5	13.1	17.6	28.7
Prop In Lane	1.00		0.57	1.00		0.10	1.00		0.41	1.00		1.00
Lane Grp Cap(c), veh/h	415	1009	964	537	977	1010	158	562	551	305	1114	497
V/C Ratio(X)	0.36	0.21	0.21	0.42	0.34	0.34	0.62	0.31	0.32	0.12	0.54	0.79
Avail Cap(c_a), veh/h	415	1009	964	537	977	1010	158	562	551	305	1114	497
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	21.4	12.7	12.7	19.2	13.9	13.9	50.0	31.1	31.2	36.1	33.9	37.7
Incr Delay (d2), s/veh	2.4	0.5	0.5	2.4	0.9	0.9	16.9	1.4	1.5	0.8	1.9	12.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	2.7	2.7	4.2	4.7	4.8	3.6	3.9	4.0	0.9	7.3	11.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.8	13.2	13.2	21.6	14.8	14.8	66.9	32.5	32.7	37.0	35.8	50.0
LnGrp LOS	C	B	B	C	B	B	E	C	C	D	D	D
Approach Vol, veh/h		563			901			447			1036	
Approach Delay, s/veh		16.0			16.5			40.1			41.3	
Approach LOS		B			B			D			D	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		46.0		76.3		46.0		76.3				
Change Period (Y+Rc), s		* 6.4		* 6.3		* 6.4		* 6.3				
Max Green Setting (Gmax), s		* 40		* 70		* 40		* 49				
Max Q Clear Time (g_c+I1), s		41.3		30.4		30.7		28.5				
Green Ext Time (p_c), s		0.0		3.5		3.5		4.8				

Intersection Summary		
HCM 6th Ctrl Delay		28.7
HCM 6th LOS		C

Notes
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	390	3	12	358	3	14	0	33	2	0	2
Future Vol, veh/h	0	390	3	12	358	3	14	0	33	2	0	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	89	89	89	90	90	90	60	60	60
Heavy Vehicles, %	7	7	7	9	9	9	22	22	22	0	0	0
Mvmt Flow	0	433	3	13	402	3	16	0	37	3	0	3

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	405	0	0	436	0	0	662	866	218	647	866	203
Stage 1	-	-	-	-	-	-	435	435	-	430	430	-
Stage 2	-	-	-	-	-	-	227	431	-	217	436	-
Critical Hdwy	4.24	-	-	4.28	-	-	7.94	6.94	7.34	7.5	6.5	6.9
Critical Hdwy Stg 1	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.94	5.94	-	6.5	5.5	-
Follow-up Hdwy	2.27	-	-	2.29	-	-	3.72	4.22	3.52	3.5	4	3.3
Pot Cap-1 Maneuver	1115	-	-	1072	-	-	310	256	728	360	293	810
Stage 1	-	-	-	-	-	-	519	531	-	579	587	-
Stage 2	-	-	-	-	-	-	701	534	-	771	583	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1115	-	-	1072	-	-	306	253	728	339	289	810
Mov Cap-2 Maneuver	-	-	-	-	-	-	306	253	-	339	289	-
Stage 1	-	-	-	-	-	-	519	531	-	579	580	-
Stage 2	-	-	-	-	-	-	690	528	-	732	583	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	12.8	12.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	516	1115	-	-	1072	-	-	478
HCM Lane V/C Ratio	0.101	-	-	-	0.013	-	-	0.014
HCM Control Delay (s)	12.8	0	-	-	8.4	-	-	12.6
HCM Lane LOS	B	A	-	-	A	-	-	B
HCM 95th %tile Q(veh)	0.3	0	-	-	0	-	-	0

APPENDIX C

Traffic Volume Memorandum

SPALDING DEDECKER
Engineering & Surveying Excellence since 1954

MEMORANDUM

DATE: 11/10/2022

TO: Terry Schweitzer, AICP

ORGANIZATION NAME: City of Kentwood

FROM: Spalding DeDecker

RE: Steelcase Facilities Traffic Study

JOB NO.: RB22018

Spalding DeDecker has been provided potential land uses for the former Steelcase property located off 52nd Street in Kentwood, MI. These potential land uses include a motor freight terminal, a contractor's yard, and a vehicle repair for commercial trucks. Each land use, if implemented, will contribute additional traffic volume to the existing 52nd Street traffic. The existing parcel will be divided into three different uses. To develop a range of potential traffic impacts of the three development uses, the minimum and maximum traffic volume scenarios were formulated.

In the tables below, the various development scenarios are listed along with peak hour volumes that were calculated from Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition methodology. The additional tables show the total additional peak traffic volumes for scenarios assuming the most amount of additional traffic volume and the least amount of additional traffic volume given the land uses that have been identified. The maximum traffic volume scenario is the most intense land use implemented over all three areas; the minimum traffic scenario is the least intense land use implemented over the three areas.

The motor freight terminal was the most impactful land use with 58 trips generated during the morning peak hour and 52 trips generated during the afternoon peak hour. The vehicle repair land use contributed the lowest additional volume with 14 trips generated during the morning peak hour and 14 trips generated during the afternoon peak hour. The contractor's yard land use contributes 16 trips during the morning peak hour and 20 trips during the afternoon peak hour. The developments will likely be a mix of the three previously mentioned land uses. A combination of the three land uses would contribute 88 trips generated during the morning peak hour and 86 trips during the afternoon peak hour.

The maximum number of trips generated from these developments was found to be 174 trips during the morning peak hour and 156 trips during the afternoon peak hour if all three parcels were developed to match the motor freight terminal land use. The minimum number of trips generated from these developments was found to be 42 trips during the morning peak hour and 42 trips during the afternoon peak hour for the vehicle repair, major land use.

Assumptions

- The vehicle repair, major land use that was provided was assumed to be equivalent to the industrial park (130) ITE land use. The ITE land use was chosen based on the description that has been attached. The automobile care center (942) land use was not used as an equivalent as this land use focuses more on passenger vehicle services such as a dealership or auto parts store, which provides a different trip generation profile than a land use that services commercial trucking related activities. The industrial park (130) land use was determined to be a more comparable representation of how this development would be used.
- The contractor's yard land use that was provided was assumed to be equivalent to the construction equipment rental store (811) ITE land use. The ITE land use was chosen based on the description that has been attached.
- The square footage used to calculate trip generation volumes for the motor freight terminal and vehicle repair, major were provided by Transport Properties. The square footage for equipment rental store was determined by determining the average square footage of existing similar facilities.
- Since the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition does not contain an appropriate equivalent land use for the motor freight terminal, a traffic analysis for a similar development was used to determine the trip generation. This additional study references the City of San Diego Municipal Code Land Development Code Trip Generation Manual (2003). The difference in the land use area between the studied site and the proposed site was calculated to determine the predicted trips generated. Please see Section 4.1 (p.43) of the appended 2020 traffic study for a discussion of its trip generation methodology for a trucking storage faclitiy.

PROPOSED TRAFFIC VOLUMES						
Land Use	ITE Code	ITE Code Name	Independent Variable	IV Number	Trips Generated AM[1]	Trips Generated PM[1]
Vehicle Repair, Major	130	Industrial Park	sqft	40340	14	14
Contractor's Yard	811[2]	Construction Equipment Rental Store	sqft	16912	16	20
Motor Freight Terminal[3]			Acre	8	58	52
Total					**88**	**86**

[1]Numbers collected from itetripgen.org

[2]AM peak hour data was not available for this land use. It was assumed that there would be a 25% difference between AM and PM peak hours. This was determined by comparing related land uses.

[3]Trips genereated for this land were taken from a traffic analysis performed by a similar development that used the City of San Diego Municipal Code Land Development Code Trip Generation Manual (2003).

MAXIMUM TRAFFIC VOLUMES						
Land Use	ITE Code	ITE Code Name	Independent Variable	IV Number	Trips Generated AM	Trips Generated PM
Motor Freight Terminal[3]			Acre	8	58	52
Motor Freight Terminal[3]			Acre	8	58	52
Motor Freight Terminal[3]			Acre	8	58	52
Total					**174**	**156**

[3]Trips genereated for this land were taken from a traffic analysis performed by a similar development that used the City of San Diego Municipal Code Land Development Code Trip Generation Manual (2003).

MINIMUM TRAFFIC VOLUMES						
Land Use	ITE Code	ITE Code Name	Independent Variable	IV Number	Trips Generated AM[1]	Trips Generated PM[1]
Vehicle Repair, Major	130	Industrial Park	sqft	40340	14	14
Vehicle Repair, Major	130	Industrial Park	sqft	40340	14	14
Vehicle Repair, Major	130	Industrial Park	sqft	40340	14	14
Total					**42**	**42**

[1]Numbers collected from itetripgen.org

Land Use: 130
Industrial Park

Description

An industrial park contains several individual industrial or related facilities. It is characterized by a mix of manufacturing, service, and warehouse facilities with a wide variation in the proportion of each type of use from one location to another. Many industrial parks contain highly diversified facilities. Some parks in the database have a large number of small businesses and others have one or two dominant industries. General light industrial (Land Use 110) and manufacturing (Land Use 140) are related uses.

Additional Data

The sites were surveyed in the 1980s, the 2000s, 2010s, and the 2020s in California, Georgia, New Jersey, Massachusetts, New York, Ontario (CAN), and Pennsylvania.

Source Numbers

106, 162, 184, 251, 277, 422, 706, 747, 753, 937, 1032, 1070

Industrial Park
(130)

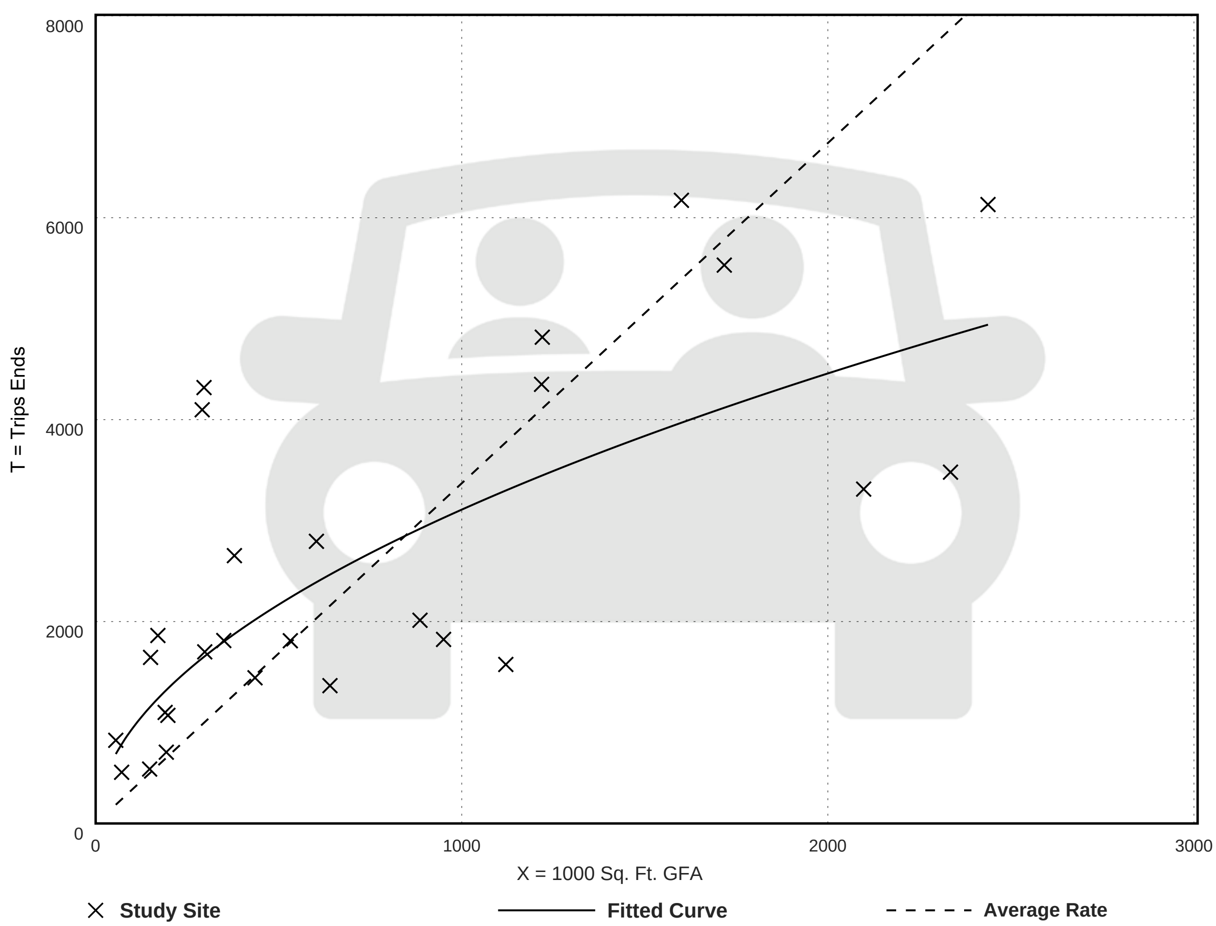
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 27
Avg. 1000 Sq. Ft. GFA: 762
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
3.37	1.41 - 14.98	2.60

Data Plot and Equation



Fitted Curve Equation: $Ln(T) = 0.52\ Ln(X) + 4.45$ **$R^2 = 0.58$**

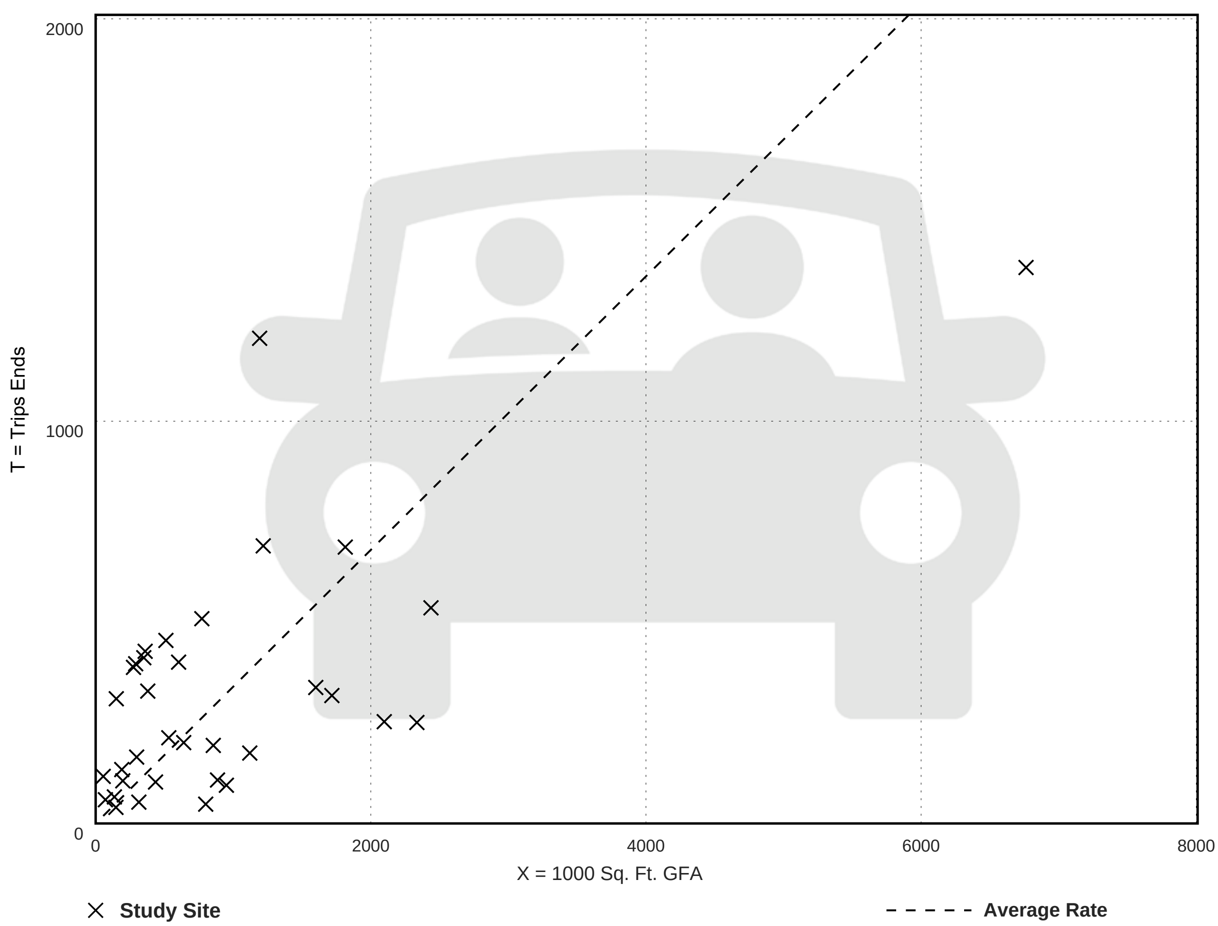
Industrial Park
(130)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	34
Avg. 1000 Sq. Ft. GFA:	956
Directional Distribution:	81% entering, 19% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.34	0.06 - 2.13	0.33

Data Plot and Equation



Fitted Curve Equation: Not Given R^2= ***

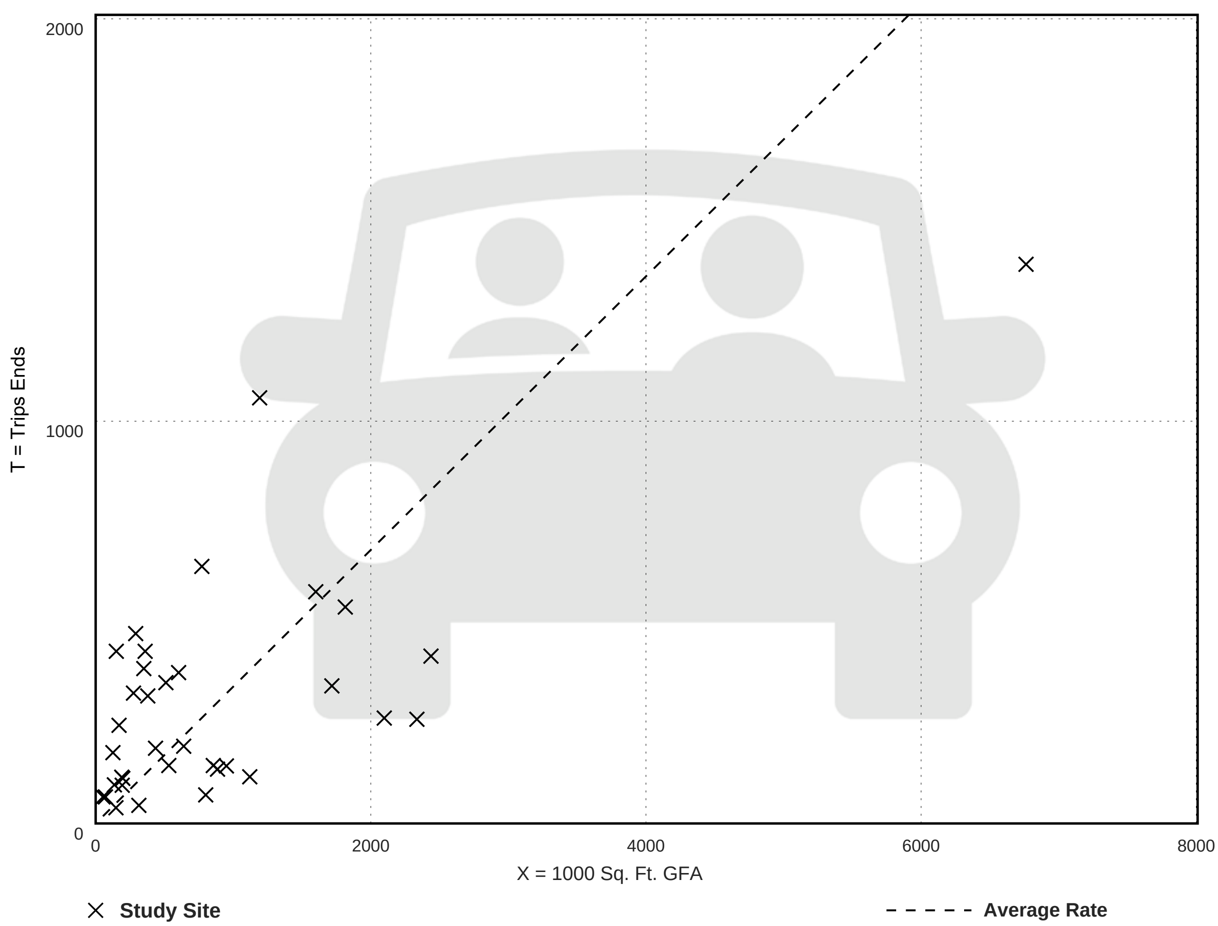
Industrial Park
(130)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,** **Peak Hour of Adjacent Street Traffic,** **One Hour Between 4 and 6 p.m.**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	35
Avg. 1000 Sq. Ft. GFA:	899
Directional Distribution:	22% entering, 78% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.34	0.09 - 2.85	0.36

Data Plot and Equation



Fitted Curve Equation: Not Given **R^2= *****

Industrial Park
(130)

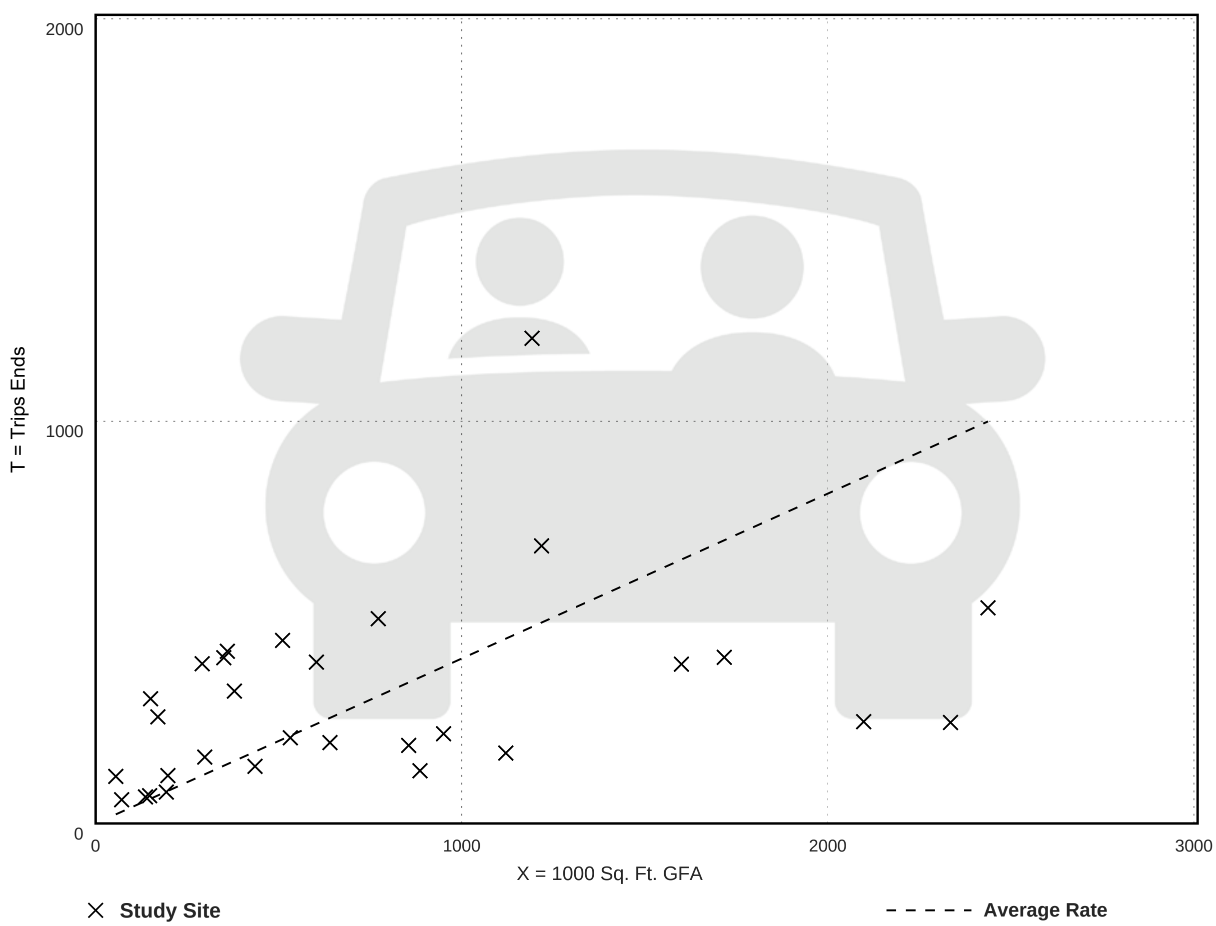
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
AM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 30
Avg. 1000 Sq. Ft. GFA: 757
Directional Distribution: 87% entering, 13% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.41	0.11 - 2.13	0.37

Data Plot and Equation



Fitted Curve Equation: Not Given **R^2= *****

Industrial Park
(130)

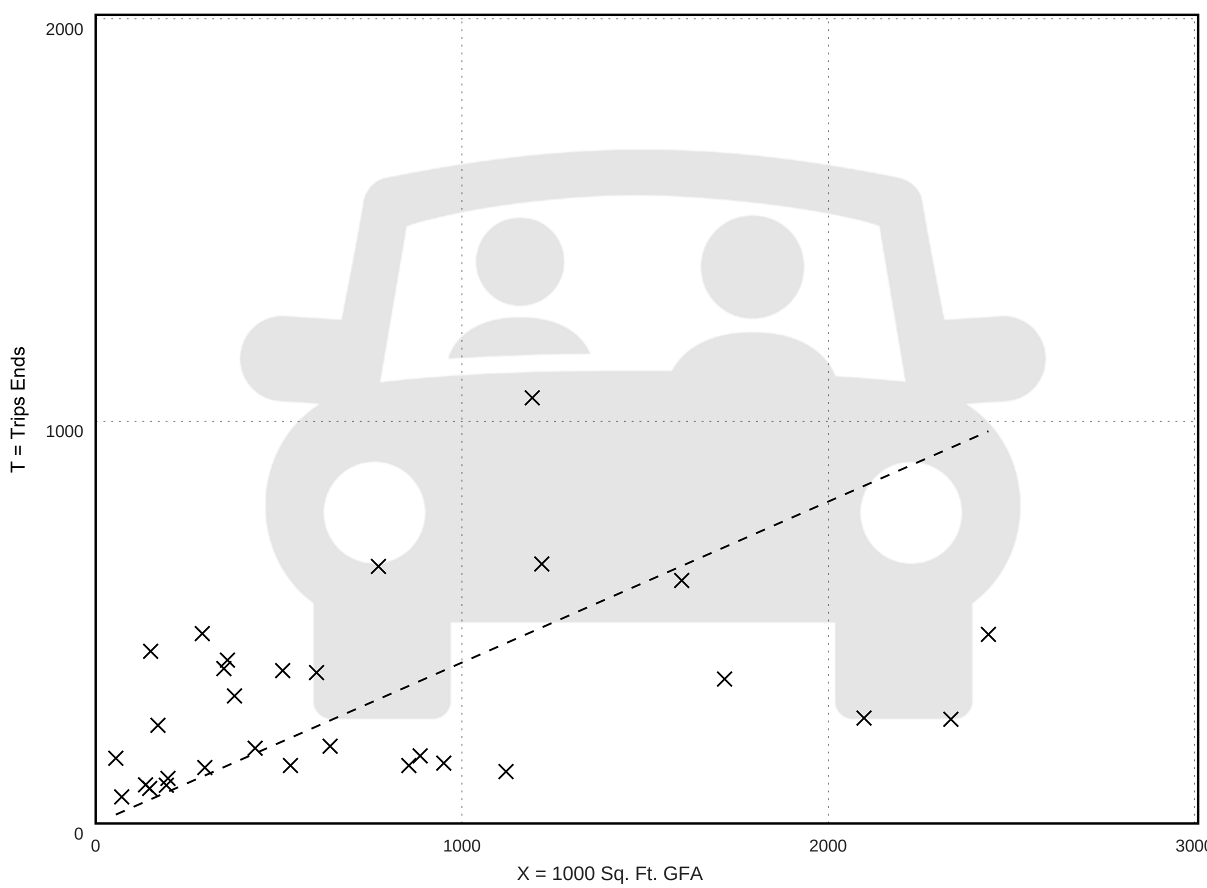
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Weekday,
PM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 30
Avg. 1000 Sq. Ft. GFA: 757
Directional Distribution: 21% entering, 79% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.40	0.11 - 2.95	0.41

Data Plot and Equation



× **Study Site** - - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= *****

Industrial Park
(130)

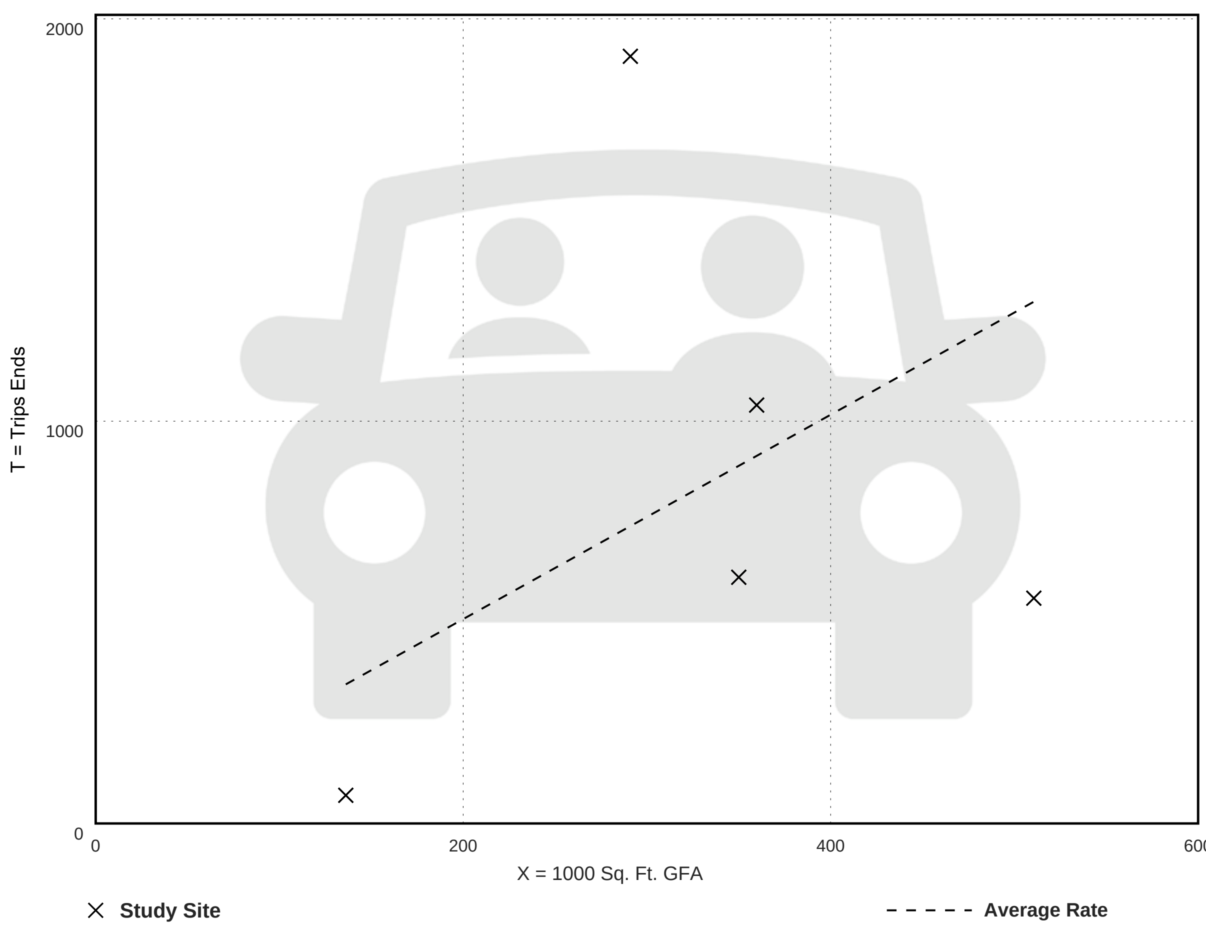
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Saturday

Setting/Location: General Urban/Suburban
Number of Studies: 5
Avg. 1000 Sq. Ft. GFA: 329
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
2.54	0.51 - 6.55	2.23

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= ***

Industrial Park
(130)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Saturday, Peak Hour of Generator

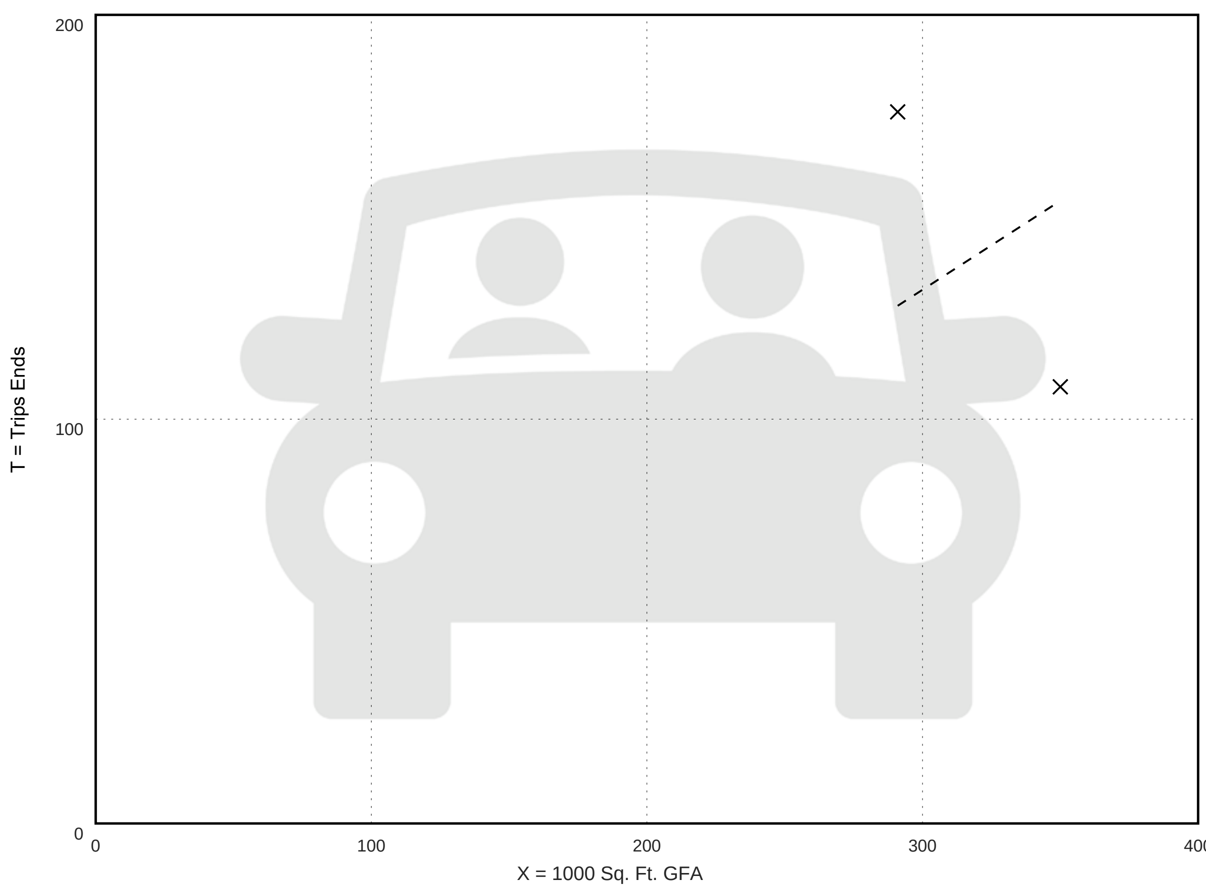
Setting/Location: General Urban/Suburban
Number of Studies: 2
Avg. 1000 Sq. Ft. GFA: 321
Directional Distribution: 32% entering, 68% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.44	0.31 - 0.60	***

Data Plot and Equation

Caution – Small Sample Size



× **Study Site** - - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= *****

Industrial Park
(130)

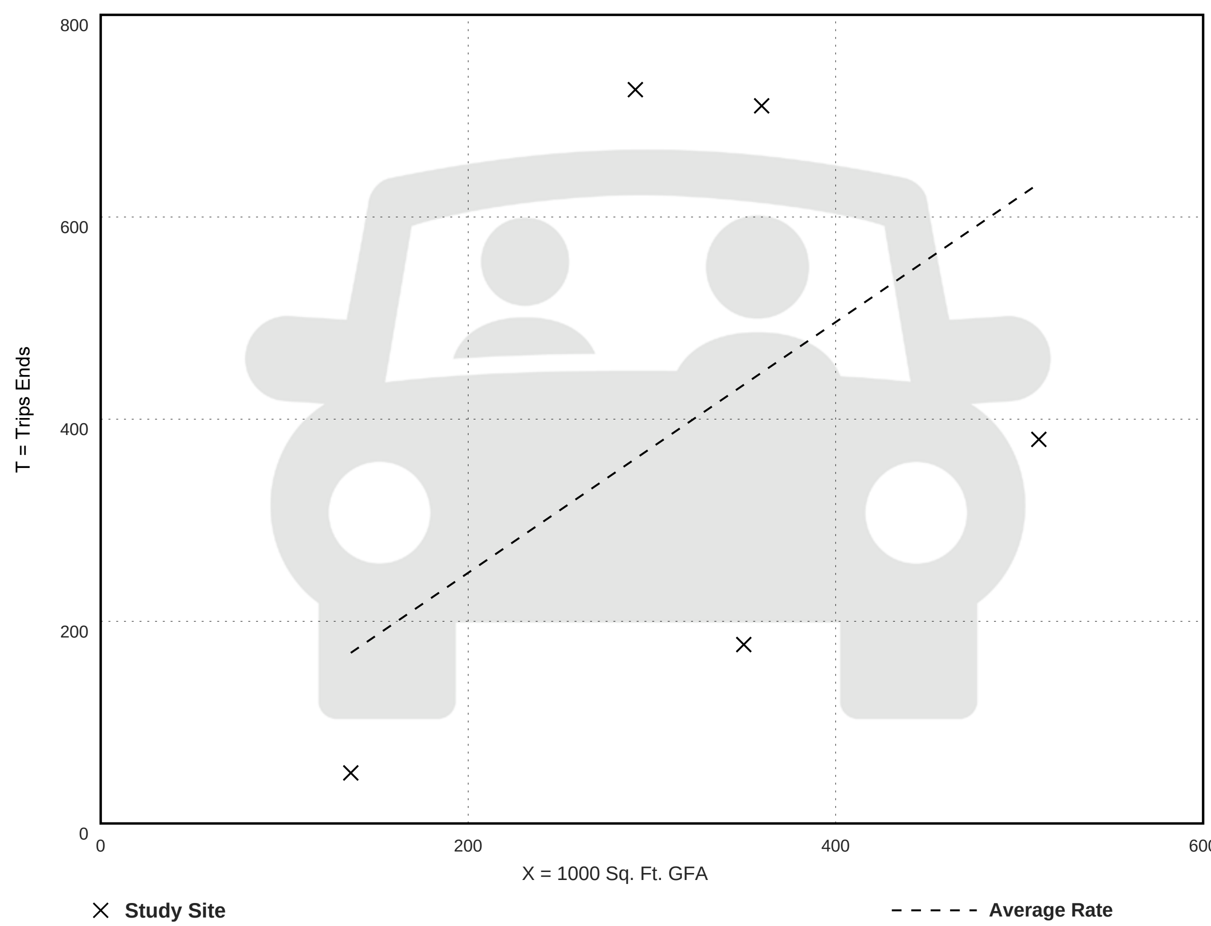
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Sunday

Setting/Location: General Urban/Suburban
Number of Studies: 5
Avg. 1000 Sq. Ft. GFA: 329
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.24	0.37 - 2.49	0.90

Data Plot and Equation



Fitted Curve Equation: Not Given **R^2= *****

Industrial Park
(130)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA
On a: Sunday, Peak Hour of Generator

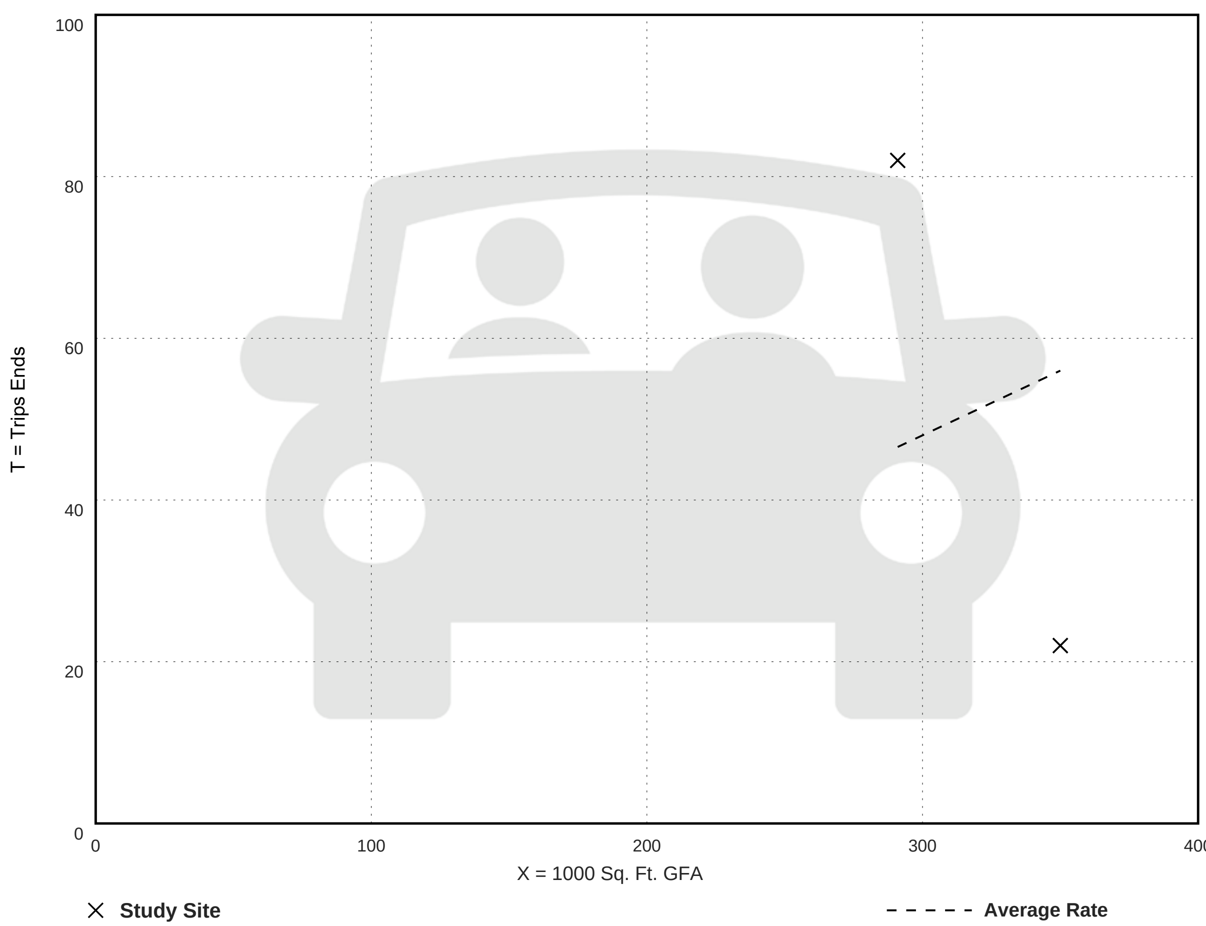
Setting/Location: General Urban/Suburban
Number of Studies: 2
Avg. 1000 Sq. Ft. GFA: 321
Directional Distribution: 46% entering, 54% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.16	0.06 - 0.28	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= ***

Industrial Park
(130)

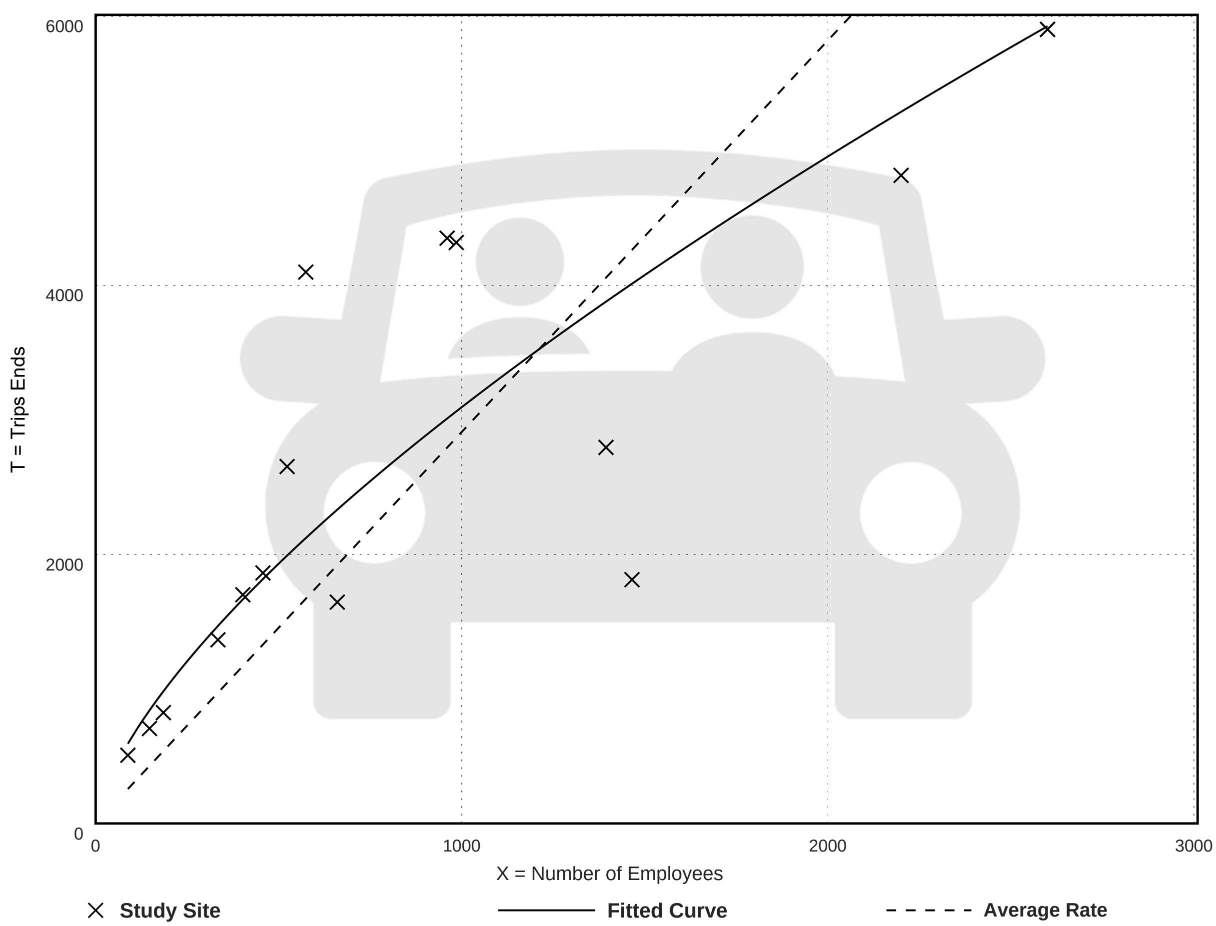
Vehicle Trip Ends vs: Employees
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 16
Avg. Num. of Employees: 973
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
2.91	1.24 - 7.14	1.42

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.68 Ln(X) + 3.34 **R^2= 0.81**

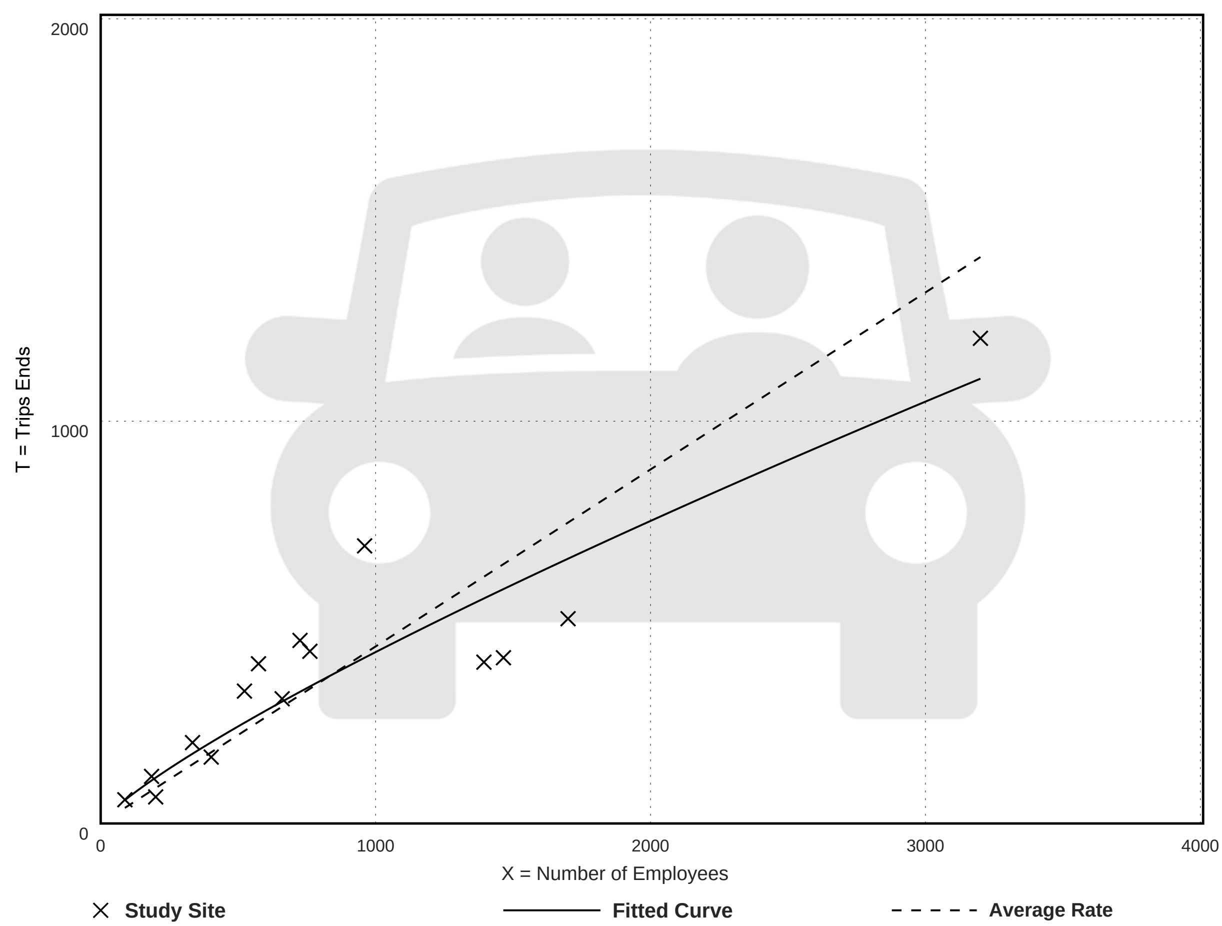
Industrial Park
(130)

Vehicle Trip Ends vs: Employees
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 15
Avg. Num. of Employees: 878
Directional Distribution: 86% entering, 14% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.44	0.28 - 0.72	0.16

Data Plot and Equation



Fitted Curve Equation: $Ln(T) = 0.82\ Ln(X) + 0.39$

$R^2 = 0.87$

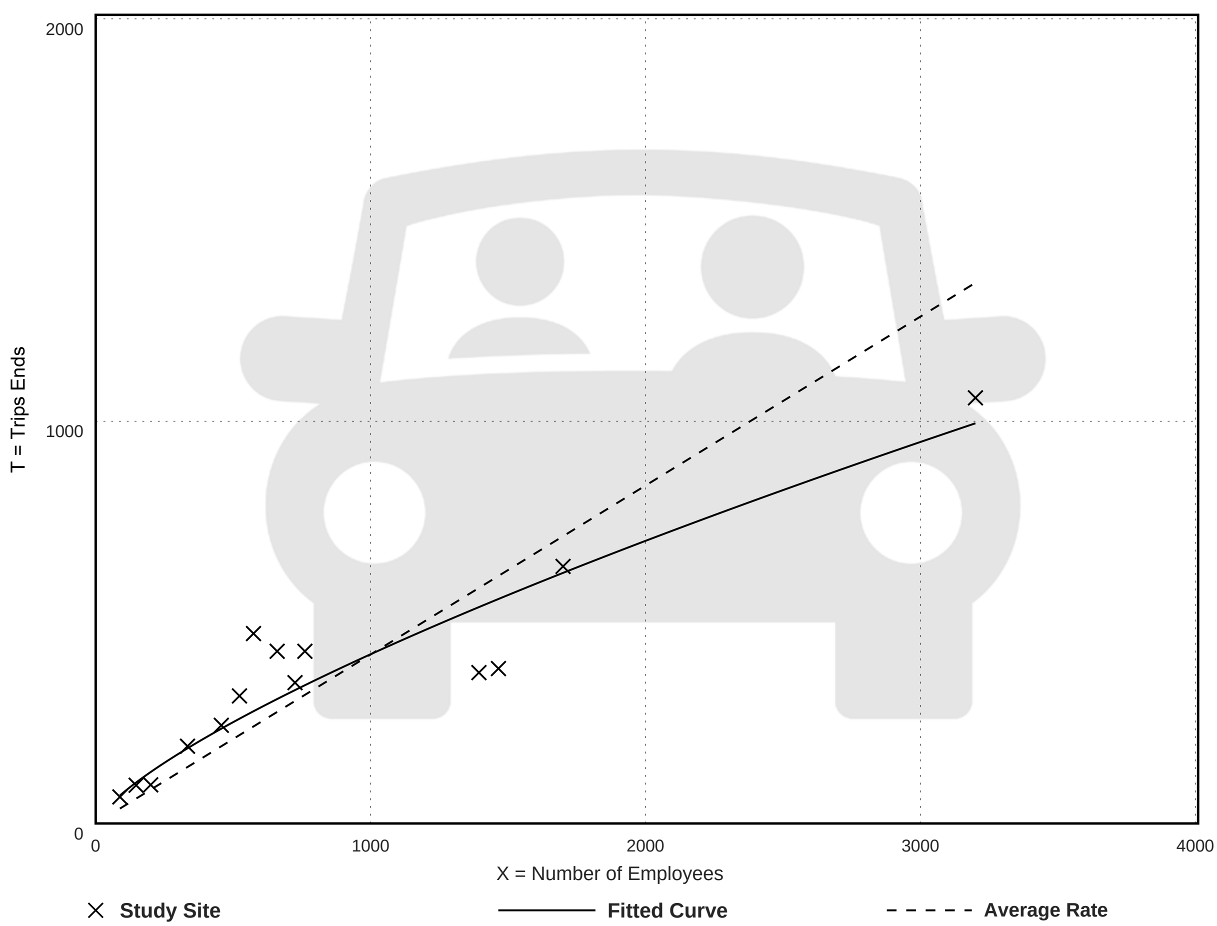
Industrial Park
(130)

Vehicle Trip Ends vs:	**Employees**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	14
Avg. Num. of Employees:	873
Directional Distribution:	20% entering, 80% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.42	0.26 - 0.82	0.16

Data Plot and Equation



Fitted Curve Equation: $Ln(T) = 0.74 Ln(X) + 0.93$ **$R^2 = 0.90$**

Industrial Park
(130)

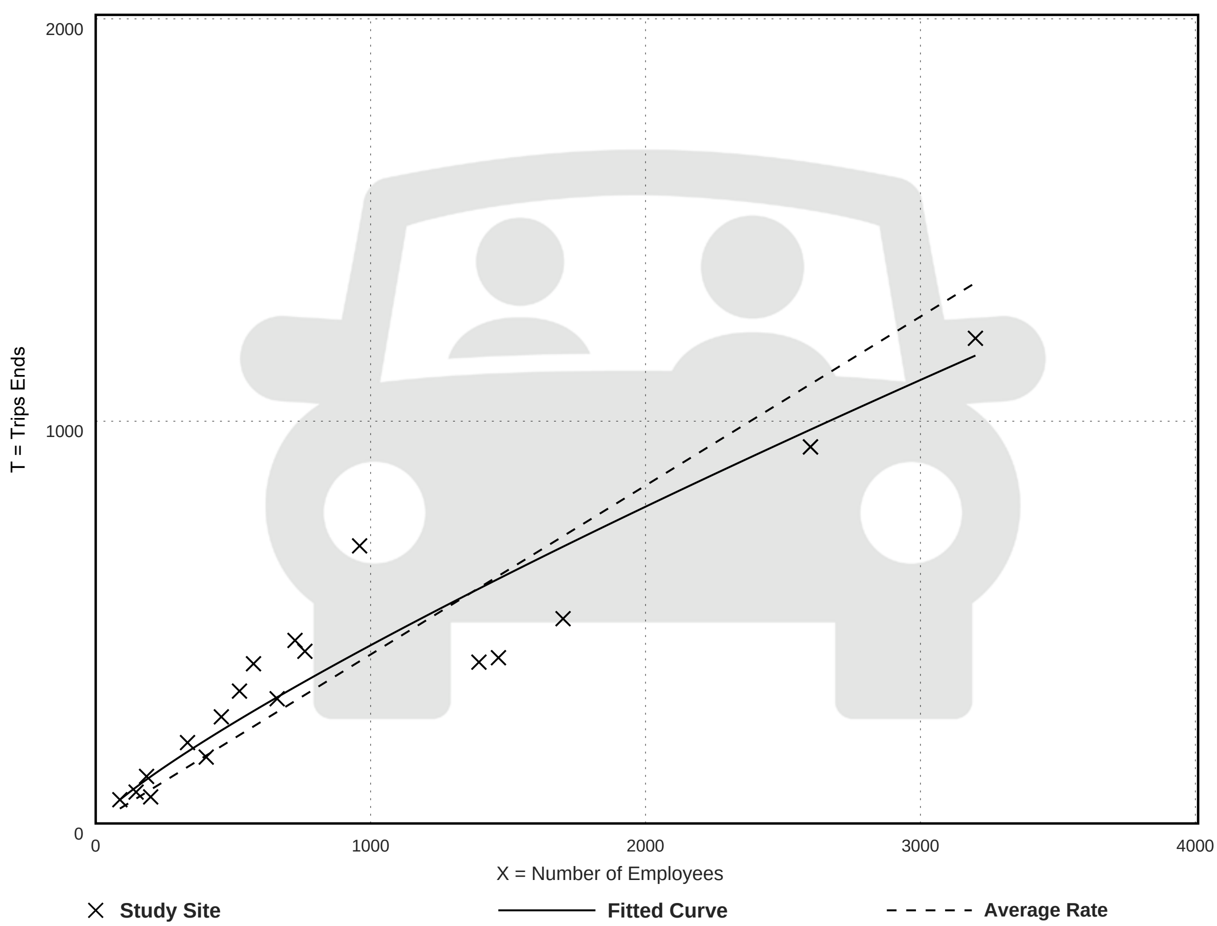
Vehicle Trip Ends vs: Employees
On a: Weekday,
AM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 19
Avg. Num. of Employees: 999
Directional Distribution: 87% entering, 13% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.42	0.28 - 0.72	0.14

Data Plot and Equation



Fitted Curve Equation: $Ln(T) = 0.83\ Ln(X) + 0.36$

$R^2 = 0.90$

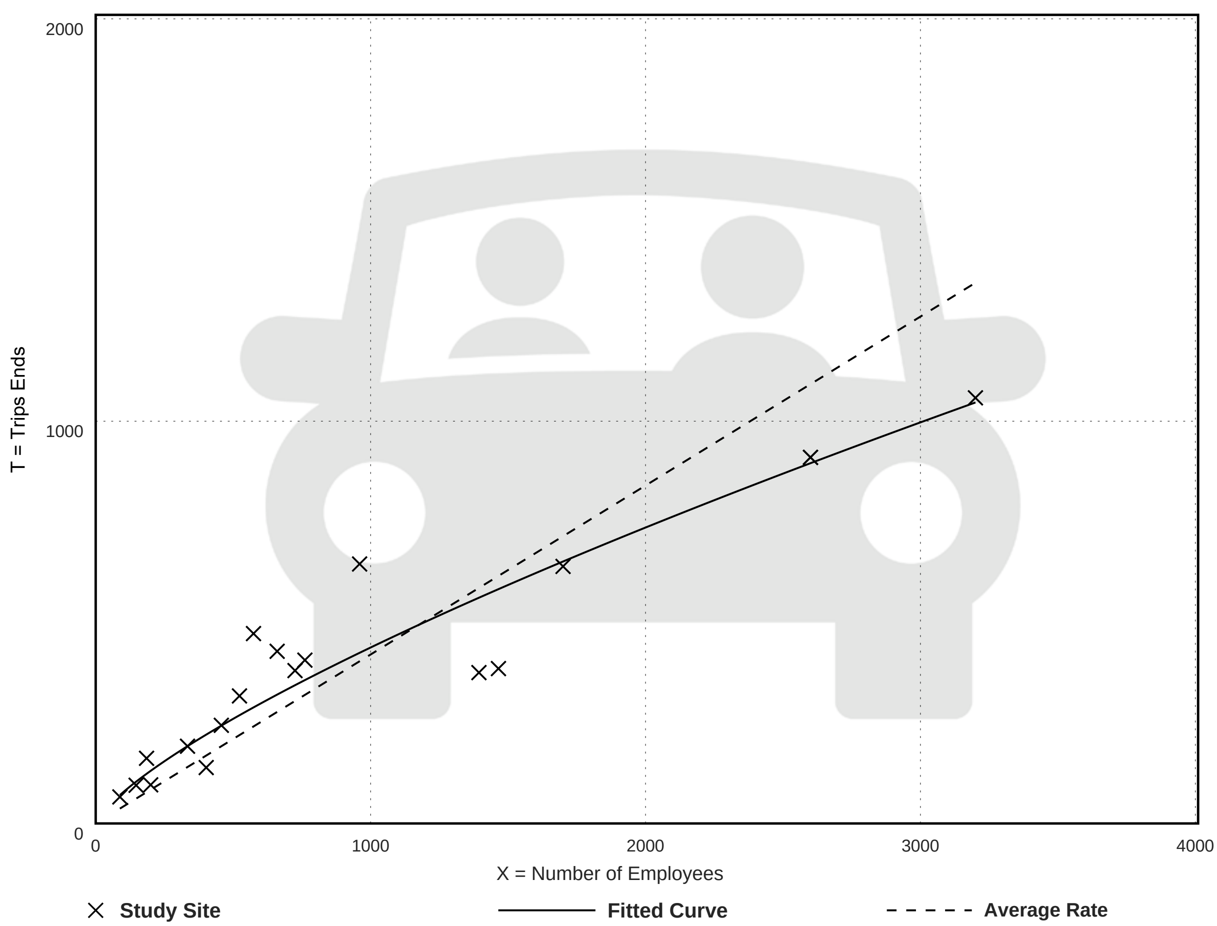
Industrial Park
(130)

Vehicle Trip Ends vs:	**Employees**
On a:	**Weekday,**
	PM Peak Hour of Generator
Setting/Location:	**General Urban/Suburban**
Number of Studies:	19
Avg. Num. of Employees:	999
Directional Distribution:	21% entering, 79% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.42	0.26 - 0.88	0.15

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.75 Ln(X) + 0.90 **R^2= 0.89**

Industrial Park
(130)

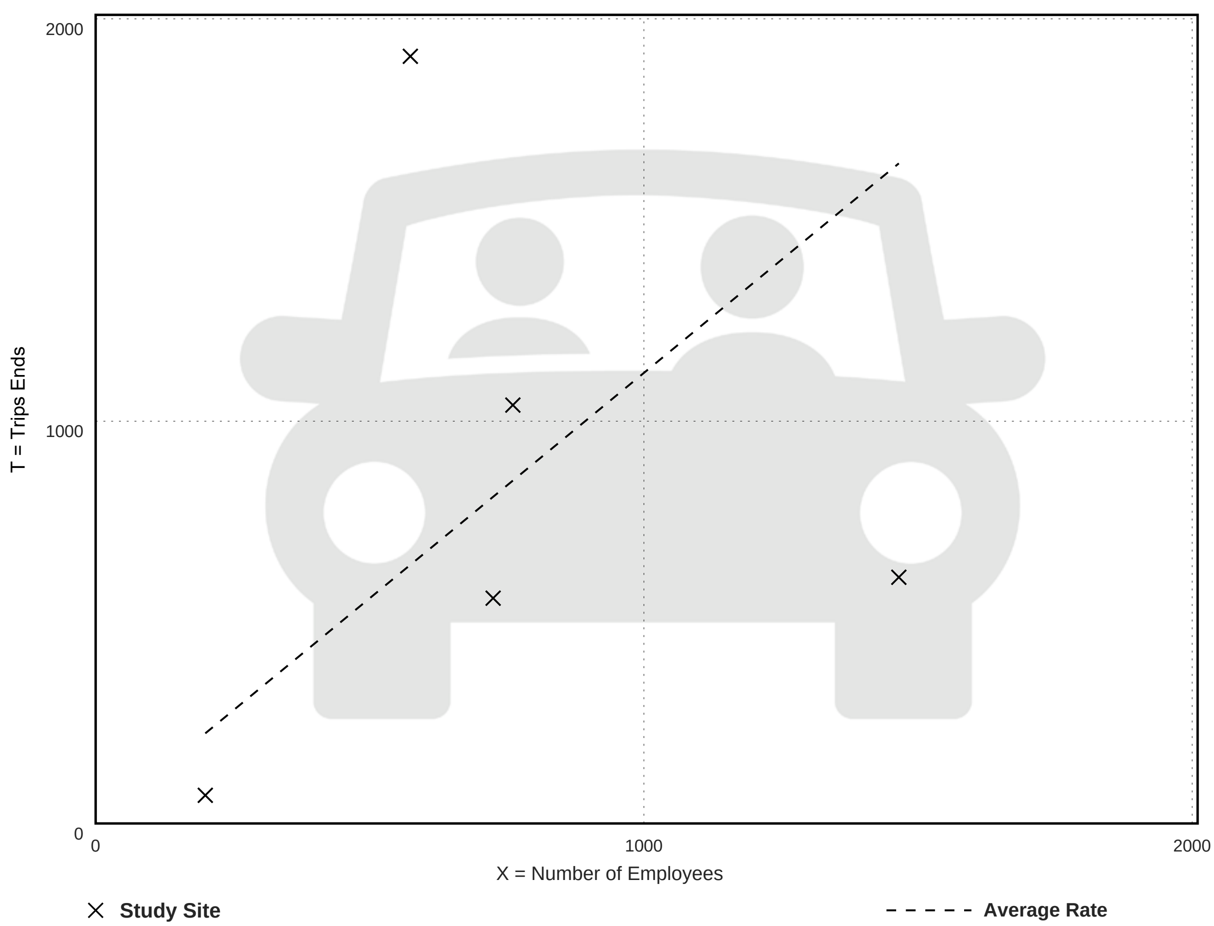
Vehicle Trip Ends vs: Employees
On a: Saturday

Setting/Location: General Urban/Suburban
Number of Studies: 5
Avg. Num. of Employees: 745
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
1.12	0.35 - 3.32	1.12

Data Plot and Equation



Fitted Curve Equation: Not Given **R^2= *****

Industrial Park
(130)

Vehicle Trip Ends vs: Employees
On a: Saturday, Peak Hour of Generator

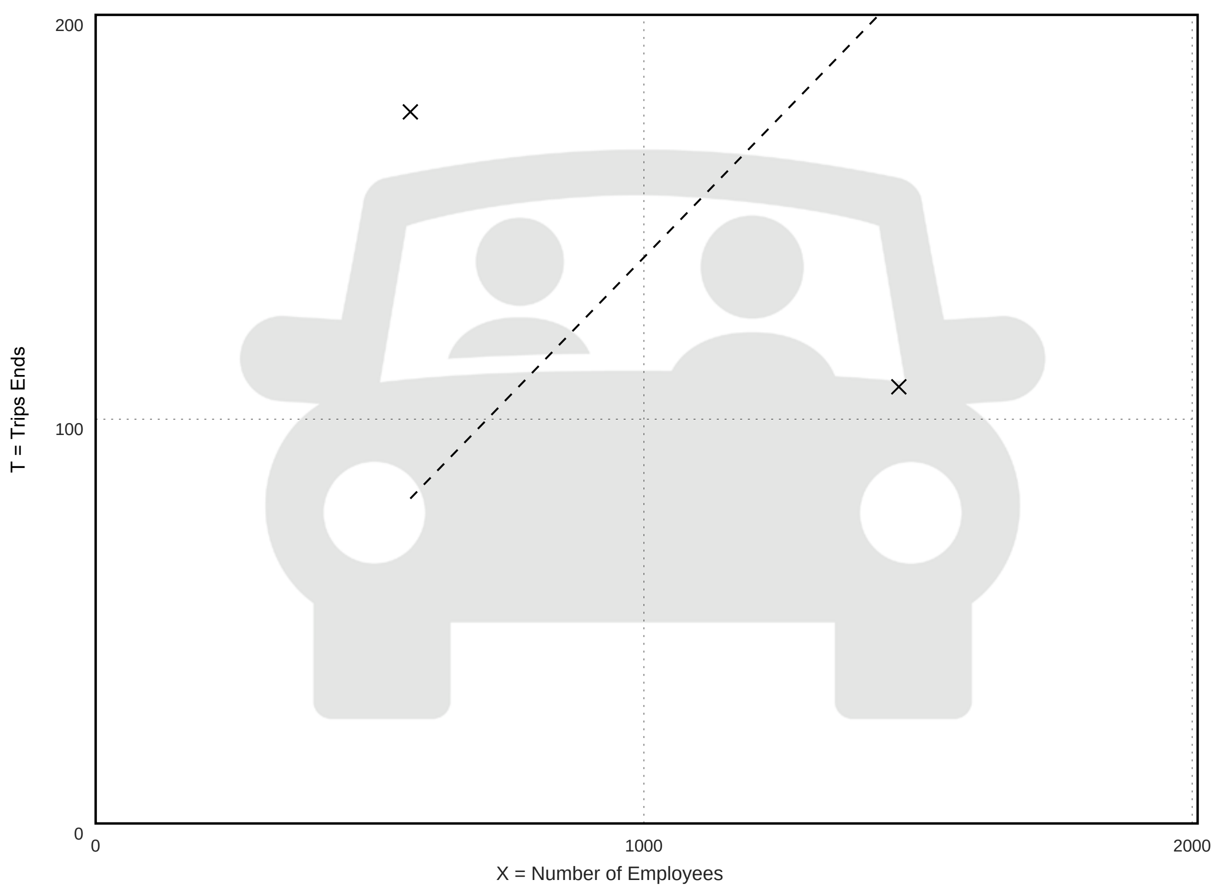
Setting/Location: General Urban/Suburban
Number of Studies: 2
Avg. Num. of Employees: 1020
Directional Distribution: 32% entering, 68% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.14	0.07 - 0.31	***

Data Plot and Equation

Caution – Small Sample Size



× **Study Site** - - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= *****

Industrial Park
(130)

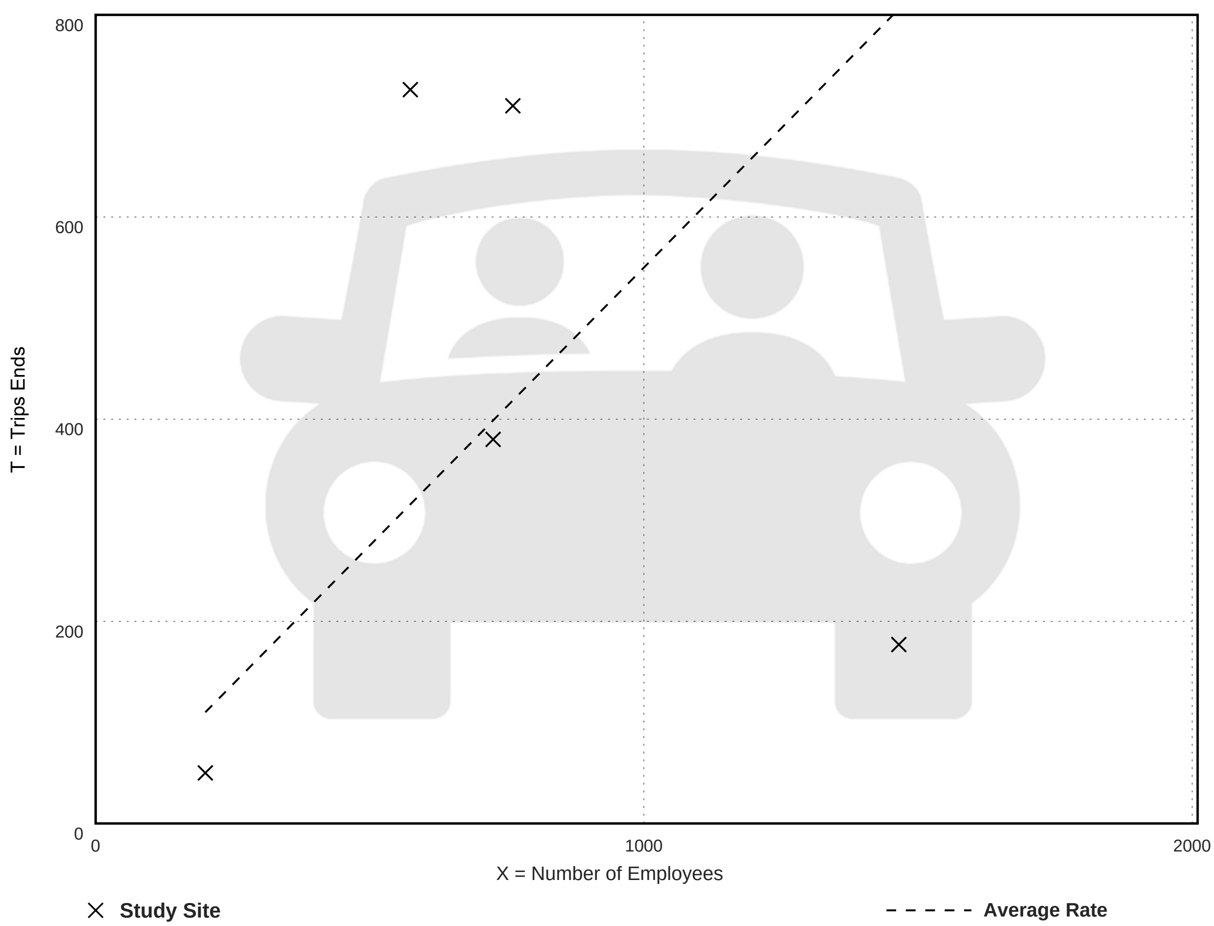
Vehicle Trip Ends vs: Employees
On a: Sunday

Setting/Location: General Urban/Suburban
Number of Studies: 5
Avg. Num. of Employees: 745
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.55	0.12 - 1.26	0.48

Data Plot and Equation



Fitted Curve Equation: Not Given R^2= ***

Industrial Park
(130)

Vehicle Trip Ends vs: Employees
On a: Sunday, Peak Hour of Generator

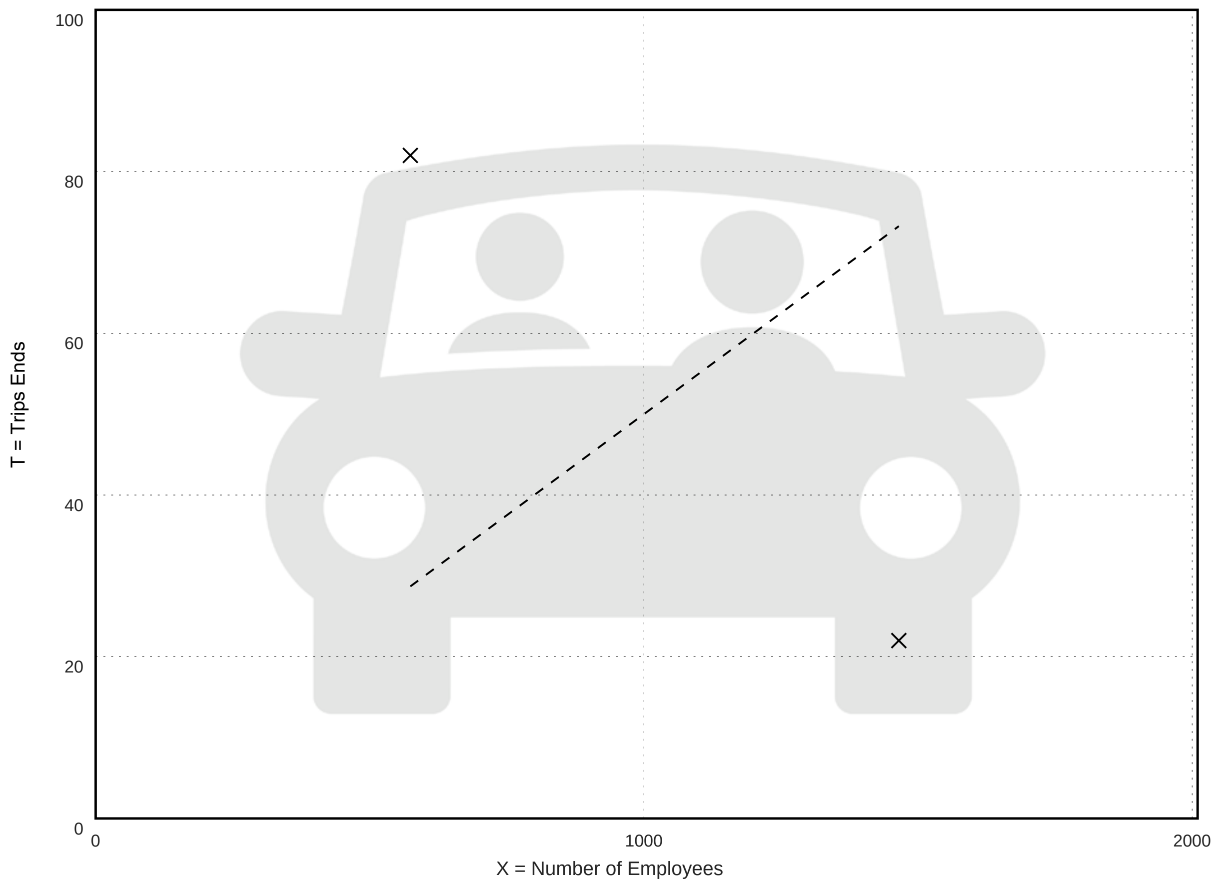
Setting/Location: General Urban/Suburban
Number of Studies: 2
Avg. Num. of Employees: 1020
Directional Distribution: 46% entering, 54% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.05	0.02 - 0.14	***

Data Plot and Equation

Caution – Small Sample Size



× **Study Site** - - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= *****

Land Use: 811
Construction Equipment Rental Store

Description

A construction equipment rental store is a business that specializes in the rental of construction equipment tools and supplies including, but not limited to, electrical and industrial tools, pumps, lawn and garden equipment, paving and earthmoving equipment, and safety equipment.

Additional Data

An outside storage area is not included in the overall gross floor area measurements. However, if the storage area is located within the principal outside faces of the exterior walls, it is included in the overall gross floor area of the building.

The sites were surveyed in the 2000s in Alabama, Alaska, Alberta (CAN), Arkansas, and Florida.

Source Number

721

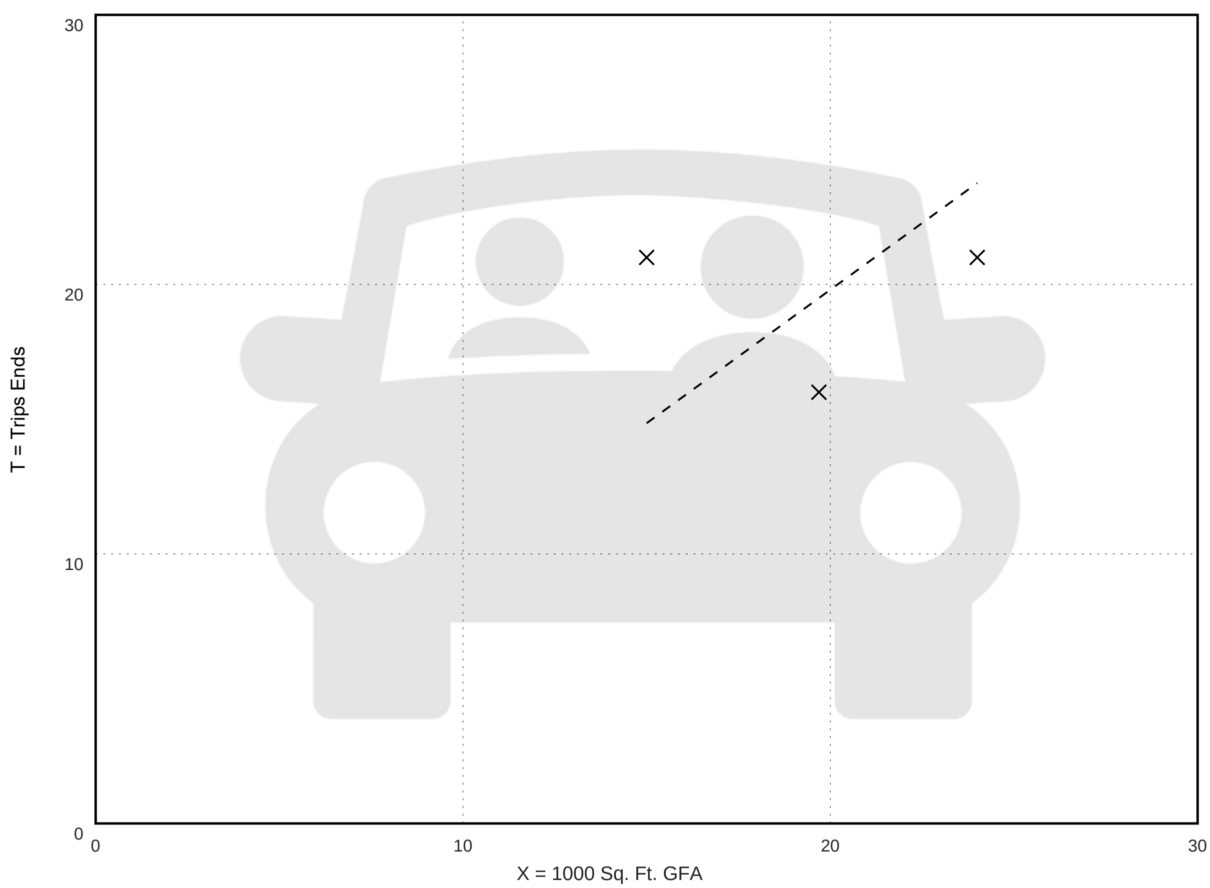
Construction Equipment Rental Store
(811)

Vehicle Trip Ends vs:	**1000 Sq. Ft. GFA**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 4 and 6 p.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	3
Avg. 1000 Sq. Ft. GFA:	20
Directional Distribution:	28% entering, 72% exiting

Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
0.99	0.81 - 1.40	0.30

Data Plot and Equation



× **Study Site** - - - - - **Average Rate**

Fitted Curve Equation: Not Given **R^2= *****

Cedar Avenue Trucking Storage (PROJ-2020-00035)

TRAFFIC ANALYSIS

COUNTY OF SAN BERNARDINO

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JUNE 19, 2020

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APPENDICES

LIST OF EXHIBITS

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LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
CA MUTCD	California Manual on Uniform Traffic Control Devices
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CMP	Congestion Management Program
DIF	Development Impact Fee
E+P	Existing Plus Project
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
HOV	High Occupancy Vehicle
ITE	Institute of Transportation Engineers
LOS	Level of Service
NCHRP	National Cooperative Highway Research Program
PCE	Passenger Car Equivalents
PeMS	Performance Measurement System
PHF	Peak Hour Factor
Project	Cedar Avenue Trucking Storage
OPR	Office of Planning and Research
RTP	Regional Transportation Plan
SB	Senate Bill
SBCTA	San Bernardino County Transportation Authority
SBTAM	San Bernardino Transportation Analysis Model
SCAG	Southern California Association of Governments
SCS	Sustainable Communities Strategy
sf	Square Feet
SHS	State Highway System
TA	Traffic Analysis
v/c	Volume to Capacity
VMT	Vehicle Miles Traveled
vphgpl	Vehicles per Hour Green per Lane

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1 SUMMARY OF FINDINGS

This report presents the results of the traffic analysis (TA) for the proposed Cedar Avenue Trucking Storage ("Project"), which is located west of Cedar Avenue, between Slover Avenue and Santa Ana Avenue, in the County of San Bernardino, as shown on Exhibit 1-1.

The purpose of this TA is to evaluate the potential circulation system deficiencies that may result from the development of the proposed Project, and where necessary recommend improvements to achieve acceptable operations consistent with General Plan level of service goals and policies. This TA has been prepared in accordance with the San Bernardino County Congestion Management Program (CMP) Guidelines for CMP Traffic Impact Analysis Reports (Appendix B, 2016 Update), the County of San Bernardino Transportation Impact Study Guidelines (dated July 9, 2019), the California Department of Transportation (Caltrans) Guide for the Preparation of Traffic Impact Studies (December 2002), and consultation with County staff during the TA scoping process. (1) (2) (3) The County approved Project Traffic Study Scoping agreement is provided in Appendix 1.1 of this TA.

1.1 SUMMARY OF FINDINGS

The Project is to construct the following improvements as design features in conjunction with development of the site:

- Project to install a traffic signal at the intersection of Cedar Avenue & Driveway 1 (shared with the existing Cedar Village Mobile Home Park).
- Project to construct Cedar Avenue at its ultimate half-section width as a Major Highway (104-foot right-of-way) along the west side from the Project's northbound boundary to the Project's southern boundary consistent with the County's standards.

Additional details and intersection lane geometrics are provided in Section 1.7 *Recommendations* of this report.

The development of the proposed Project is not anticipated to require the construction of any off-site improvements, however, there are improvement needs identified at off-site intersections for future traffic analysis scenarios where the Project would contribute traffic (as measured by 50 or more peak hour trips). As such, the Project Applicant's responsibility for the Project's contributions towards off-site intersection deficiencies is fulfilled through payment of fair share or participation in the pre-existing fee programs that would be assigned to construction of the identified recommended improvements. The Project Applicant would be required to pay requisite fair share contributions and fee payments consistent with the County's requirements (see Section 8 *Local and Regional Funding Mechanisms*).

EXHIBIT 1-1: PRELIMINARY SITE PLAN

1.2 PROJECT OVERVIEW

Exhibit 1-1 illustrates the preliminary Project site plan. The Project is proposed to consist of up to 8.940 acres of truck terminal use. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2021. Access to the Project site will be provided to Cedar Avenue via a proposed full-access signalized driveway. Regional access to the Project site will be provided by the I-10 Freeway via Cedar Avenue.

Trips generated by the Project's proposed land uses have been estimated based on the trip generation trip-generation statistics published in the City of San Diego Municipal Code Land Development Code Trip Generation Manual (2003) for the Truck Terminal land use. Based on the characteristics of the proposed Project, it is assumed Project traffic will consist of passenger cars (20.0% of total traffic) and 4+-axle trucks (80.0% of total traffic). Passenger car equivalent (PCE) factors were applied to the trip generation rates to convert trips made by heavy trucks (large 4+-axles trucks) to PCE values. The proposed Project is anticipated to generate 716 actual trip ends per day, with 65 AM peak hour trips and 58 PM peak hour trips. The assumptions and methods used to estimate the Project's trip generation characteristics are discussed in greater detail in Section 4.1 *Project Trip Generation* of this report.

1.3 ANALYSIS SCENARIOS

For the purposes of this TA, potential deficiencies to traffic and circulation have been assessed for each of the following conditions:

- Existing (2020)
- Existing plus Project (E+P)
- Opening Year Cumulative (2021) Without Project
- Opening Year Cumulative (2021) With Project
- Horizon Year (2040) Without Project
- Horizon Year (2040) With Project

1.3.1 EXISTING (2020) CONDITIONS

Information for Existing (2020) conditions is disclosed to represent the baseline traffic conditions as they existed at the time this report was prepared.

1.3.2 EXISTING PLUS PROJECT CONDITIONS

The Existing plus Project (E+P) analysis determines traffic deficiencies that would occur on the existing roadway system with the addition of Project traffic.

1.3.3 OPENING YEAR CUMULATIVE (2021) CONDITIONS

The Opening Year Cumulative conditions analysis determines the potential near-term cumulative circulation system deficiencies. To account for background traffic growth, traffic associated with other known cumulative development projects in conjunction with an ambient growth factor from Existing conditions of 1.5% is included for Opening Year Cumulative (2021) traffic conditions. The ambient growth is consistent with the growth used by other projects in the area. This comprehensive list was compiled from information provided by the County of San Bernardino and other near-by agencies.

1.3.4 HORIZON YEAR (2040) CONDITIONS

Traffic projections for Horizon Year (2040) with Project conditions were derived from the San Bernardino Transportation Analysis Model (SBTAM) modified to represent buildout of the County of San Bernardino. The Horizon Year (2040) conditions analysis will be utilized to determine if improvements funded through regional transportation fee programs, such as the County's Development Impact Fee (DIF) program, or other approved funding mechanisms can accommodate the long-range cumulative traffic at the target level of service (LOS) identified by the County of San Bernardino (lead agency). Other improvements needed beyond the "funded" improvements (such as localized improvements to non-DIF facilities) are identified as such.

1.4 STUDY AREA

To ensure that this TA satisfies the County of San Bernardino's requirements, Urban Crossroads, Inc. prepared a project TA scoping package for review by County staff prior to the preparation of this report. The Agreement provides an outline of the Project study area, trip generation, trip distribution, and analysis methodology.

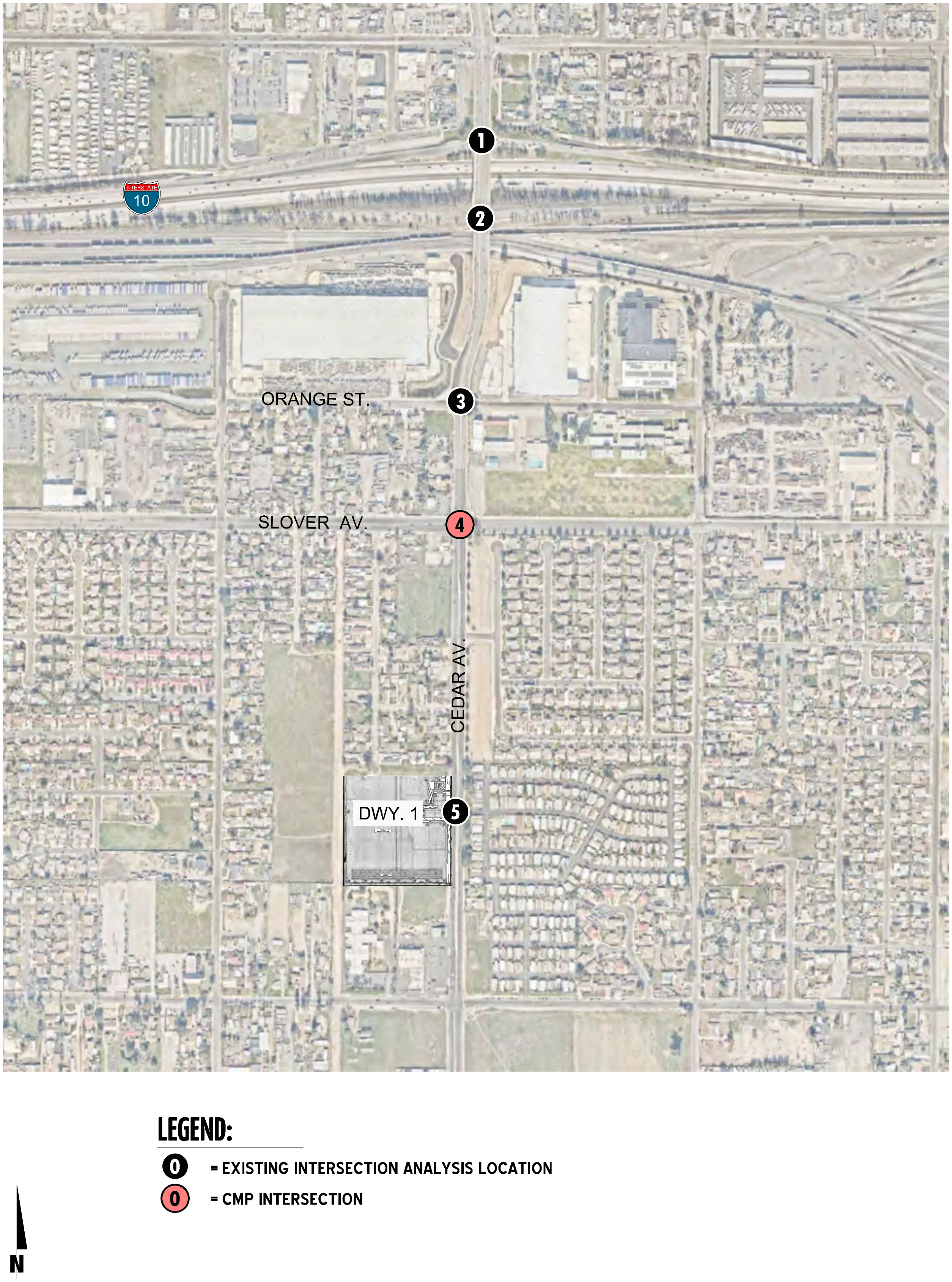
1.4.1 INTERSECTIONS

The following 5 study area intersections shown on Exhibit 1-2 and listed on Table 1-1 were selected for this TA based on consultation with County of San Bernardino staff. The "50 peak hour trip" criterion generally represents a minimum number of trips at which a typical intersection would have the potential to be affected by a given development proposal. Although each intersection may have unique operating characteristics, this traffic engineering rule of thumb is a widely utilized tool for estimating a potential area of influence (i.e., study area). Other analysis intersections, within the adjacent cities were not selected for evaluation as the Project is anticipated to contribute less than 50 peak hour trips.

TABLE 1-1: INTERSECTION ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction	CMP?
1	Cedar Av. & I-10 Westbound Ramps	County of San Bernardino, Caltrans	No
2	Cedar Av. & I-10 Eastbound Ramps	County of San Bernardino, Caltrans	No
3	Cedar Av. & Orange Av.	County of San Bernardino	No
4	Cedar Av. & Slover Av.	County of San Bernardino	Yes
5	Cedar Av. & Driveway 1	County of San Bernardino	No

EXHIBIT 1-2: LOCATION MAP



The intent of a CMP is to more directly link land use, transportation, and air quality, thereby prompting reasonable growth management programs that will effectively utilize new transportation funds, alleviate traffic congestion and related deficiencies, and improve air quality. Counties within California have developed CMPs with varying methods and strategies to meet the intent of the CMP legislation. Study area intersections that are identified as CMP facilities in the County of San Bernardino per the San Bernardino County Transportation Authority (SBCTA) CMP are indicated on Table 1-1. (1)

1.4.2 FREEWAY MAINLINE AND RAMP JUNCTION ANALYSIS

Study area freeway mainline analysis locations were selected based on Caltrans TA guidelines, which may require the analysis of State highway facilities. (3) Consistent with recent Caltrans guidance, and because deficiencies to freeway segments tend to dissipate with distance from the point of State Highway System (SHS) entry, quantitative study of freeway segments beyond those immediately adjacent to the point of entry typically is not required. This study evaluates the following freeway facilities adjacent to the point of entry to the SHS at the I-10 Freeway and Cedar Avenue (see Table 1-2):

TABLE 1-2: FREEWAY FACILITY ANALYSIS LOCATIONS

ID	Freeway Facilities
1	I-10 Freeway Westbound, West of Cedar Av.
2	I-10 Freeway Westbound, On-Ramp at Cedar Av.
3	I-10 Freeway Westbound, Off-Ramp at Cedar Av.
4	I-10 Freeway Westbound, East of Cedar Av.
5	I-10 Freeway Eastbound, West of Cedar Av.
6	I-10 Freeway Eastbound, Off-Ramp at Cedar Av.
7	I-10 Freeway Eastbound, On-Ramp at Cedar Av.
8	I-10 Freeway Eastbound, East of Cedar Av.

1.5 SENATE BILL 743 – VEHICLE MILES TRAVELED (VMT)

Senate Bill 743 (SB 743), approved in 2013, endeavors to change the way transportation impacts will be determined according to the California Environmental Quality Act (CEQA). The Office of Planning and Research (OPR) has recommended the use of vehicle miles traveled (VMT) as the replacement for automobile delay-based LOS. In December 2018, the Natural Resources Agency finalized updates to CEQA Guidelines to incorporate SB 743 (i.e., VMT). The VMT thresholds and methodology outlined in the County's July 2019 TA guidelines will be utilized to conduct the VMT analysis for the Project. The VMT analysis will be prepared and submitted under separate cover.

The revised Caltrans traffic impact analysis guidelines are set to be available in Summer 2020, however, Caltrans acknowledges automobile delay will no longer be considered a CEQA impact for development projects and will use VMT as the metric for determining impacts on the SHS. As such, the LOS operations included in this TA for study area intersections are informational and are not anticipated to support the environmental document.

1.6 DEFICIENCIES

This section provides a summary of deficiencies by analysis scenario. Section 2 *Methodologies* provides information on the methodologies used in the analysis and Section 5 *E+P Traffic Conditions*, Section 6 *Opening Year Cumulative (2021) Traffic* Conditions, and Section 7 *Horizon Year (2040) Traffic Conditions* includes the detailed analysis. A summary of LOS results for all analysis scenarios is presented on Exhibit 1-3.

1.6.1 E+P CONDITIONS

Intersections

Consistent with Existing traffic conditions, the study area intersections are anticipated to operate at acceptable LOS during the peak hours.

Off-Ramp Queues

There are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows, consistent with Existing (2020) traffic conditions.

Freeway Facilities

The study area freeway mainline segments and merge/diverge ramp junctions are anticipated to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours, consistent with Existing (2020) traffic conditions.

1.6.2 OPENING YEAR CUMULATIVE (2021) CONDITIONS

Intersections

The following study area intersections are anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2021) Without Project traffic conditions:

- Cedar Avenue & I-10 Westbound Ramps (#1) – LOS E PM peak hour only
- Cedar Avenue & I-10 Eastbound Ramps (#2) – LOS E PM peak hour only
- Cedar Avenue & Orange Street (#3) – LOS E PM peak hour only
- Cedar Avenue & Slover Avenue (#4) – LOS F PM peak hour only
- Cedar Avenue & Driveway 1 (#5) – LOS E PM peak hour only

There are no additional intersections anticipated to operate at a deficient LOS during the peak hours with the addition of Project traffic. It should be noted with the implementation of the Project design features as discussed in Section 1.7 *Recommendations*; the intersection of Cedar Avenue & Driveway 1 is anticipated to operate at an acceptable LOS during the peak hours.

EXHIBIT 1-3: SUMMARY OF DEFICIENT INTERSECTIONS BY ANALYSIS SCENARIO

#	Intersection	Existing (2020)	E+P	Opening Year Cumulative (2021) Without Project	Opening Year Cumulative (2021) With Project	Horizon Year (2040) Without Project	Horizon Year (2040) With Project
1	Cedar Av. & I-10 WB Ramps	🟢/🟢	🟢/🟢	🟢/🟡	🟡/🔴	🟡/🔴	🟡/🔴
2	Cedar Av. & I-10 EB Ramps	🟢/🟢	🟢/🟢	🟢/🟡	🟢/🟡	🟢/🟡	🟢/🔴
3	Cedar Av. & Orange St.	🟢/🟢	🟢/🟢	🟢/🟡	🟢/🟡	🟢/🟢	🟢/🟢
4	Cedar Av. & Slover Av.	🟢/🟢	🟢/🟢	🟢/🔴	🟢/🔴	🟡/🔴	🟡/🔴
5	Cedar Av. & Dwy. 1	🟢/🟢	🟢/🟢	🟢/🟡	🟢/🟢	🟢/🟢	🟢/🟢

LEGEND:

- ◖ = AM PEAK HOUR
- ◗ = PM PEAK HOUR
- 🟢 = LOS A-D
- 🟡 = LOS E
- 🔴 = LOS F

Off-Ramp Queues

There are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Opening Year Cumulative (2021) traffic conditions, consistent with Existing (2020) traffic conditions.

Freeway Facilities

The study area freeway mainline segments and merge/diverge ramp junctions are anticipated to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours, consistent with Existing (2020) traffic conditions.

1.6.5 HORIZON YEAR (2040) CONDITIONS

Intersections

The following study area intersections are anticipated to operate at an unacceptable LOS under Horizon Year (2040) Without Project traffic conditions:

- Cedar Avenue & I-10 Westbound Ramps (#1) – LOS E AM peak hour; LOS F PM peak hour
- Cedar Avenue & I-10 Eastbound Ramps (#2) – LOS E PM peak hour only
- Cedar Avenue & Slover Avenue (#4) – LOS E AM peak hour; LOS F PM peak hour

With the addition of Project traffic, there are no additional study area intersections anticipated to operate at a deficient LOS during one or both peak hours for Horizon Year (2040) With Project traffic conditions.

Off-Ramp Queues

There are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Horizon Year (2040) traffic conditions, consistent with Existing (2020) traffic conditions.

Freeway Facilities

The following study area freeway mainline segments and merge/diverge ramp junctions are anticipated to operate at an unacceptable LOS (i.e., LOS E or worse) during the peak hours for Horizon Year (2040) Without Project and With Project traffic conditions:

- I-10 Freeway Westbound, West of Cedar Avenue (#1) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, On-Ramp at Cedar Avenue (#2) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, Off-Ramp at Cedar Avenue (#3) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, East of Cedar Avenue (#4) – LOS E AM and PM peak hours
- I-10 Freeway Eastbound, West of Cedar Avenue (#5) – LOS E PM peak hour only
- I-10 Freeway Eastbound, East of Cedar Avenue (#8) – LOS E PM peak hour only

1.7 RECOMMENDATIONS

1.7.1 SITE ADJACENT AND SITE ACCESS RECOMMENDATIONS

The following recommendations are based on the improvements needed to accommodate site access. The site adjacent recommendations are shown on Exhibit 1-4.

Recommendation 1.1 – ***Cedar Avenue & Driveway 1 (#5)*** – The following improvements are necessary to accommodate site access:

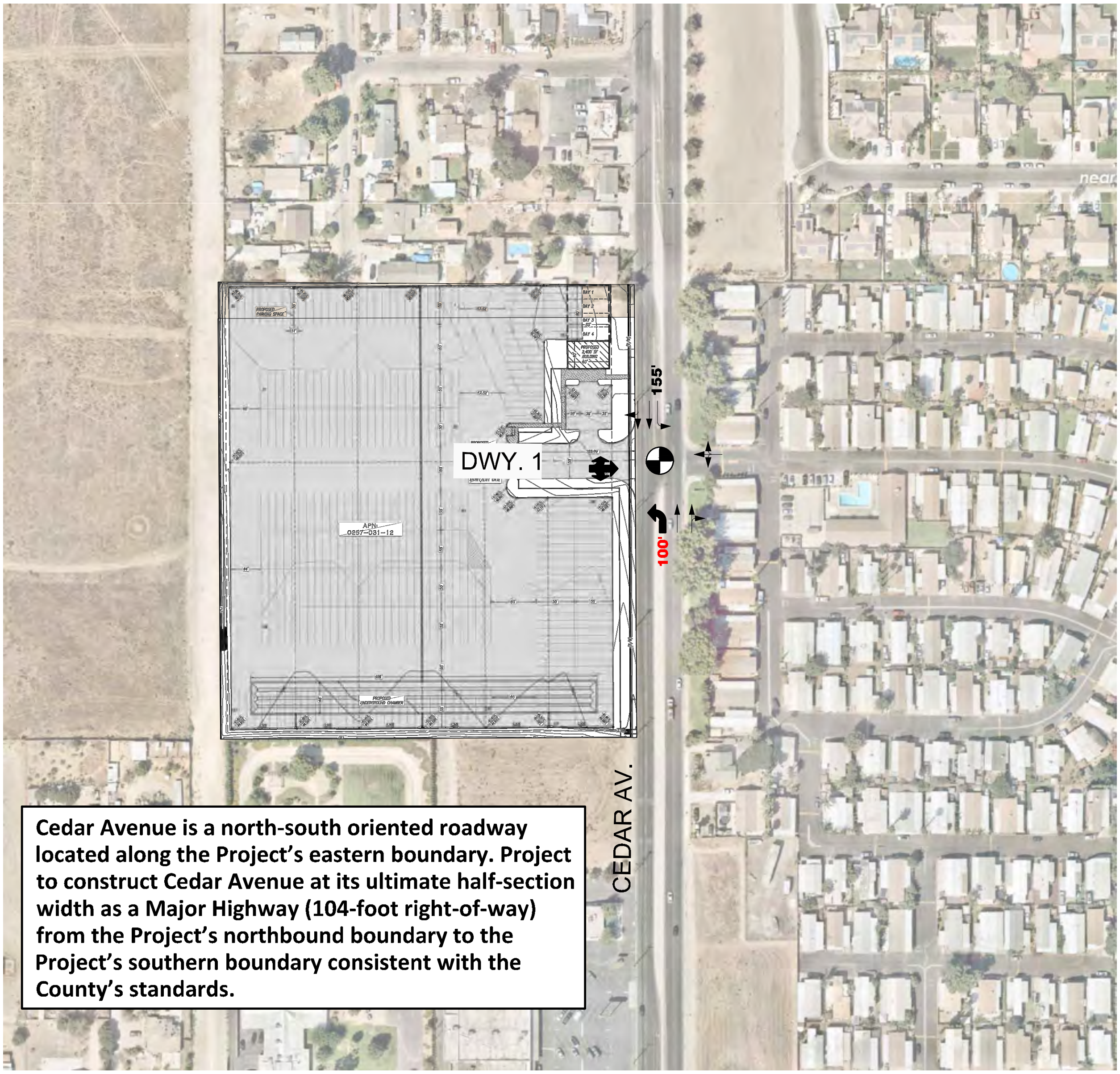
- Project to install a traffic signal. In order to support the Cedar Avenue corridor signal timing coordination efforts by SBCTA, the Project should ensure that the traffic signal is interconnected by copper or fiber.
- Project to construct a northbound left turn lane within the existing raised median with a minimum of 100-feet of storage.
- Project to construct an eastbound shared left-through-right turn lane.

Recommendation 2.1 – Cedar Avenue is a north-south oriented roadway located along the Project's eastern boundary. Project to construct Cedar Avenue at its ultimate half-section width as a Major Highway (104-foot right-of-way) from the Project's northbound boundary to the Project's southern boundary consistent with the County's standards.

On-site traffic signing and striping should be implemented agreeable with the provisions of the California Manual on Uniform Traffic Control Devices (CA MUTCD) and in conjunction with detailed construction plans for the Project site.

Sight distance at each project access point should be reviewed with respect to standard Caltrans and County of San Bernardino sight distance standards at the time of preparation of final grading, landscape, and street improvement plans.

EXHIBIT 1-4: SITE ADJACENT ROADWAY AND SITE ACCESS RECOMMENDATIONS



On-site traffic signing and striping should be implemented agreeable with the provisions of the California Manual on Uniform Traffic Control Devices (CA MUTCD) and in conjunction with detailed construction plans for the Project site.

LEGEND:

- = *NEW TRAFFIC SIGNAL*
- = *EXISTING LANE*
- = *LANE IMPROVEMENT*
- 150' = *TURN POCKET LENGTH IMPROVEMENT*
- 150' = *EXISTING TURN POCKET LENGTH*

Sight distance at each project access point should be reviewed with respect to standard Caltrans and County of San Bernardino sight distance standards at the time of preparation of final grading, landscape and street improvement plans.

N

1.7.2 OFF-SITE RECOMMENDATIONS

The recommended improvements needed to address the cumulative deficiencies identified under Existing (2020), E+P, Opening Year Cumulative (2021), and Horizon Year (2040) traffic conditions are summarized in Table 1-3. For those improvements listed in Table 1-3 and not constructed as part of the Project, the Project Applicant's responsibility for the Project's contributions towards deficient intersections is fulfilled through payment of fees or fair share that would be assigned to construction of the identified recommended improvements.

Table 1-3 also summarizes the applicable cost associated with each of the recommended improvements based on the preliminary construction cost estimates found in Appendix G of the San Bernardino County CMP in conjunction with a cost escalation factor of 1.568 to reflect current (2020) costs. A rough order of magnitude cost has been prepared to determine the appropriate contribution value based upon the Project's fair share of traffic as part of the project approval process. Based on the Project fair share percentages, the Project's fair share cost is estimated at $230,396. These estimates are a rough order of magnitude only as they are intended only for disclosure purposes and do not imply any legal responsibility or formula for contributions or mitigation.

Recommendation 3.1 – Prior to the issuance of building permits, the Project Applicant shall pay the Project's fair share amount of $128,436 for the improvements identified in Table 1-3 at intersections located within the County of San Bernardino, or as agreed to by the County and Project Applicant.

Recommendation 4.1 – The Developer's fair-share amount for the intersections that either share a mutual border with or are wholly located within the jurisdiction of Caltrans that have recommended improvements which are not covered by a pre-existing fee program is $101,960. Developer shall be required to pay the amount shown above to the County of San Bernardino prior to the issuance of building permits. The County of San Bernardino shall hold Developer's Fair Share contribution in trust and shall apply Developer's Fair Share Contribution to any fee program adopted or agreed upon by the County of San Bernardino and other agencies.

1.8 TRUCK ACCESS AND CIRCULATION

Due to the typical wide turning radius of large trucks, a truck turning template has been overlaid on the site plan at the Project driveway anticipated to be utilized by heavy trucks in order to determine appropriate curb radii and to verify that trucks will have sufficient space to execute turning maneuvers (see Exhibit 1-5). As shown on Exhibit 1-5, the following curb radius change is necessary in order to accommodate the ingress and egress of heavy trucks:

- Driveway 1 on Cedar Avenue should be modified to provide a 45-foot radius on the northwest curb.

Table 1-3

Summary of Improvements and Rough Order of Magnitude Costs

#	Intersection	Jurisdiction	Existing (2020)	E+P	2021 Without Project	2021 With Project	Horizon Year (2040) Without Project	Horizon Year (2040) With Project	Improvements in City DIF or County TUMF?[1]	Project Responsibility[2]	Total Cost[3,4]	Fair Share %[5]	Fair Share Cost[6]
1	Cedar Av. & I-10 WB Ramps	Caltrans, County of San Bernardino	None	None	Add 2nd NB left turn lane	Same	Same	Same	No	Fair Share	$858,000	7.1%	$61,236
											$858,000		**$61,236**
2	Cedar Av. & I-10 EB Ramps	Caltrans, County of San Bernardino	None	None	None	None	Add 2nd SB left turn lane	Same	No	Fair Share	$858,000	11.8%	$101,343
							Add EB right turn lane	Same	No	Fair Share	$350,000		$41,341
											$1,208,000		**$142,684**
4	Cedar Av. & Slover Av.	County of San Bernardino	None	None	Restripe the EB approach to provide two left turn lanes, one through lane, and one shared through-right turn lane	Same	Same	Same	No	Fair Share	$39,200	11.3%	$4,413
					Add SB right turn lane	Same	Same	Same	No	Fair Share	$78,400		$8,825
					Modify the traffic signal to provide a 120-second cycle length during the AM and PM peak hours	Same	Same	Same	No	Fair Share	$117,600		$13,238
											$235,200		**$26,476**
										Total Costs for Horizon Year (2040) Improvements	**$2,301,200**		**$230,396**
										Total Project Fair Share Contribution to the County of San Bernardino[7]		**$128,436**	
										Total Project Fair Share Contribution to Caltrans[8]		**$101,960**	

[1] Improvements included in City of Jurupa Valley DIF or County TUMF programs for local and regional components.

[2] Identifies the Project's responsibility to construct an improvement or contribute fair share or fee payment towards the implementation of the improvement shown.

[3] Costs have been estimated using the data provided in Appendix "G" of the CMP (2016 Update) for preliminary construction costs.

[4] Appendix "G" costs escalated by a factor of 1.568 except Traffic Signals.

[5] Program improvements constructed by project may be eligible for fee credit, at discretion of City. See Table 8-1 for Fair Share Calculations.

[6] Rough order of magnitude cost estimate.

[7] Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within the County of San Bernardino.

[8] Total project fair share contribution consists of the improvements which are not already included in a fee program for those intersections wholly or partially within Caltrans' jurisdiction.

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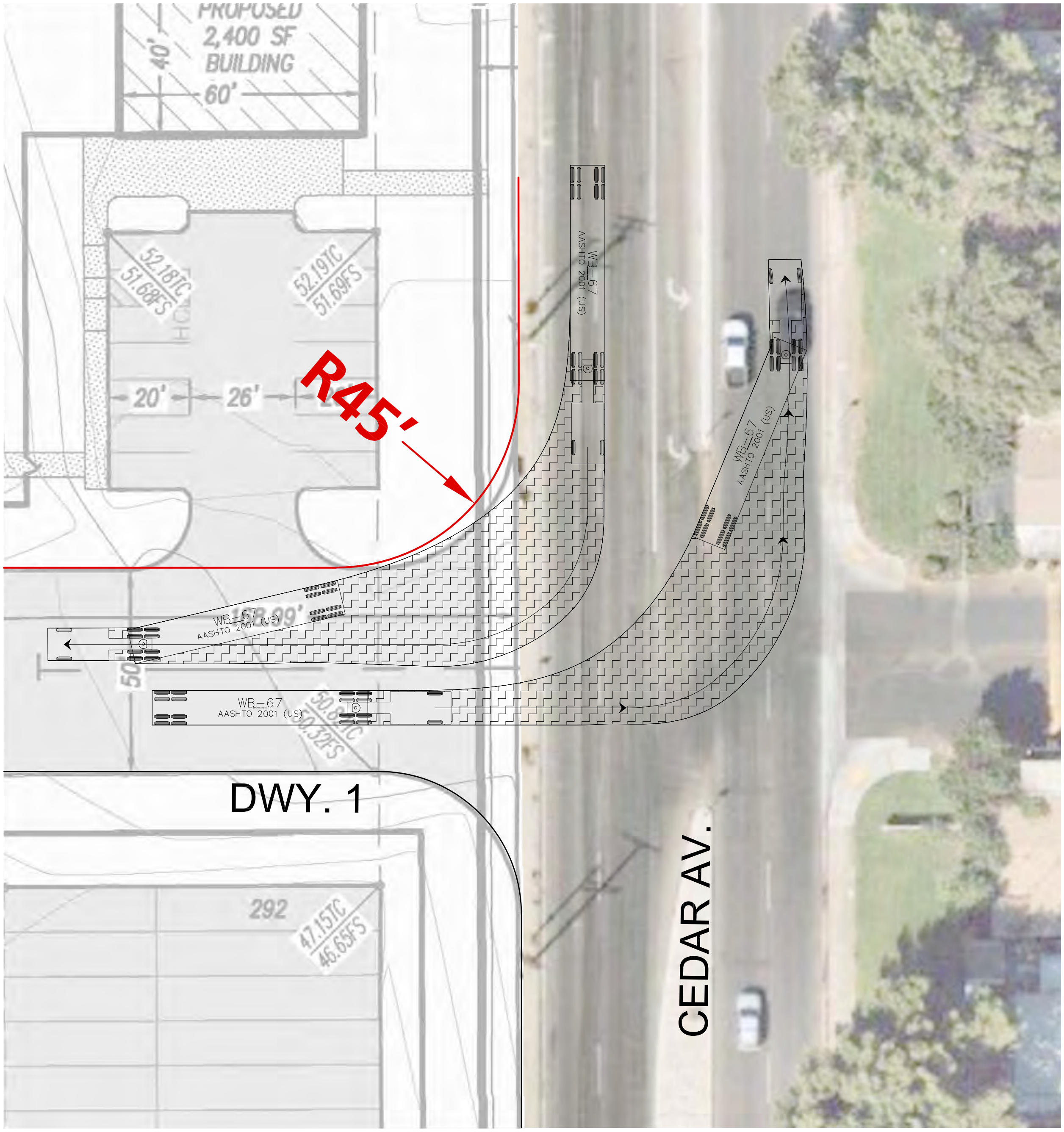
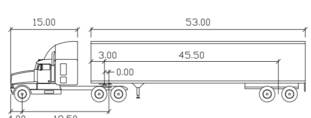
EXHIBIT 1-5: TRUCK ACCESS



LEGEND:



WB-67

	feet		
Tractor Width	: 8.00	Lock to Lock Time	: 6.0
Trailer Width	: 8.50	Steering Angle	: 28.4
Tractor Track	: 8.00	Articulating Angle	: 75.0
Trailer Track	: 8.50		

GRAPHIC SCALE

0 20 40

1"=40'

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2 METHODOLOGIES

This section of the report presents the methodologies used to perform the traffic analyses summarized in this report. The methodologies described are consistent with County of San Bernardino's TA Guidelines.

2.1 LEVEL OF SERVICE

Traffic operations of roadway facilities are described using the term "Level of Service" (LOS). LOS is a qualitative description of traffic flow based on several factors such as speed, travel time, delay, and freedom to maneuver. Six levels are typically defined ranging from LOS A, representing completely free-flow conditions, to LOS F, representing breakdown in flow resulting in stop-and-go conditions. LOS E represents operations at or near capacity, an unstable level where vehicles are operating with the minimum spacing for maintaining uniform flow.

2.2 INTERSECTION CAPACITY ANALYSIS

The definitions of LOS for interrupted traffic flow (flow restrained by the existence of traffic signals and other traffic control devices) differ slightly depending on the type of traffic control. The LOS is typically dependent on the quality of traffic flow at the intersections along a roadway. The 6th Edition Highway Capacity Manual (HCM) methodology expresses the LOS at an intersection in terms of delay time for the various intersection approaches. (4) The HCM uses different procedures depending on the type of intersection control.

2.2.1 SIGNALIZED INTERSECTIONS

The County of San Bernardino requires signalized intersection operations analysis based on the methodology described in the HCM. (4) Intersection LOS operations are based on an intersection's average control delay. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. For signalized intersections LOS is directly related to the average control delay per vehicle and is correlated to a LOS designation as described on Table 2-1.

Consistent with Appendix B of the San Bernardino County CMP, the following saturation flow rates, in vehicles per hour green per lane (vphgpl), will be utilized in the traffic analysis for signalized intersections:

Existing and Opening Year Cumulative Traffic Conditions:

- Exclusive through: 1800 vphgpl
- Exclusive left: 1700 vphgpl
- Exclusive right: 1800 vphgpl
- Exclusive dual left: 1600 vphgpl
- Exclusive triple left: 1500 vphgpl

Horizon Year (2040) Traffic Conditions:

- Exclusive through: 1900 vphgpl
- Exclusive left: 1800 vphgpl
- Exclusive dual left: 1700 vphgpl
- Exclusive right: 1900 vphgpl
- Exclusive dual right: 1800 vphgpl
- Exclusive triple left: 1600 vphgpl or less

TABLE 2-1: SIGNALIZED INTERSECTION LOS THRESHOLDS

Description	**Average Control Delay (Seconds), V/C ≤ 1.0**	**Level of Service, V/C ≤ 1.0**	**Level of Service, V/C > 1.0**
Operations with very low delay occurring with favorable progression and/or short cycle length.	0 to 10.00	A	F
Operations with low delay occurring with good progression and/or short cycle lengths.	10.01 to 20.00	B	F
Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	20.01 to 35.00	C	F
Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable.	35.01 to 55.00	D	F
Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	55.01 to 80.00	E	F
Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths.	80.01 and up	F	F

Source: HCM (6th Edition)

The traffic modeling and signal timing optimization software package Synchro (Version 10) has been utilized to analyze signalized intersections within the County of San Bernardino. Synchro is a macroscopic traffic software program that is based on the signalized intersection capacity analysis as specified in the HCM. Macroscopic level models represent traffic in terms of aggregate measures for each movement at the study intersections. Equations are used to determine measures of effectiveness such as delay and queue length. The level of service and capacity analysis performed by Synchro takes into consideration optimization and coordination of signalized intersections within a network.

The peak hour traffic volumes have been adjusted using a peak hour factor (PHF) to reflect peak 15-minute volumes. Common practice for LOS analysis is to use a peak 15-minute rate of flow. However, flow rates are typically expressed in vehicles per hour. The PHF is the relationship between the peak 15-minute flow rate and the full hourly volume (e.g. PHF = [Hourly Volume] / [4 x Peak 15-minute Flow Rate]). The use of a 15-minute PHF produces a more detailed analysis as compared to analyzing vehicles per hour. Existing PHFs have been used for all analysis scenarios. Per the HCM, PHF values over 0.95 often are indicative of high traffic volumes with capacity constraints on peak hour flows while lower PHF values are indicative of greater variability of flow during the peak hour. (4)

California Department of Transportation (Caltrans)

Per the Caltrans Guide for the Preparation of Traffic Impact Studies, the traffic modeling and signal timing optimization software package Synchro (Version 10) has also been utilized to analyze signalized intersections under Caltrans' jurisdiction, which include interchange to arterial ramps (i.e., I-10 Freeway ramps at Cedar Avenue, etc.). (3)

Signal timing for the freeway arterial-to-ramp intersections and the signalized intersections along the Cedar Avenue corridor have been obtained from the County and reflect the SBCTA coordinated signal timing that has recently been implemented in 2020. It should be noted that for the purposes of this analysis, no optimization of signal timing has been performed for the LOS analysis unless noted otherwise (for improvements).

2.2.2 UNSIGNALIZED INTERSECTIONS

The County of San Bernardino requires the operations of unsignalized intersections be evaluated using the methodology described in the HCM. (4) The LOS rating is based on the weighted average control delay expressed in seconds per vehicle (see Table 2-2).

TABLE 2-2: UNSIGNALIZED INTERSECTION LOS THRESHOLDS

Description	**Average Control Delay Per Vehicle (Seconds)**	**Level of Service, V/C ≤ 1.0**	**Level of Service, V/C > 1.0**
Little or no delays.	0 to 10.00	A	F
Short traffic delays.	10.01 to 15.00	B	F
Average traffic delays.	15.01 to 25.00	C	F
Long traffic delays.	25.01 to 35.00	D	F
Very long traffic delays.	35.01 to 50.00	E	F
Extreme traffic delays with intersection capacity exceeded.	> 50.00	F	F

Source: HCM (6^{th} Edition)

At two-way or side-street stop-controlled intersections, LOS is calculated for each controlled movement and for the left turn movement from the major street, as well as for the intersection as a whole. For approaches composed of a single lane, the delay is computed as the average of all movements in that lane. For all-way stop controlled intersections, LOS is computed for the intersection as a whole.

2.3 TRAFFIC SIGNAL WARRANT ANALYSIS METHODOLOGY

The term "signal warrants" refers to the list of established criteria used by Caltrans and other public agencies to quantitatively justify or ascertain the potential need for installation of a traffic signal at an otherwise unsignalized intersection. This TA uses the signal warrant criteria presented in the latest edition of the Caltrans California Manual on Uniform Traffic Control Devices (CA MUTCD). (5)

The signal warrant criteria for Existing study area intersections are based upon several factors, including volume of vehicular and pedestrian traffic, frequency of accidents, and location of school areas. The CA MUTCD indicates that the installation of a traffic signal should be considered if one or more of the signal warrants are met. (5) Specifically, this TA utilizes the Peak Hour Volume-based Warrant 3 as the appropriate representative traffic signal warrant analysis for existing traffic conditions. Warrant 3 is appropriate to use for this TA because it provides specialized warrant criteria for intersections with rural characteristics (e.g. located in communities with populations of less than 10,000 persons or with adjacent major streets operating above 40 miles per hour). For the purposes of this study, the speed limit was the basis for determining whether Urban or Rural warrants were used for a given intersection.

Future intersections that do not currently exist have been assessed regarding the potential need for new traffic signals based on future average daily traffic (ADT) volumes, using the Caltrans planning level ADT-based signal warrant analysis worksheets.

Traffic signal warrant analyses were performed for the following study area intersection shown on Table 2-3:

TABLE 2-3: TRAFFIC SIGNAL WARRANT ANALYSIS LOCATIONS

ID	Intersection Location	Jurisdiction	SBCTA CMP?
5	Cedar Avenue & Driveway 1	County of San Bernardino	No

The Existing conditions traffic signal warrant analysis is presented in the subsequent section, Section 3 *Area Conditions* of this report. The traffic signal warrant analyses for future conditions are presented in Section 5 *E+P Traffic Conditions,* Section 6 *Opening Year Cumulative (2021) Traffic Conditions,* and Section 7 *Horizon Year (2040) Traffic Conditions* of this report. It is important to note that a signal warrant defines the minimum condition under which the installation of a traffic signal might be warranted. Meeting this threshold condition does not require that a traffic control signal be installed at a particular location, but rather, that other traffic factors and conditions be evaluated in order to determine whether the signal is truly justified. It should also be noted that signal warrants do not necessarily correlate with LOS. An intersection may satisfy a signal warrant condition and operate at or above acceptable LOS or operate below acceptable LOS and not meet a signal warrant.

2.4 FREEWAY OFF-RAMP QUEUING ANALYSIS

The study area for this TA includes the I-10 Freeway at Cedar Avenue interchange. Consistent with Caltrans requirements, the 95th percentile queuing of vehicles has been assessed at the off-ramps to determine potential queuing deficiencies at the freeway ramp intersections at the interchanges identified above. Specifically, the queuing analysis is utilized to identify any potential queuing and "spill back" onto the I-10 Freeway mainline from the off-ramps.

The traffic progression analysis tool and HCM intersection analysis program, Synchro, has been used to assess the potential deficiencies/needs of the intersections with traffic added from the proposed Project. Storage (turn-pocket) length recommendations at the ramps have been based upon the 95th percentile queue resulting from the Synchro progression analysis. There are two footnotes which appear on the Synchro outputs. One footnote indicates if the 95th percentile cycle exceeds capacity. Traffic is simulated for two complete cycles of the 95th percentile traffic in Synchro in order to account for the effects of spillover between cycles. In practice, the 95th percentile queue shown will rarely be exceeded and the queues shown with the footnote are acceptable for the design of storage bays. The other footnote indicates whether or not the volume for the 95th percentile queue is metered by an upstream signal. If the upstream intersection is at or near capacity, the 50th percentile queue represents the maximum queue experienced.

A vehicle is considered queued whenever it is traveling at less than 10 feet/second. A vehicle will only become queued when it is either at the stop bar or behind another queued vehicle. The 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes during the peak hour and is derived from the average (50th percentile) queue plus 1.65 standard deviations. The queue length reported is for the lane with the highest queue in the lane group. The 95th percentile queue is not necessarily ever observed it is simply based on statistical calculations.

2.5 FREEWAY MAINLINE SEGMENT ANALYSIS METHODOLOGY

Consistent with recent Caltrans guidance, the TA has evaluated freeway segments where the Project is anticipated to contribute 50 or more peak hour one-way trips on either side of the Cedar Avenue interchange, in an effort to conduct a conservative analysis and overstate as opposed to understand potential deficiencies.

The freeway system in the study area has been broken into segments defined by the freeway-to-arterial interchange locations. The freeway segments have been evaluated in this TA based upon peak hour directional volumes. The freeway segment analysis is based on the methodology described in the HCM and performed using Highway Capacity Software (HCS) 7. The performance measure preferred by Caltrans to calculate LOS is density. Density is expressed in terms of passenger cars per mile per lane. Table 2-4 illustrates the freeway segment LOS descriptions for each density range utilized for this analysis.

TABLE 2-4: DESCRIPTION OF FREEWAY MAINLINE LOS

Level of Service	Description	Density Range (pc/mi/ln)[1]
A	Free-flow operations in which vehicles are relatively unimpeded in their ability to maneuver within the traffic stream. Effects of incidents are easily absorbed.	0.0 – 11.0
B	Relative free-flow operations in which vehicle maneuvers within the traffic stream are slightly restricted. Effects of minor incidents are easily absorbed.	11.1 – 18.0
C	Travel is still at relative free-flow speeds, but freedom to maneuver within the traffic stream is noticeably restricted. Minor incidents may be absorbed, but local deterioration in service will be substantial. Queues begin to form behind significant blockages.	18.1 – 26.0
D	Speeds begin to decline slightly and flows and densities begin to increase more quickly. Freedom to maneuver is noticeably limited. Minor incidents can be expected to create queuing as the traffic stream has little space to absorb disruptions.	26.1 – 35.0
E	Operation at capacity. Vehicles are closely spaced with little room to maneuver. Any disruption in the traffic stream can establish a disruption wave that propagates throughout the upstream traffic flow. Any incident can be expected to produce a serious disruption in traffic flow and extensive queuing.	35.1 – 45.0
F	Breakdown in vehicle flow.	>45.0

[1] pc/mi/ln = passenger cars per mile per lane. Source: HCM, 6th Edition

The number of lanes for existing baseline conditions has been obtained from field observations conducted by Urban Crossroads in May 2020. These existing freeway geometrics have been utilized for Existing, E+P, Opening Year Cumulative (2021), and Horizon Year (2040) conditions.

The I-10 Freeway mainline volume data was obtained from the Caltrans Performance Measurement System (PeMS) website for the segments of the I-10 Freeway interchanges at Cedar Avenue. The data was obtained from May 2020. A 1.5 percent growth rate has been applied to the 2019 PeMS data to reflect 2020 conditions. In an effort to conduct a conservative analysis, the maximum value observed within the 3-day period was utilized for the weekday morning (AM) and weekday evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic and actual vehicles (as opposed to PCE volumes) have been utilized for the purposes of the basic freeway segment analysis. (6)

2.6 FREEWAY MERGE/DIVERGE RAMP JUNCTION ANALYSIS

The freeway system in the study area has been broken into segments defined by freeway-to-arterial interchange locations resulting in 4 existing on and off ramp locations where the Project is anticipated to contribute 50 or more peak hour trips (see Table 1-2) at the I-10 Freeway and Cedar Avenue interchange. Although the HCM indicates the influence area for a merge/diverge junction is 1,500 feet, the analysis presented in this TA has been performed at all ramp locations with respect to the nearest on or off ramp at each interchange in an effort to be consistent with Caltrans guidance/comments on other projects Urban Crossroads has worked on in the region.

The merge/diverge analysis is based on the HCM Ramps and Ramp Junctions analysis method and performed using HCS7 software. The measure of effectiveness (reported in passenger car/mile/lane) are calculated based on the existing number of travel lanes, number of lanes at the on and off ramps both at the analysis junction and at upstream and downstream locations (if applicable) and acceleration/deceleration lengths at each merge/diverge point. Table 2-5 presents the merge/diverge area level of service descriptions for each density range utilized for this analysis.

TABLE 2-5: DESCRIPTION OF FREEWAY MERGE AND DIVERGE LOS

Level of Service	Density Range (pc/mi/ln)[1]
A	≤10.0
B	10.0 – 20.0
C	20.0 – 28.0
D	28.0 – 35.0
E	>35.0
F	Demand Exceeds Capacity

[1] pc/mi/ln = passenger cars per mile per lane. Source: HCM, 6th Edition

Similar to the basic freeway segment analysis, the I-10 Freeway mainline volume data were obtained from the Caltrans maintained PeMS website for the segments of the I-10 Freeway interchange at Cedar Avenue. The ramp data (per the count data presented in Appendix 3.1) were then utilized to flow conserve the mainline volumes to determine the remaining I-10 Freeway mainline segment volumes. Flow conservation checks ensure that traffic flows from north to south (and vice versa) of the interchange area with no unexplained loss of vehicles. The data was obtained from May 2019. A 2 percent growth rate was applied to the May 2019 data to reflect 2020 conditions. In an effort to conduct a conservative analysis, the maximum value observed within the 3-day period was utilized for the weekday morning (AM) and weekday evening (PM) peak hours. In addition, truck traffic, represented as a percentage of total traffic and actual vehicles (as opposed to PCE volumes) have been utilized for the purposes of the freeway ramp junction (merge/diverge) analysis. (6)

2.7 MINIMUM ACCEPTABLE LEVELS OF SERVICE (LOS)

Minimum Acceptable LOS and associated definitions of intersection deficiencies has been obtained from each of the applicable surrounding jurisdictions.

2.7.1 COUNTY OF SAN BERNARDINO

Per the County of San Bernardino TA Guidelines, the following LOS will be utilized for study area intersections located within the County: Require development to achieve a peak hour Level of Service (LOS) D or better. Therefore, any intersection operating at LOS E or F will be considered deficient for the purposes of this analysis.

2.7.2 CALTRANS

Caltrans endeavors to maintain a target LOS at the transition between LOS C and LOS D on SHS facilities, however, Caltrans acknowledges that this may not always be feasible and recommends that the lead agency consult with Caltrans to determine the appropriate target LOS. (3) If an existing State highway facility is operating at less than this target LOS, the existing LOS should be maintained. In general, the region-wide goal for an acceptable LOS on all freeways and intersections is LOS D. Consistent with the County of San Bernardino LOS threshold of LOS D, LOS D will be used as the target LOS for freeway ramps, freeway segments, and freeway merge/diverge ramp junctions.

2.7.3 SAN BERNARDINO COUNTY CMP

The CMP definition of deficiency is based on maintaining a level of service standard of LOS E or better, where feasible, except where an existing LOS F condition is identified in the CMP document. However, for the purposes of this analysis, LOS D has been utilized for all study area intersections.

2.8 DEFICIENCY CRITERIA

This section outlines the methodology used in this analysis related to identifying circulation system deficiencies.

2.8.1 INTERSECTIONS

Signalized Intersections

Per the County of San Bernardino TA Guidelines, the following LOS will be utilized for signalized study area intersections located within the Desert, Valley and Mountain regions of the County:

- Any signalized study intersection in the Valley or Mountain regions that is operating at an acceptable LOS D or better without project traffic in which the addition of project traffic causes the intersection to degrade to an LOS E or F shall identify improvements to improve operations to LOS D or better.
- Any signalized study intersection in the Desert region that is operating at an LOS C or better without project traffic in which the addition of project traffic causes the intersection to degrade to an LOS D, E, or F shall identify improvements to improve operations to LOS C.
- Any signalized study intersection in the Valley or Mountain regions that is operating at LOS E or F without project traffic where the project increases delay by 5.0 or more seconds shall identify improvements to offset the increase in delay.
- Any signalized study intersection in the Desert region that is operating at LOS D, E, or F without project traffic where the project increases delay by 5.0 or more seconds shall identify improvements to offset the increase in delay.

Unsignalized Intersections

Per the County of San Bernardino TA Guidelines, the following LOS will be utilized for unsignalized study area intersections located within the Desert, Valley and Mountain regions of the County:

- The addition of project related traffic causes the intersection to degrade from an LOS D or better to a LOS E or worse in the Valley and Mountain regions or from an LOS C or better to an LOS D or worse in the Desert region.

  OR

- The project adds 5.0 seconds or more of delay to an intersection that is already projected to operate without project traffic at an LOS E or F in the Valley and Mountain regions or at an LOS D, E, or F in the Desert region (per Section 10.5.2 b))

  AND

- One or both of the following conditions are met:
  - The project adds ten (10) or more trips to any approach
  - The intersection meets the peak hour traffic signal warrant after the addition of project traffic (per Section 10.5.2 c)).

The proposed significance thresholds will be applied at study area intersections for the purposes of determining project-related deficiencies.

2.8.2 CALTRANS FACILITIES

To determine whether the addition of project traffic to the SHS freeway segments would result in a deficiency, the following will be utilized:

- The TA finds that the LOS of a segment will degrade from D or better to E or F.

The TA finds that a project will exacerbate an already deficient condition if it contributes 50 or more one-way peak hour trips. A segment that is operating at or near capacity is deemed to be deficient.

2.9 PROJECT FAIR SHARE CALCULATION METHODOLOGY

In cases where this TA identifies that the Project would contribute additional traffic volumes to traffic deficiencies, Project fair share costs of improvements necessary to address deficiencies have been identified. The Project's fair share cost of improvements is determined based on the following equation, which is the ratio of Project traffic to new traffic, and new traffic is total future (Horizon Year) traffic less existing baseline traffic:

Project Fair Share % = Project (2040) AM/PM Traffic / (2040 With Project AM/PM Total Traffic – Existing AM/PM Traffic)

The project fair share percentage has been calculated for both the AM peak hour and PM peak hour and the highest of the two has been selected. The Project fair share contribution calculations are presented in Section 8 *Local and Regional Funding Mechanisms* of this TA. The cost of implementing the improvements shown on Table 1-3 have been estimated based on the preliminary construction cost estimates found in Appendix G of the San Bernardino County CMP in conjunction with a total cost escalation factor of 1.568 to more closely approximate current (2020) costs. These cost estimates have been utilized in conjunction with the Project fair share percentages to determine the Project's fair share cost of the recommended improvements (see Table 8-1). These estimates are a rough order of magnitude only as they are intended only for discussion purposes and do not imply any legal responsibility or formula for contributions or physical improvements.

3 AREA CONDITIONS

This section provides a summary of the existing circulation network, the County of San Bernardino General Plan Circulation Network, and a review of existing peak hour intersection operations, traffic signal warrant, off-ramp queuing, and freeway facility analyses.

3.1 EXISTING CIRCULATION NETWORK

Pursuant to the agreement with County of San Bernardino staff (Appendix 1.1), the study area includes a total of 5 existing and future intersections as shown previously on Exhibit 1-2. Exhibit 3-1 illustrates the study area intersections located near the proposed Project and identifies the number of through traffic lanes for existing roadways and intersection traffic controls.

3.2 COUNTY OF SAN BERNARDINO GENERAL PLAN CIRCULATION ELEMENT

The study area contains five intersections that exist within the County of San Bernardino. Exhibit 3-2 shows the County of San Bernardino General Plan Circulation Element, and Exhibit 3-3 illustrates the County of San Bernardino General Plan Roadway Cross-Sections. The study area roadways that lie within the unincorporated areas of the County of San Bernardino are described below.

Major Highways are designed to accommodate four travel lanes with a median, within a typical 104-foot right of way, carry high traffic volumes and provide limited access. Their primary function is to link the major arterial highways to the secondary arterials, as well as to carry vehicles entering and exiting the unincorporated County area from neighboring areas. Driveway access is also typically limited on these facilities, where feasible. The following study area roadways within the County of San Bernardino are classified as Major Highways:

- Slover Avenue
- Cedar Avenue

3.3 TRUCK ROUTES

The County of San Bernardino does not have a truck route map. The truck trip distribution patterns for the proposed Project have been developed through consultation with the County of San Bernardino during the TA scoping process and are consistent with other nearby studies.

3.4 BICYCLE & PEDESTRIAN FACILITIES

Field observations indicate nominal pedestrian and bicycle activity within the study area. As shown on Exhibit 3-4, pedestrian facilities are built out along portions Cedar Avenue and Slover Avenue. However, there are limited pedestrian facilities within close proximity to the Project site on Cedar Avenue. The County of San Bernardino does not have an exhibit showing bikeways and trails.

EXHIBIT 3-1: EXISTING NUMBER OF THROUGH LANES AND INTERSECTION CONTROLS

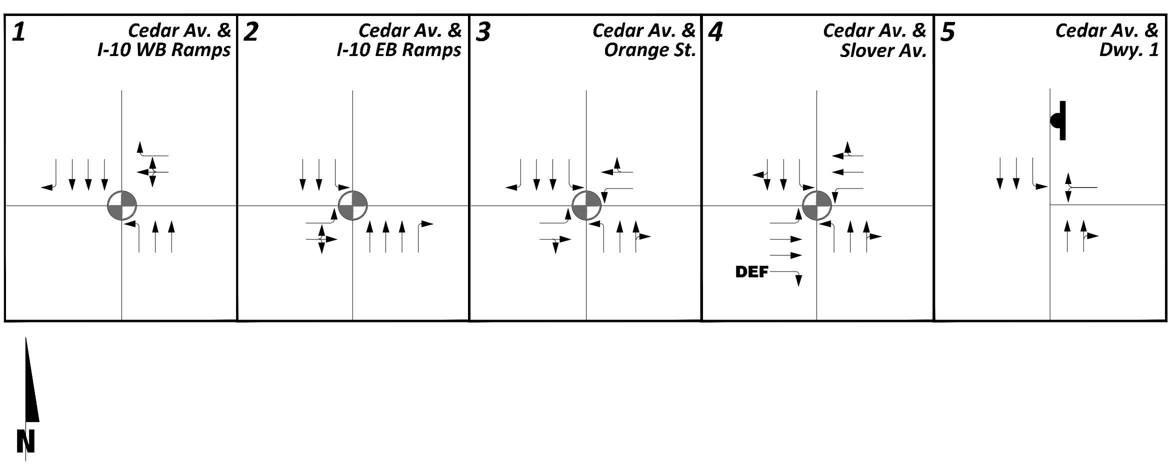
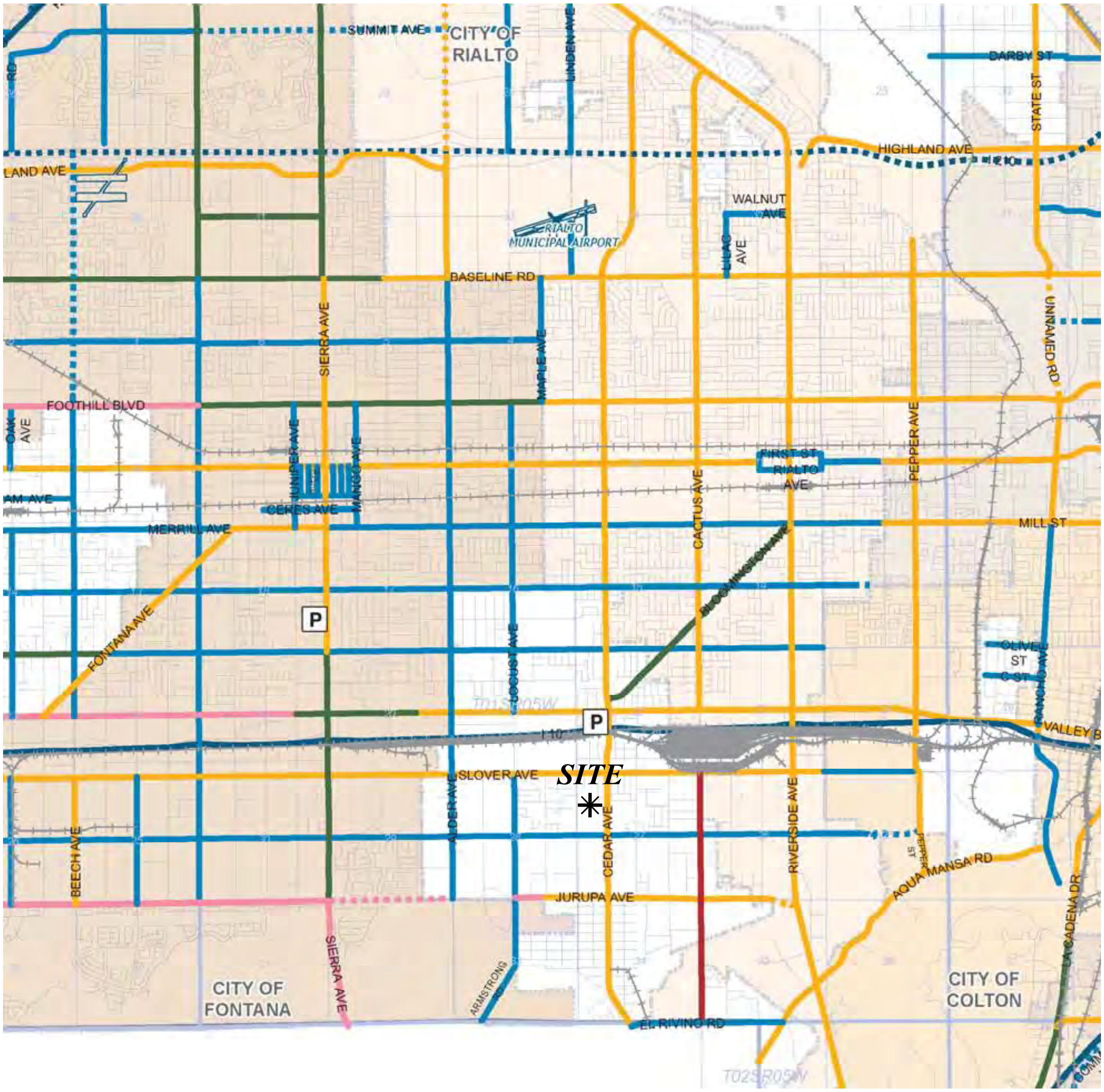


EXHIBIT 3-2: COUNTY OF SAN BERNARDINO GENERAL PLAN CIRCULATION ELEMENT



Legend

Existing	Proposed	
		Freeway
		Major Divided Highway
		Major Arterial Highway
		Major Highway
		Secondary Highway
		Controlled/Limited Access Collector
		Mountain Major Highway
		Mountain Secondary Highway
		State Highway (Special Standards or Conditions)

P Park & Ride — Railroad ✕ Airport / Airfield

N

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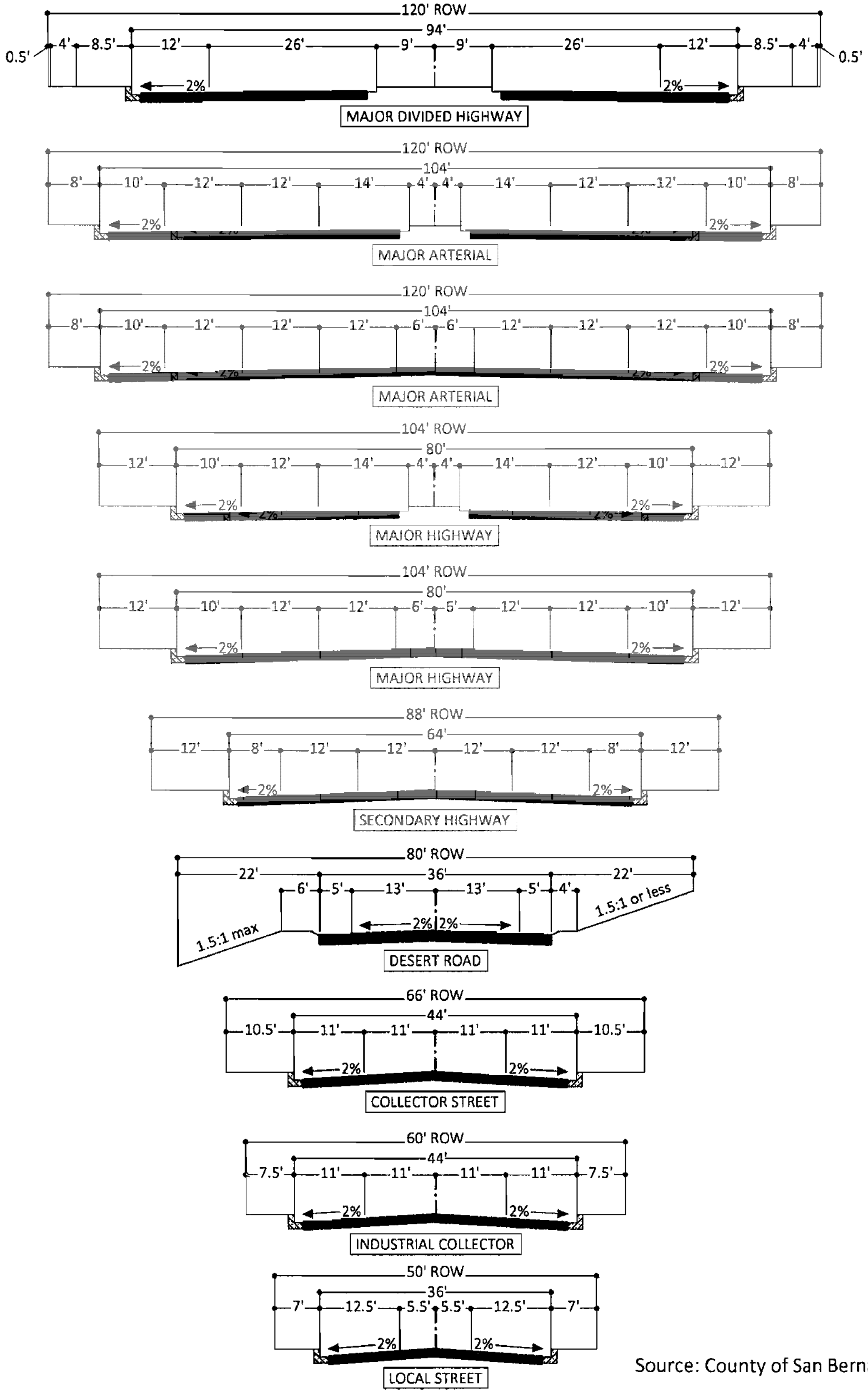
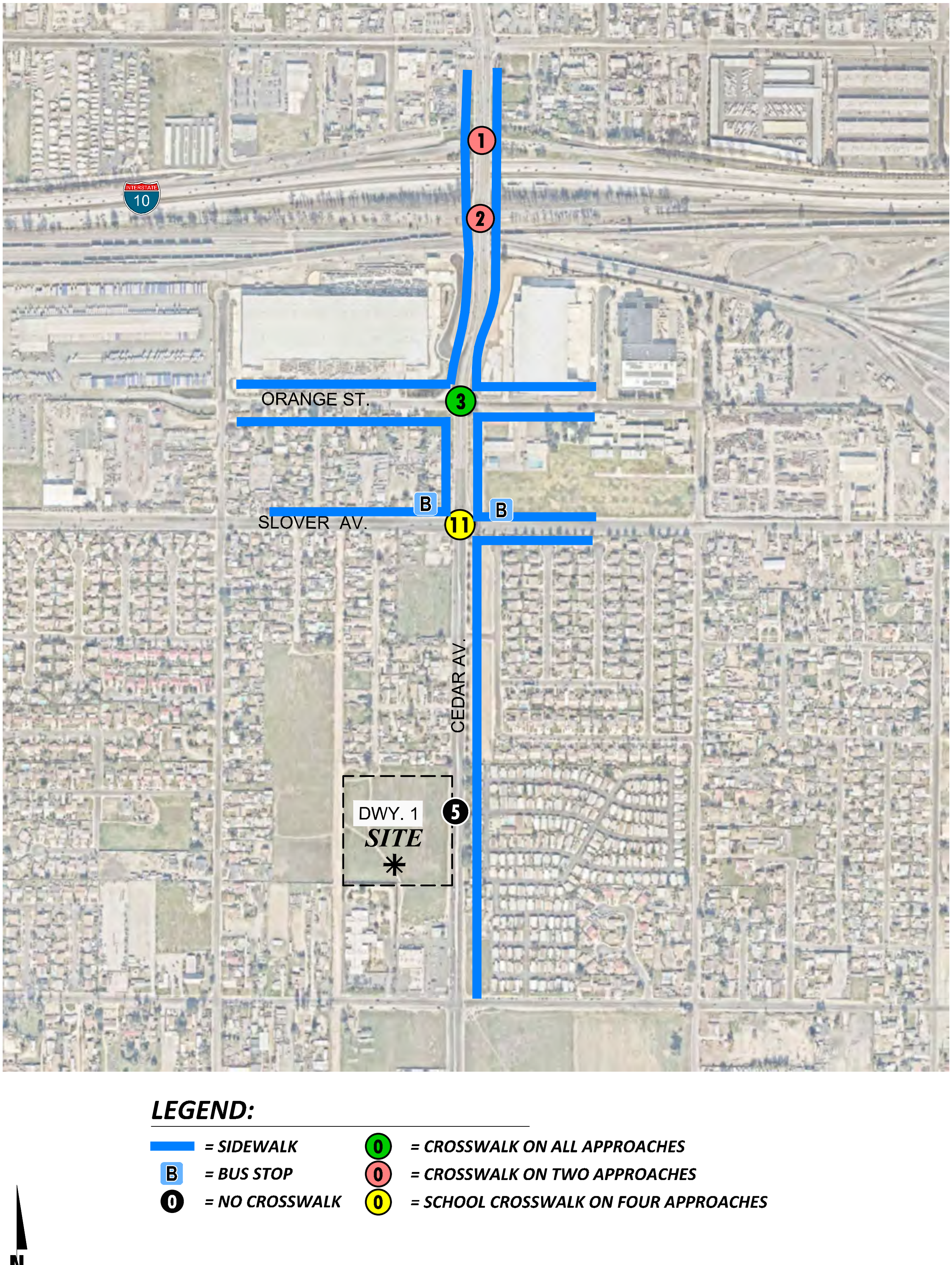
URBAN CROSSROADS

EXHIBIT 3-3: COUNTY OF SAN BERNARDINO GENERAL PLAN ROADWAY CROSS-SECTIONS



Source: County of San Bernardino

EXHIBIT 3-4: EXISTING PEDESTRIAN FACILITIES



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3.5 TRANSIT SERVICE

The study area is currently served by Omnitrans, a public transit agency serving various jurisdictions within San Bernardino County, with bus service along Cedar Avenue and Slover Avenue via Route 29. Omnitrans Route 290 runs along the I-10 Freeway but does not provide transit service to the study area. The existing transit routes within the area by Omnitrans is shown on Exhibit 3-5. Transit service is reviewed and updated by Omnitrans periodically to address ridership, budget, and community demand needs. Changes in land use can affect these periodic adjustments which may lead to either enhanced or reduced service where appropriate.

3.6 EXISTING (2020) TRAFFIC COUNTS

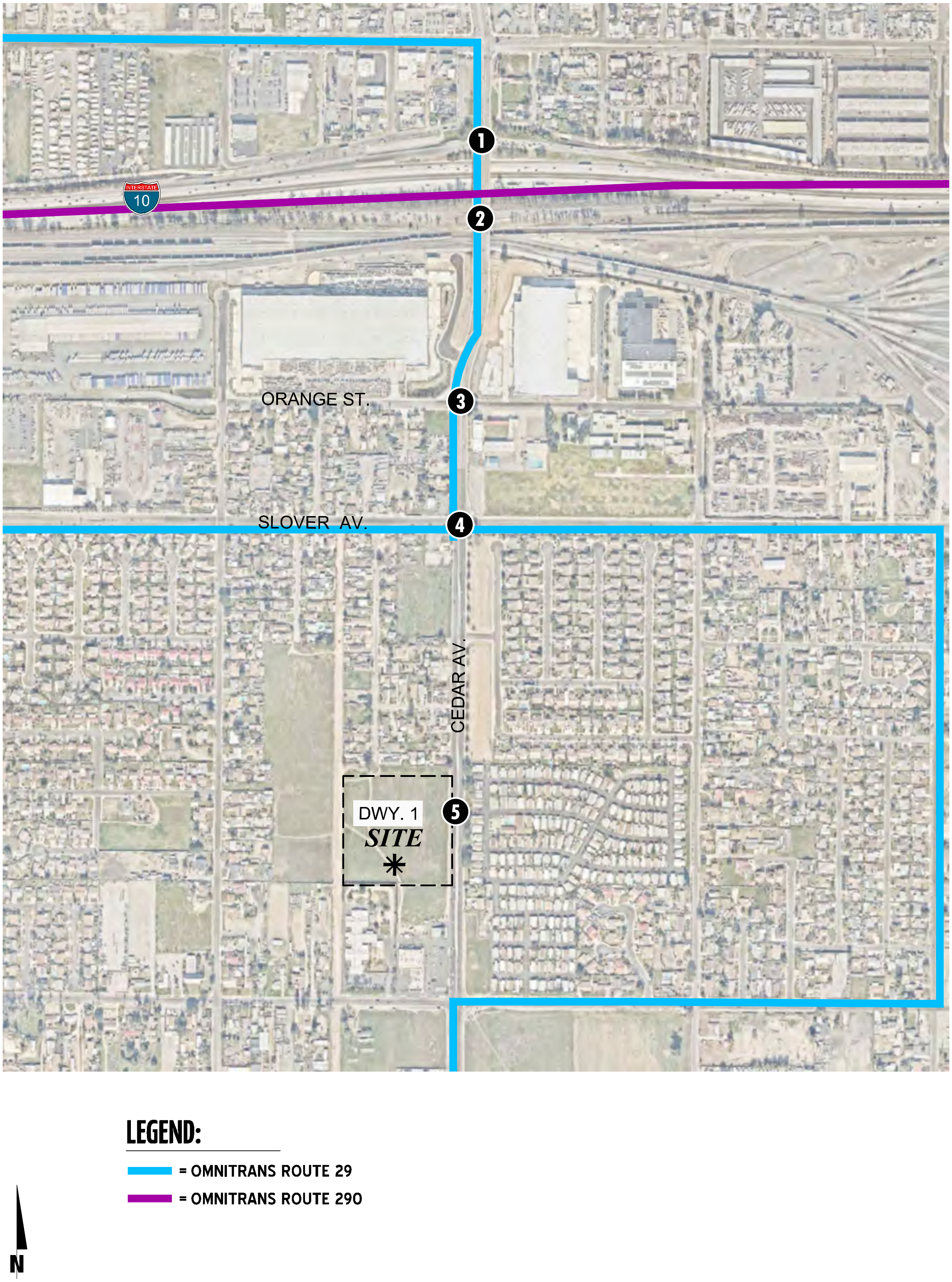
The intersection LOS analysis is based on the traffic volumes observed during the peak hour conditions using traffic count data collected in May 2019. The following peak hours were selected for analysis:

- Weekday AM Peak Hour (peak hour between 7:00 AM and 9:00 AM)
- Weekday PM Peak Hour (peak hour between 4:00 PM and 6:00 PM)

Due to the currently ongoing COVID-19 pandemic, schools and businesses within the study area were closed or operating at less than full capacity at the time this study was prepared. As such, historic (2019) traffic counts were utilized in conjunction with a 2% growth rate to reflect 2020 conditions. The 2019 weekday AM and weekday PM peak hour count data is representative of typical weekday peak hour traffic conditions in the study area. There were no observations made in the field that would indicate atypical traffic conditions on the count dates, such as construction activity or detour routes and near-by schools were in session and operating on normal schedules. The raw manual peak hour turning movement traffic count data sheets are included in Appendix 3.1.

The traffic counts collected in May 2019 include the following vehicle classifications: Passenger Cars, 2-Axle Trucks, 3-Axle Trucks, and 4 or More Axle Trucks. To represent the effects large trucks, buses and recreational vehicles have on traffic flow; all trucks were converted into PCE. By their size alone, these vehicles occupy the same space as two or more passenger cars. In addition, the time it takes for them to accelerate and slow-down is much longer than for passenger cars and varies depending on the type of vehicle and number of axles. For the purpose of this analysis, a PCE factor of 1.5 has been applied to 2-axle trucks, 2.0 for 3-axle trucks, and 3.0 for 4+-axle trucks to estimate each turning movement. These factors are consistent with the values recommended for use in the CMP.

EXHIBIT 3-5: EXISTING TRANSIT ROUTES



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A 2019 count data was not available for the existing Cedar Village Mobile Home Park entry on Cedar Avenue. As such, a 2020 traffic count was conducted at this location in June 2020. The existing Cedar Village Mobile Home Park has 239 home sites and currently has access on Cedar Avenue, Santa Ana Avenue to the south, and Larch Avenue to the east. 50% of the ITE based trip generation for a mobile home park was used to conservatively calculate the total inbound and outbound trips that could potentially access the Cedar Avenue entry. Comparison of the ITE based trip generation to the June 2020 traffic count suggests that additional modifications were not necessary to adjust for any reductions in traffic that would be attributable to the COVID-19 pandemic. However, through volumes along Cedar Avenue were understated in comparison to the historic 2019 traffic count (adjusted to 2020), so traffic along Cedar Avenue was flowed at Driveway 1 on Cedar Avenue to represent through traffic more accurately along Cedar Avenue.

Existing weekday ADT volumes are shown on Exhibit 3-6. Where actual 24-hour tube count data was not available, Existing ADT volumes were based upon factored intersection peak hour counts collected by Urban Crossroads, Inc. using the following formula for each intersection leg:

Weekday PM Peak Hour (Approach Volume + Exit Volume) x 14.30 = Leg Volume

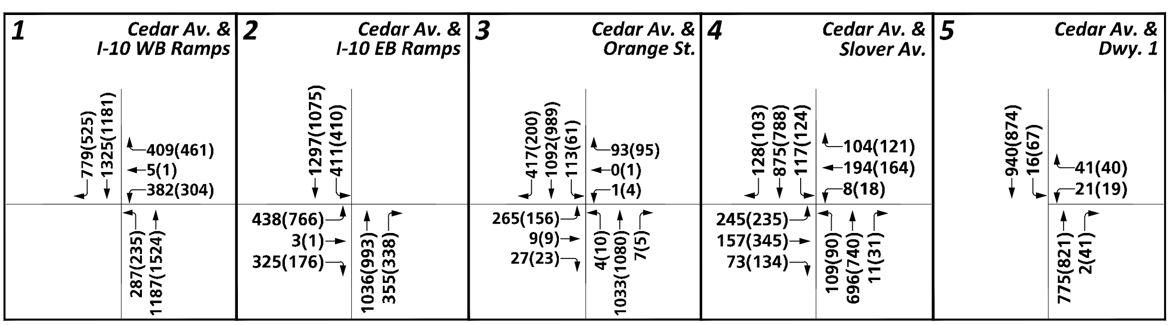
A comparison of the PM peak hour and daily traffic volumes of various roadway segments within the study area indicated that the peak-to-daily relationship is approximately 7.00 percent. As such, the above equation utilizing a factor of 14.30 estimates the ADT volumes on the study area roadway segments assuming a peak-to-daily relationship of approximately 7.00 percent (i.e., 1/0.06995 = 14.30) and was assumed to sufficiently estimate average daily traffic (ADT) volumes for planning-level analyses. Existing weekday AM and weekday PM peak hour intersection volumes (in PCE) are shown on Exhibit 3-6.

3.7 INTERSECTION OPERATIONS ANALYSIS

Signal timing for the freeway arterial-to-ramp intersections and the signalized intersections along the Cedar Avenue corridor have been obtained from the County and reflect the SBCTA coordinated signal timing that has recently been implemented in 2020. It should be noted that for the purposes of this analysis, no optimization of signal timing has been performed for the LOS analysis unless noted otherwise (for improvements).

Existing peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2.2 *Intersection Capacity Analysis* of this report. The intersection operations analysis results are summarized on Table 3-1, which indicates all existing study area intersections are currently operating at an acceptable LOS during the peak hours. Consistent with Table 3-1, a summary of the peak hour intersection LOS for Existing conditions are shown on Exhibit 3-7. The intersection operations analysis worksheets are included in Appendix 3.2 of this TA.

EXHIBIT 3-6: EXISTING (2020) TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) = *AM(PM) PEAK HOUR INTERSECTION VOLUMES*

10.0 = *VEHICLES PER DAY (1000'S)*

N

EXHIBIT 3-7: EXISTING (2020) SUMMARY OF LOS

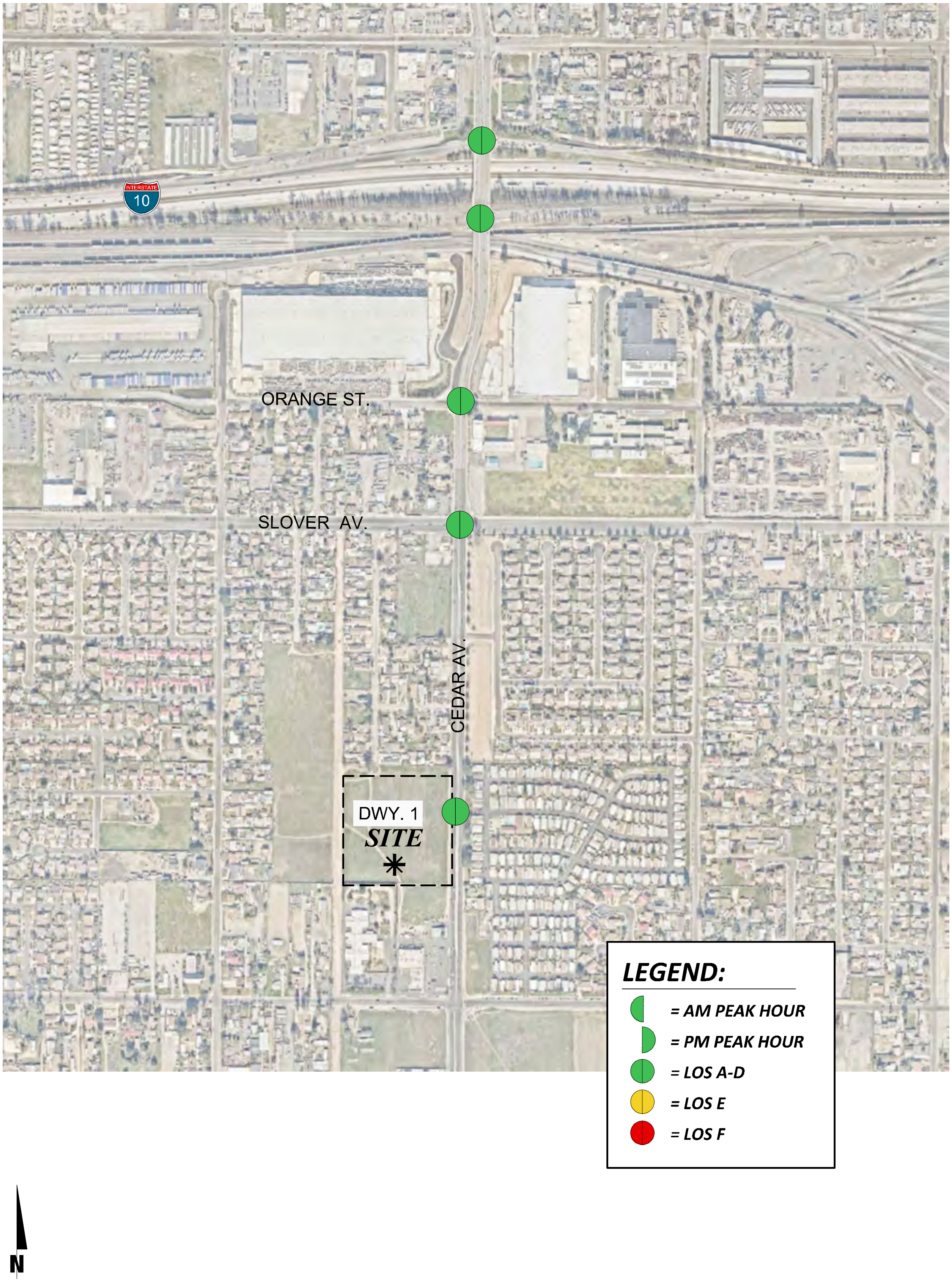


Table 3-1

Intersection Analysis for Existing (2020) Conditions

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[2] (secs.) AM	PM	Level of Service AM	PM
1	Cedar Av. & I-10 WB Ramps	TS	1	2	0	0	3	1	0	0	0	0	1	1	23.6	23.5	C	C
2	Cedar Av. & I-10 EB Ramps	TS	0	3	1	1	2	0	1	1	0	0	0	0	26.1	28.3	C	C
3	Cedar Av. & Orange Av.	TS	1	2	0	1	2	1	1	1	0	0	1	0	22.9	22.5	C	C
4	Cedar Av. & Slover Av.	TS	1	2	0	1	2	0	1	2	d	1	2	0	44.9	42.7	D	D
5	Cedar Av. & Driveway 1	CSS	0	2	0	1	2	0	0	0	0	0	1	0	14.0	14.6	B	B

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

1 When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes

L = Left; T = Through; R = Right; d = Defacto Right Turn Lane

2 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

3 CSS = Cross-street Stop; TS = Traffic Signal

3.8 TRAFFIC SIGNAL WARRANTS ANALYSIS

Traffic signal warrants for Existing traffic conditions are based on existing peak hour intersection turning volumes. There are no unsignalized study area intersections that currently warrant a traffic signal for Existing traffic conditions. Existing conditions traffic signal warrant analysis worksheets are provided in Appendix 3.3.

3.9 OFF-RAMP QUEUING ANALYSIS

A queuing analysis was performed for the off-ramps at the study area intersections along the I-10 Freeway to assess vehicle queues for the off ramps that may potentially result in deficient peak hour operations at the ramp-to-arterial intersections and may potentially “spill back” onto the I-10 Freeway mainlines. Queuing analysis findings are presented on Table 3-2. It is important to note that off-ramp lengths are consistent with the measured distance between the intersection and the freeway mainline. As shown on Table 3-2, there are no movements that are currently experiencing queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows. Worksheets for Existing traffic conditions off-ramp queuing analysis are provided in Appendix 3.4.

3.10 FREEWAY FACILITY ANALYSIS

Existing (2020) mainline directional volumes for the AM and PM peak hours are provided on Exhibit 3-8. As shown in Table 3-3, the study area freeway segments and merge/diverge ramp junctions analyzed for this study are currently operating at an acceptable LOS (i.e., LOS D or better) during the peak hours for Existing (2020) traffic conditions. Existing (2020) freeway facility analysis worksheets are provided in Appendix 3.5.

3.11 RECOMMENDED IMPROVEMENTS

3.11.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

As shown on Table 3-1, there are currently no deficient intersections for Existing traffic conditions. As such, no improvements have been recommended.

3.11.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown on Table 3-2, there are currently no peak hour queuing issues at I-10 Freeway study area interchange. As such, no improvements have been recommended.

3.11.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

As shown on Table 3-3, the study area freeway segments and merge/diverge ramp junctions are currently operating at an acceptable LOS. As such no improvements have been recommended.

Table 3-2

Peak Hour Freeway Off-Ramp Queuing Summary for Existing (2020) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	95th Percentile Queue (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM
Cedar Av. & I-10 WB Ramps	WBL/T/R	1,270	454 [2]	493 [2]	Yes	Yes
	WBR	480	320	408 [2]	Yes	Yes
Cedar Av. & I-10 EB Ramps	EBL	400	370	636 [2,3]	Yes	Yes
	EBL/T/R	1,900	315	580 [2]	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.
[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.
[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-10 Freeway mainline.

Table 3-3

Freeway Facility Analysis for Existing (2020) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]
I-10	Westbound	West of Cedar Av.	4	31.5	D	27.8	D
		On-Ramp at Cedar Av.	4	30.6	D	27.3	C
		Off-Ramp at Cedar Av.	5	22.2	C	20.9	C
		East of Cedar Av.	5	22.5	C	21.2	C
	Eastbound	West of Cedar Av.	4	24.7	C	27.9	D
		Off-Ramp at Cedar Av.	5	18.9	C	20.9	C
		On-Ramp at Cedar Av.	4	25.2	C	26.4	C
		East of Cedar Av.	4	25.1	C	26.8	D

* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

EXHIBIT 3-8: EXISTING (2020) FREEWAY MAINLINE VOLUMES

LEGEND:

100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

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4 PROJECTED FUTURE TRAFFIC

This section presents the traffic volumes estimated to be generated by the Project, as well as the Project's trip assignment onto the study area roadway network. The Project is proposed to consist of up to 8.940 acres of truck terminal use. It is anticipated that the Project would be developed in a single phase with an anticipated Opening Year of 2021. Access to the Project site will be provided to Cedar Avenue via a proposed full-access signalized driveway. Regional access to the Project site will be provided by the I-10 Freeway via Cedar Avenue.

4.1 PROJECT TRIP GENERATION

Trip generation represents the amount of traffic that is attracted and produced by a development and is based upon the specific land uses planned for a given project. Truck terminal rates based on acreage are not readily available in the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition, 2017). In addition, the intermodal truck terminal land use in the ITE Trip Generation Manual is not consistent with the proposed use as there would be no transfer of goods on the proposed site. Lastly, the intermodal truck terminal trip generation rates published in the ITE Trip Generation Manual are based on limited survey data (2-4 sites). As such, in order to develop the traffic characteristics of the proposed project, trip-generation statistics published in the City of San Diego Municipal Code Land Development Code Trip Generation Manual (2003) for the Truck Terminal land use was used to estimate the trip generation. (7) Based on the characteristics of the proposed Project, it is assumed Project traffic will consist of passenger cars (20.0% of total traffic) and 4+-axle trucks (80.0% of total traffic). This vehicle mix is based on the Wheeler Trucking Project Focused Traffic Memorandum, prepared by LSA (2017), which evaluates a truck trailer yard project located in the vicinity of the proposed Project site. Trip generation rates for the proposed Project are shown in Table 4-1. (8)

Finally, PCE factors were applied to the trip generation rates to convert trips made by heavy trucks (large 4+-axles trucks) to PCE values. PCEs allow the typical "real-world" mix of vehicle types to be represented as a single, standardized unit, such as the passenger car, to be used for the purposes of capacity and level of service analyses. The PCE factors are consistent with the recommended PCE factors in Appendix B of the San Bernardino County Congestion Management Program (2016 Update). (1)

The resulting trip generation for the proposed Project is shown in Table 4-2. As shown in Table 4-2, the proposed Project is anticipated to generate 716 actual trip ends per day, with 65 AM peak hour trips and 58 PM peak hour trips. For the purposes of the operations analysis, the PCE values shown in Table 4-2 were utilized.

Table 4-1

Project Trip Generation Rates[1]

Land Use	Units[2]	Weekday AM Peak Hour In	Weekday AM Peak Hour Out	Weekday AM Peak Hour Total	Weekday PM Peak Hour In	Weekday PM Peak Hour Out	Weekday PM Peak Hour Total	Weekday Daily
Actual Vehicle Trip Generation Rates								
Truck Terminal[1]	AC	2.880	4.320	7.200	3.200	3.200	6.400	80.000
Passenger Cars (20%)[3]		0.576	0.864	1.440	0.640	0.640	1.280	16.000
4+-Axle Truck Trips (80%)[3]		2.304	3.456	5.760	2.560	2.560	5.120	64.000
PCE Trip Generation Rates								
Truck Terminal[1]	AC	2.880	4.320	7.200	3.200	3.200	6.400	80.000
Passenger Cars (20%)[3]		0.576	0.864	1.440	0.640	0.640	1.280	16.000
4+-Axle Truck Trips (80%) (PCE =3 .0)[3]		6.912	10.368	17.280	7.680	7.680	15.360	192.000

[1] Truck Terminal rates based on acreage not readily available in the 10th Edition Trip Generation Manual.
Source: San Diego Municipal Code Land Development Code Trip Generation Manual, May 2003 (Truck Terminal Use).

[2] AC = Acres

[3] Vehicle mix source: Wheeler Trucking Project Focused Traffic Memorandum, prepared by LSA (2017).

Table 4-2

Project Trip Generation Summary

Project	Quantity	Units[1]	AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	
Actual Vehicles									
Cedar Avenue Truck Storage	8.940	AC							
Passenger Cars:			5	8	13	6	6	12	144
Truck Trips (4+-Axle):			21	31	52	23	23	46	572
TOTAL TRIPS (Actual Vehicles)			***26***	***39***	***65***	***29***	***29***	***58***	***716***
Passenger Car Equivalent (PCE)									
Trailer Yard	8.940	AC							
Passenger Cars:			5	8	13	6	6	12	144
Truck Trips (4+-Axle):			62	93	155	69	69	138	1,716
TOTAL TRIPS (PCE)			***67***	***101***	***168***	***75***	***75***	***150***	***1,860***

[1] AC = Acres

4.2 PROJECT TRIP DISTRIBUTION

The Project trip distribution represents the directional orientation of traffic to and from the Project site. Trip distribution is the process of identifying the probable destinations, directions or traffic routes that will be utilized by Project traffic. The potential interaction between the planned land uses and surrounding regional access routes are considered to identify the route where the Project traffic would distribute. Truck distribution patterns are based on truck routes, the site's proximity to the regional freeway system and likely distribution of traffic if a future tenant is known. Passenger car distribution patterns are based on existing and planned land uses in the area along with the planned circulation system. Exhibit 4-1 illustrates the truck trip distribution patterns for the Project and Exhibit 4-2 illustrates the passenger car trip distribution patterns. Each of these distribution patterns was reviewed by the County of San Bernardino as part of the TA scoping process (see Appendix 1.1).

4.3 MODAL SPLIT

The potential for Project trips (non-truck) to be reduced by the use of public transit, walking or bicycling have not been included as part of the Project's estimated trip generation. Essentially, the Project's traffic projections are "conservative" in that these alternative travel modes would reduce the forecasted traffic volumes (non-truck trips only).

4.4 PROJECT TRIP ASSIGNMENT

The assignment of traffic from the Project area to the adjoining roadway system is based upon the Project trip generation, trip distribution, and the arterial highway and local street system improvements that would be in place by the time of initial occupancy of the Project. Based on the identified Project traffic generation and trip distribution patterns, Project ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-3.

4.5 BACKGROUND TRAFFIC

4.5.1 OPENING YEAR CUMULATIVE CONDITIONS

Future year traffic forecasts have been based upon background (ambient) growth at 1.5% per year. The total ambient growth is 1.5% for 2021 traffic conditions (compounded growth of 1.5 percent per year over 1 year). The ambient growth factor is intended to approximate regional traffic growth. This ambient growth rate is added to existing traffic volumes to account for area-wide growth not reflected by cumulative development projects. Ambient growth has been added to daily and peak hour traffic volumes on surrounding roadways, in addition to traffic generated by the development of future projects that have been approved but not yet built and/or for which development applications have been filed and are under consideration by governing agencies. Opening Year Cumulative (2021) traffic volumes are provided in Section 6 of this report. The traffic generated by the proposed Project was then manually added to the base volume to determine Opening Year Cumulative "With Project" forecasts for each applicable phase.

EXHIBIT 4-1: PROJECT (TRUCK) TRIP DISTRIBUTION

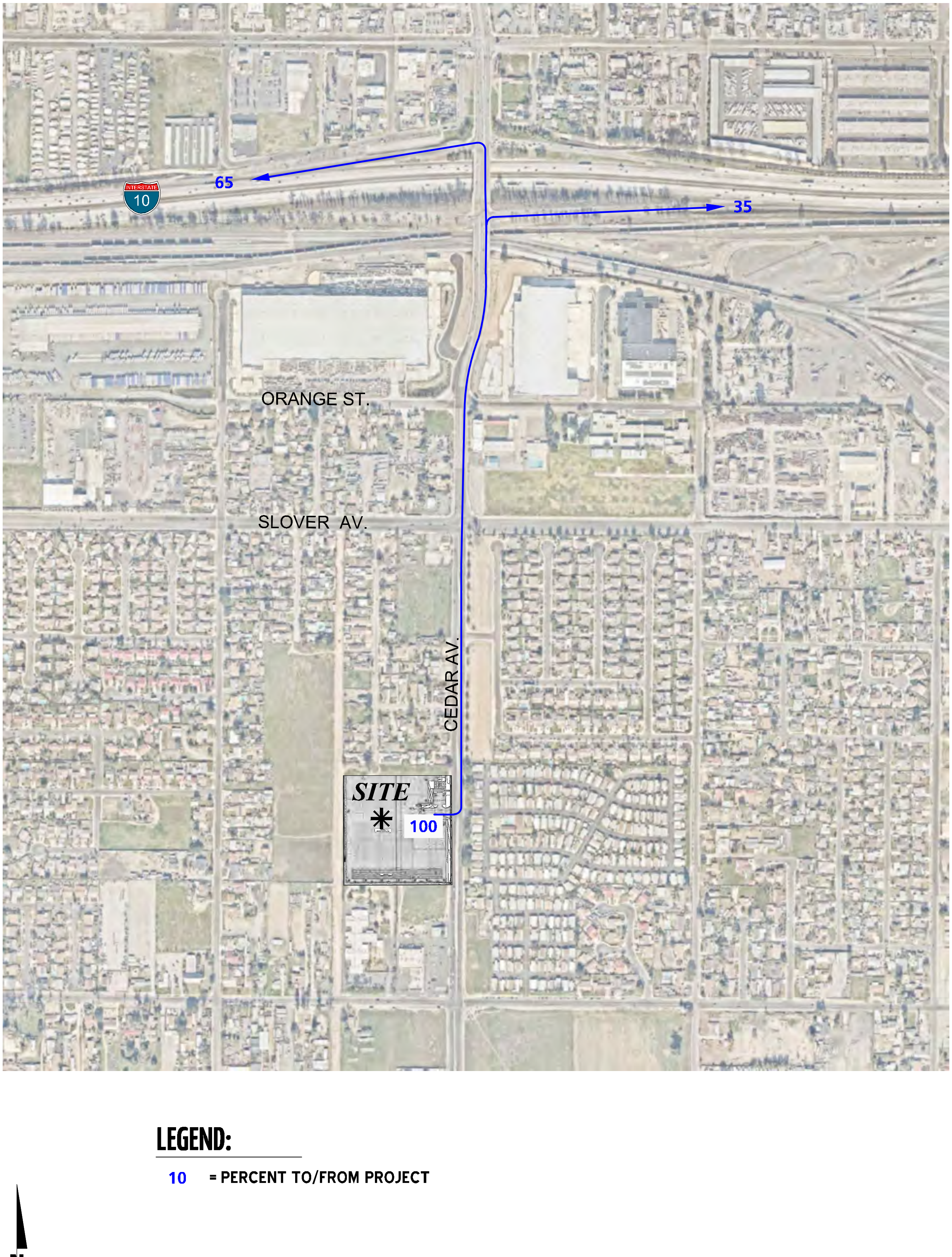


EXHIBIT 4-2: PROJECT (PASSENGER CAR) TRIP DISTRIBUTION

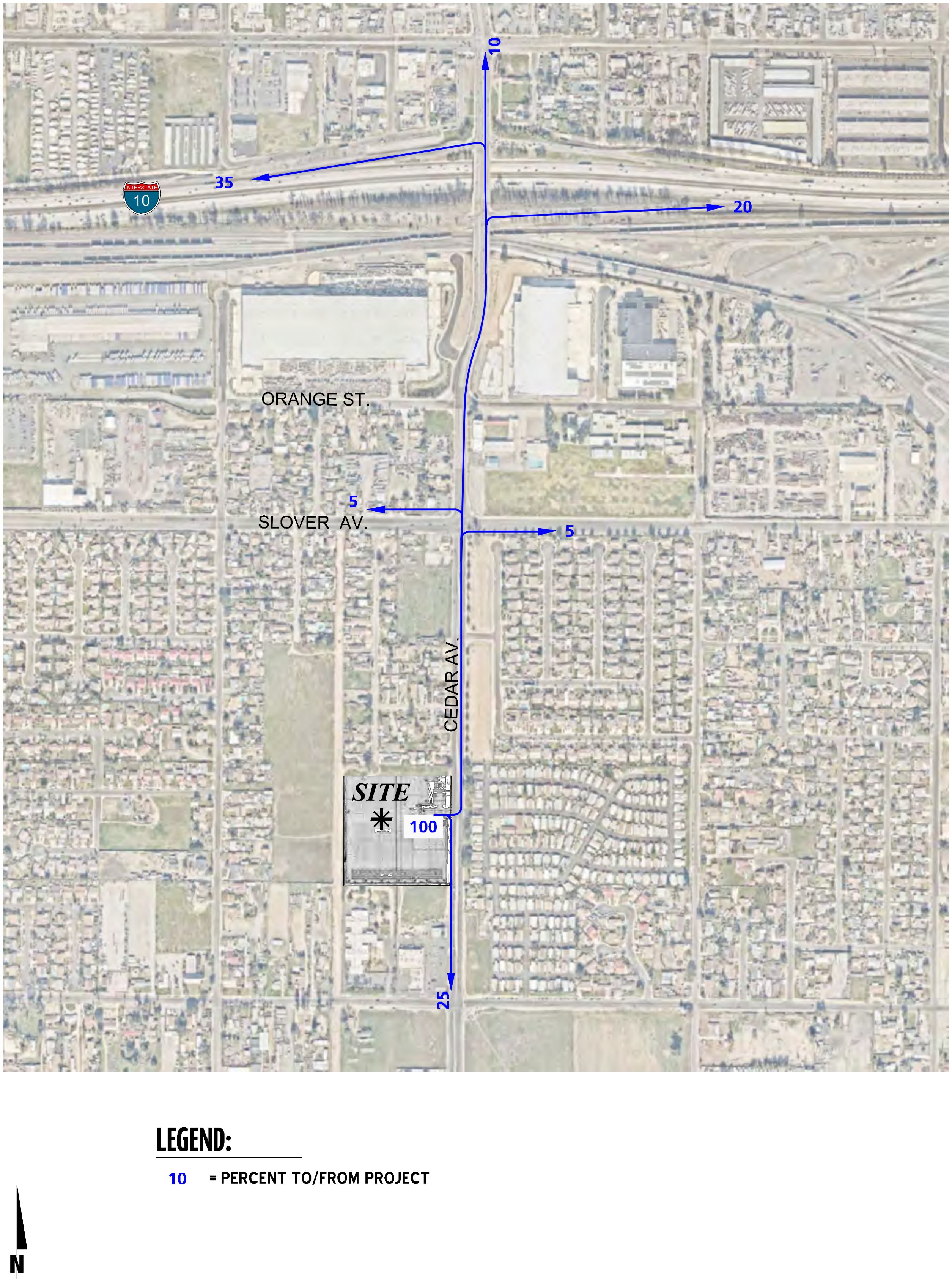
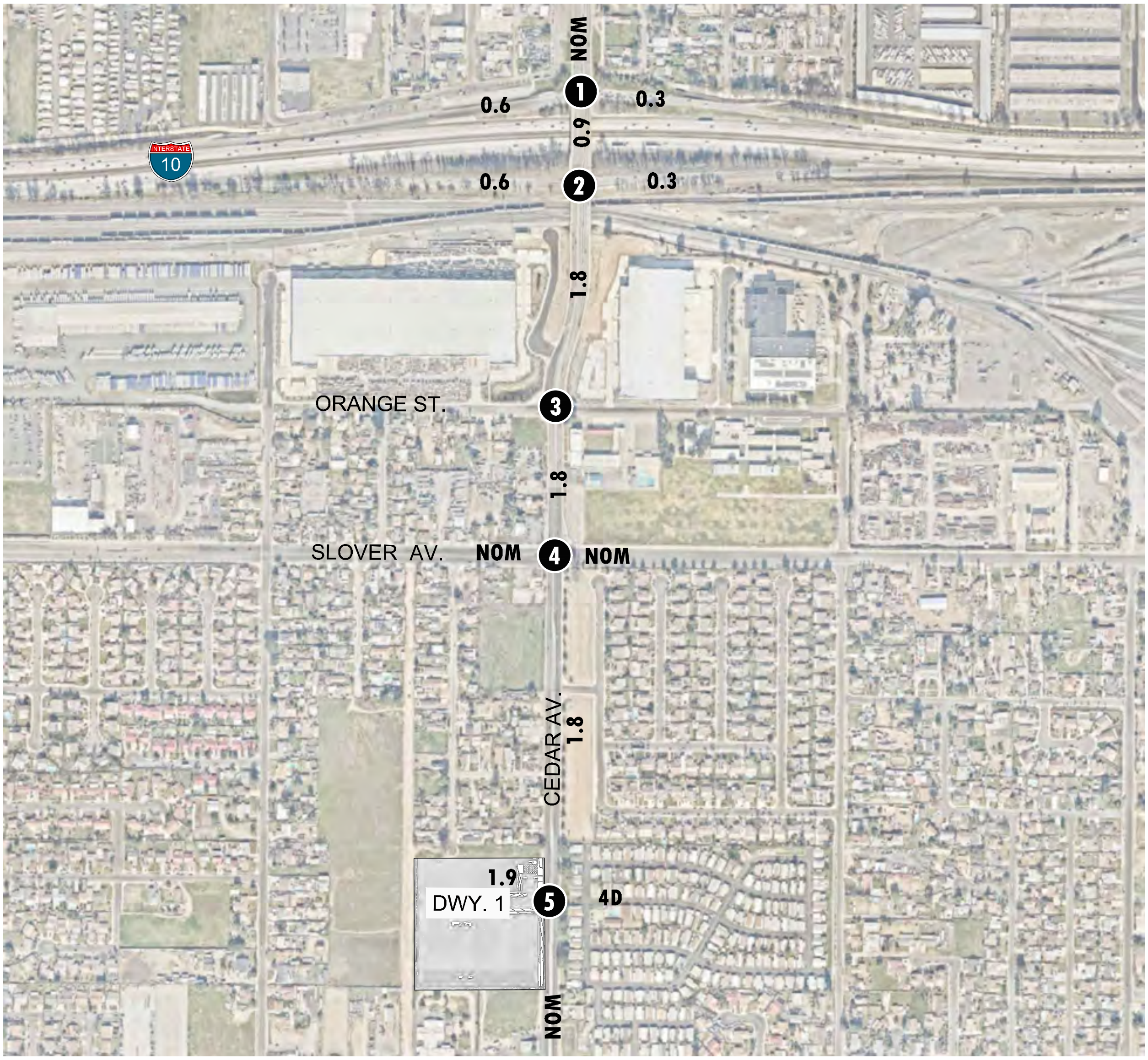
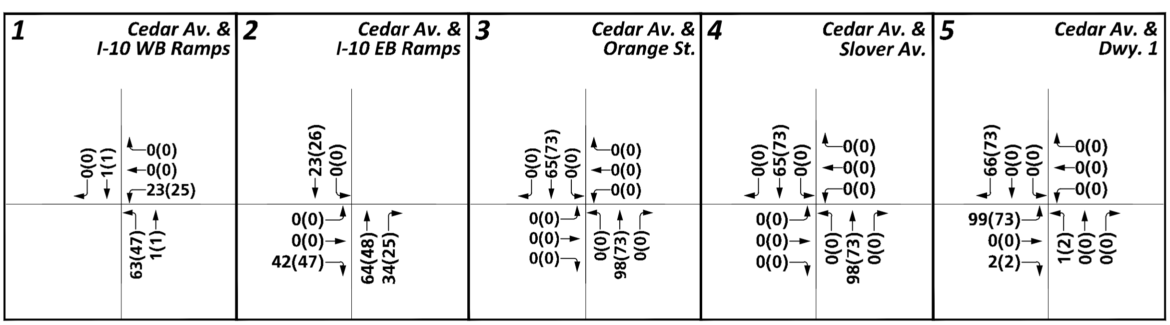


EXHIBIT 4-3: PROJECT ONLY TRAFFIC VOLUMES (IN PCE)





LEGEND:

10(10) = *AM(PM) PEAK HOUR INTERSECTION VOLUMES*
10.0 = *VEHICLES PER DAY (1000'S)*
NOM = *NOMINAL, LESS THAN 50 VEHICLES PER DAY*

N

4.5.2 HORIZON YEAR (2040) CONDITIONS

The adopted Southern California Association of Governments (SCAG) 2020 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (May 2020) growth forecasts for the County of San Bernardino identifies projected growth in population of 308,100 in 2016 to 353,100 in 2045, or a 14.61% increase over the 29-year period. (9) The change in population equates to roughly a 0.47% growth rate, compounded annually. Similarly, growth over the same 29-year period in households is projected to increase by 18.43%, or a 0.59% annual growth rate. Finally, growth in employment over the same 29-year period is projected to increase by 24.00%, or a 0.74% annual growth rate.

Based on a comparison of Existing (2020) traffic volumes to the Horizon Year (2040) forecasts, the average growth rate is estimated at approximately 1.65%, compounded annually between Existing (2020) and 2040 traffic conditions. The annual growth rate at each individual intersection is not lower than 1.13% compounded annually to as high as 2.27% compounded annually over the same time period. Therefore, the annual growth rate utilized for the purposes of this analysis would appear to conservatively approximate the anticipated regional growth in traffic volumes in the County of San Bernardino for Opening Year Cumulative and Horizon Year (2040) traffic conditions, especially when considered along with the addition of project-related traffic, which would tend to overstate as opposed to understate the potential effects to traffic and circulation.

4.6 CUMULATIVE DEVELOPMENT TRAFFIC

A cumulative project list was developed for the purposes of this analysis through consultation with planning and engineering staff from the County of San Bernardino. The cumulative projects listed are those that would generate traffic and would contribute traffic to study area intersections. Cumulative projects from the neighboring jurisdictions of Fontana, Rialto, Jurupa Valley, and Colton have also been included.

Exhibit 4-4 illustrates the cumulative development location map. A summary of cumulative development projects and their proposed land uses are shown on Table 4-2. If applicable, the traffic generated by individual cumulative projects was manually added to the Opening Year Cumulative forecasts to ensure that traffic generated by the listed cumulative development projects on Table 4-3 are reflected as part of the background traffic. In an effort to conduct a conservative analysis, the cumulative projects are added in conjunction with the ambient growth identified in Section 4.5.1 *Background Traffic: Opening Year Cumulative Conditions*. Cumulative ADT and peak hour intersection turning movement volumes are shown on Exhibit 4-5 for near-term traffic conditions.

EXHIBIT 4-4: CUMULATIVE DEVELOPMENT LOCATION MAP

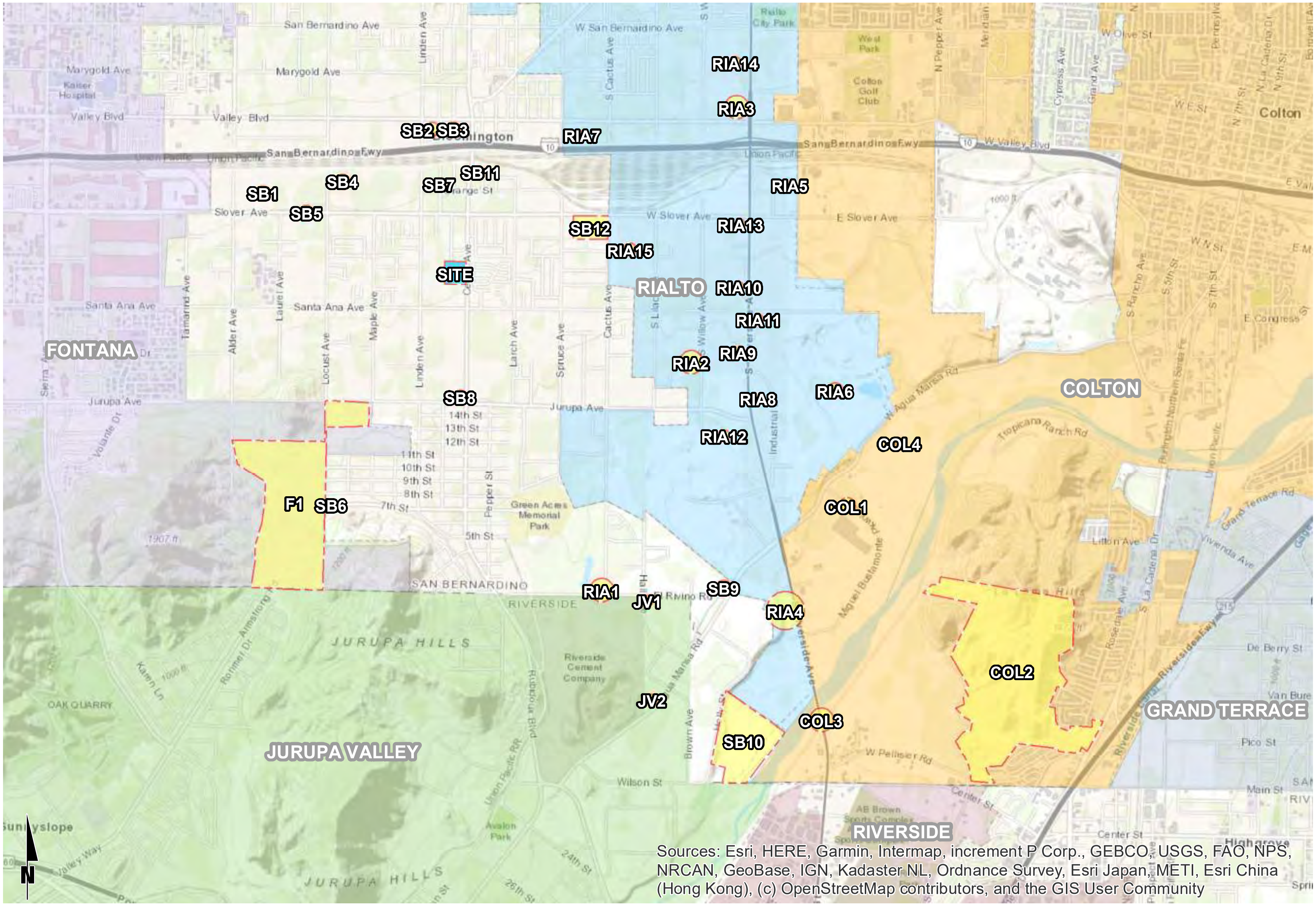
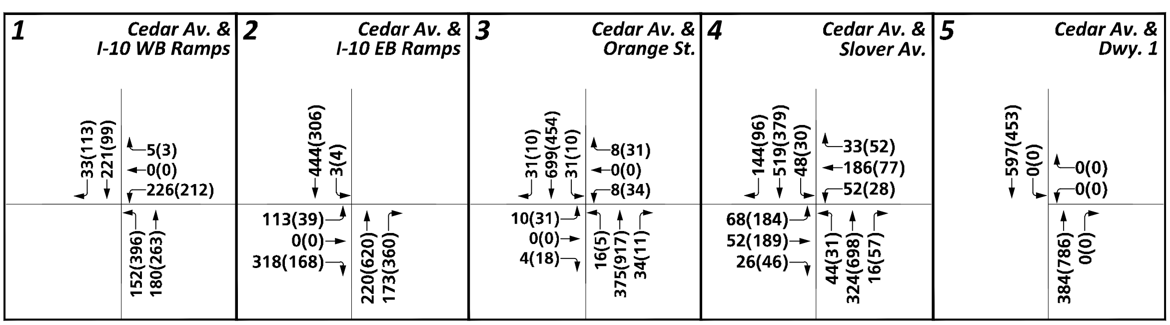


EXHIBIT 4-5: CUMULATIVE ONLY TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) *= AM(PM) PEAK HOUR INTERSECTION VOLUMES*

10.0 *= VEHICLES PER DAY (1000'S)*

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Table 4-3

Page 1 of 2

Cumulative Development Land Use Summary

ID	Project Name	Land Use[1]	Quantity	Units[2]
County of San Bernardino				
SB1	NWC of Slover Av. and Locust Av.	Fast Food Restaurant With Drive-Thru	3.265	TSF
		Retail Store	7.200	TSF
		Warehouse	20.750	TSF
SB2	SEC of Linden Av. and Valley Bl.	Fast Food Restaurant	1.500	TSF
SB3	Valley Bl., West of Linden Av.	Office Building	0.250	AC
SB4	Linden Av., north of Slover Av.	Tire Store	3.000	TSF
SB5	Slover Av. between Locust Av. and Laurel Av.	High-Cube Warehouse	344.000	TSF
SB6	Locust Av. and 7th St.	SFDR	198	DU
SB7	NEC and NWC of Cedar Av. and Orange St.	Warehouse	395.000	TSF
SB8	NWC of Cedar Av. and Jurupa Av.	High-Cube Warehouse	677.000	TSF
SB9	West of Agua Mansa Rd. and North of El Rivino Rd.	High-Cube Warehouse	476.000	TSF
		Warehouse	30.000	TSF
SB10	Holly Street Truck Terminal	Truck Terminal	450.000	TSF
SB11	Cedar Avenue Technology Center	Warehouse	184.770	TSF
SB12	Cactus and Slover Warehouse	Warehouse	257.855	TSF
City of Fontana				
F1	West Valley Logistics Center	High-Cube Transload & Short-Term Storage	3183.100	TSF
		Warehouse	290.590	TSF
City of Rialto				
RIA1	Panattoni I-10 (Cactus Av. & El Rivino Rd.)	Warehouse	2,475.745	TSF
RIA2	CapRock III	Warehouse	582.000	TSF
RIA3	Newmark Merrill Companies	Discount Super Store	198.000	TSF
		Tire Store	9.861	TSF
		Retail	25.436	TSF
		Fast Food w/ Drive-Thru	5.484	TSF
RIA4	Kore Infrastructure	Biosolids Facility	288	TPD
RIA5	NEC of Sycamore Av. and Cameron Wy.	Trucking	--[3]	--
RIA6	South of Santa Ana Av., East of Riverside Av.	Warehouse	370.000	TSF
RIA7	South of Valley Bl., West of Cactus Av.	Warehouse	--[3]	--
RIA8	SEC of Riverside Av. and Industrial Dr.	Trucking	--[3]	--
RIA9	NWC of Riversid Av. and Industrial Dr.	Truck Drop	--[3]	--
RIA10	NWC of Riverside Av. and Santa Ana Av.	Warehouse	527.900	TSF
RIA11	SEC of Riverside Av. and Santa Ana Av.	Super Convenience Market/Gas Station	16	VFP
		Diesel Station	2	VFP
RIA12	South of Jurupa Av., West of Riverside Av.	FedEx	--[3]	--
RIA13	SWC of Riverside Av. & Slover Av.	Speciality Retail & Fast Food w/ Drive-Thru	8.510	TSF

Table 4-3

Page 2 of 2

Cumulative Development Land Use Summary

ID	Project Name	Land Use[1]	Quantity	Units[2]
RIA14	North of Valley Bl., West of Riverside Av.	Warehouse	--[3]	--
RIA15	South of Slover Av., East of Cactus Av.	Wheeler Trucking	--[3]	--
City of Colton				
COL1	2036 Miguel Bustamante Pkwy.	Warehouse	124.588	TSF
	2053 Miguel Bustamante Pkwy.	Warehouse	174.996	TSF
COL2	Roquet Ranch	SFDR	754	DU
		Condo/Townhomes	244	DU
		Active Adult - Attached	52	DU
		Shopping Center	6.500	TSF
		Coffee Shop with Drive Thru	1.500	TSF
		Fast Food with Drive Thru	4.000	TSF
		Active Park	11.1	AC
		Passive Park	8.4	AC
COL3	2163 Riverside Av.	High Cube Warehouse	447.330	TSF
COL4	North of Agua Mansa Rd., East of Hopkins Rd.	Warehouse	808.500	TSF
City of Jurupa Valley				
JV1	Inland Empire Cold Storage	Cold Storage Facility	40.800	TSF
JV2	Agua Mansa Commerce Park Specific Plan	High-Cube Warehouse	4277.000	TSF
		General Light Industrial	150.000	TSF
		Commercial Retail	25.000	TSF

[1] SFDR = Single Family Detached Residential

[2] DU = Dwelling Units; TSF = Thousand Square Feet; STU = Students; AC = Acres; TPD = Tons Per Day; VFP = Vehicle Fueling Positions

[3] Quantity and land use unknown. City of Rialto provided estimated trips and PCE AM and PM.

4.7 HORIZON YEAR (2040) VOLUME DEVELOPMENT

Traffic projections for Horizon Year (2040) without Project conditions were derived from the San Bernardino Transportation Analysis Model (SBTAM) using accepted procedures for model forecast refinement and smoothing for study area intersections located within the County of San Bernardino. The current version of the SBTAM (Version 2.20, March 2019) reflects the local input in the adopted 2016 SCAG RTP within the County of San Bernardino. The post processing volume worksheets are provided in Appendix 4.1 of this TA.

The traffic forecasts reflect the area-wide growth anticipated between Existing (2020) conditions and Horizon Year (2040) traffic conditions. In most instances the traffic model zone structure is not designed to provide accurate turning movements along arterial roadways unless refinement and reasonableness checking is performed. Therefore, the Horizon Year (2040) peak hour forecasts were refined using the model derived long range forecasts, base (validation) year model forecasts, along with existing peak hour traffic count data collected at each analysis location in May 2019. The SBTAM has a base (validation) year of 2012 and a horizon (future forecast) year of 2040. The difference in model volumes (2040-2012) defines the growth in traffic over the 28-year period.

The refined future peak hour approach and departure volumes obtained from the model output data are then entered into a spreadsheet program consistent with the National Cooperative Highway Research Program (NCHRP Report 255), along with initial estimates of turning movement proportions. A linear programming algorithm is used to calculate individual turning movements which match the known directional roadway segment forecast volumes computed in the previous step. This program computes a likely set of intersection turning movements from intersection approach counts and the initial turning proportions from each approach leg.

The SBTAM uses an AM peak period-to-peak hour factor of 0.35 and a PM peak period-to-peak hour factor of 0.27. These factors represent the relationship of the highest single AM peak hour to the modeled 3 hour AM peak period (an even distribution would result in a factor of 0.33) and the highest single PM peak hour to the modeled 4 hour PM peak period (an even distribution would result in a factor of 0.25).

Typically, the model growth is prorated and is subsequently added to the existing (base validation) traffic volumes to represent Horizon Year traffic conditions. In an effort to conduct a conservative analysis, reductions to traffic forecasts from either Existing or Opening Year Cumulative traffic conditions were not assumed as part of this analysis. As such, in conjunction with the addition of cumulative projects that are not consistent with the General Plan, additional growth has also been applied on a movement-by-movement basis, where applicable, to estimate reasonable Horizon Year (2040) forecasts. Horizon Year (2040) turning volumes were compared to Opening Year Cumulative (2021) volumes in order to ensure a minimum growth as a part of the refinement process. The minimum growth includes any additional growth between Opening Year Cumulative (2021) and Horizon Year (2040) traffic conditions that is not accounted for by the traffic generated by cumulative development projects and ambient growth rates assumed between Existing (2020) and Opening Year Cumulative (2021) conditions. Future estimated peak hour traffic data was used for new intersections and intersections with an anticipated change in travel patterns to further refine the Horizon Year (2040) peak hour forecasts.

The future Horizon Year (2040) Without Project peak hour turning movements were then reviewed by Urban Crossroads, Inc. for reasonableness, and in some cases, were adjusted to achieve flow conservation, reasonable growth, and reasonable diversion between parallel routes. Flow conservation checks ensure that traffic flow between two closely spaced intersections, such as two adjacent driveway locations, is verified in order to make certain that vehicles leaving one intersection are entering the adjacent intersection and that there is no unexplained loss of vehicles. The result of this traffic forecasting procedure is a series of traffic volumes which are suitable for traffic operations analysis.

5 E+P TRAFFIC CONDITIONS

This section discusses the traffic forecasts for Existing plus Project (E+P) conditions and the resulting intersection operations, traffic signal warrant, off-ramp queuing, and freeway facility analyses.

5.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for E+P conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for E+P conditions only (e.g., intersection and roadway improvements at the Project's frontage and driveways). This include the signalization of Driveway 1 on Cedar Avenue (to be implemented by the Project).

5.2 EXISTING PLUS PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus Project traffic. The ADT and weekday AM and PM peak hour intersection turning movement volumes which can be expected for E+P traffic conditions are shown on Exhibit 5-1.

5.3 INTERSECTION OPERATIONS ANALYSIS

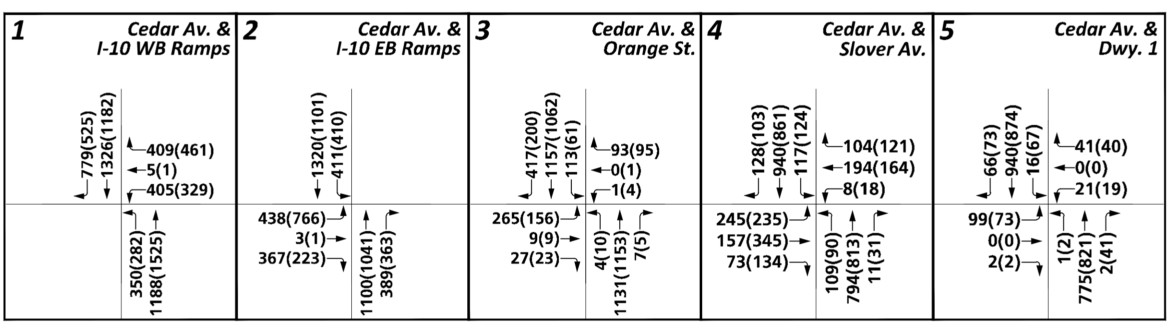
E+P peak hour traffic operations have been evaluated for the study area intersections based on the analysis methodologies presented in Section 2 *Methodologies* of this TA. The intersection analysis results are summarized on Table 5-1 for E+P traffic conditions, which indicate that consistent with Existing traffic conditions, the study area intersections are anticipated to continue to operate at an acceptable LOS under E+P traffic conditions. Consistent with Table 5-1, a summary of the peak hour intersection LOS is shown on Exhibit 5-2 for E+P traffic conditions. The intersection operations analysis worksheets for E+P traffic conditions are included in Appendix 5.1 of this TA.

5.4 TRAFFIC SIGNAL WARRANTS ANALYSIS

The following unsignalized study area intersection is anticipated to meet a peak hour volume-based traffic signal warrant for E+P traffic conditions (see Appendix 5.2):

- Cedar Avenue & Driveway 1 (#5)

EXHIBIT 5-1: E+P TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) ***= AM(PM) PEAK HOUR INTERSECTION VOLUMES***
10.0 ***= VEHICLES PER DAY (1000'S)***

N

EXHIBIT 5-2: E+P SUMMARY OF LOS

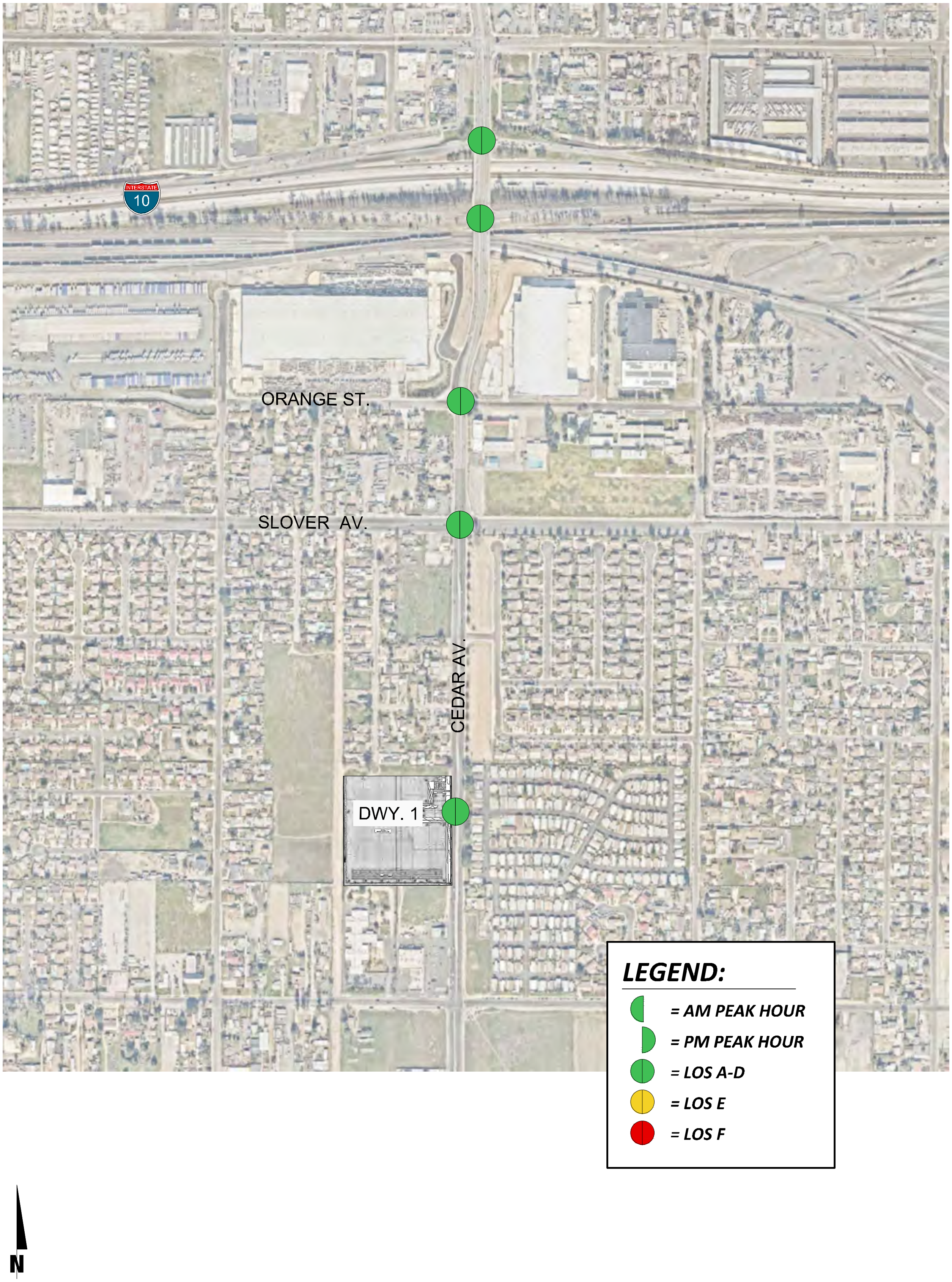


Table 5-1

Intersection Analysis for E+P Conditions

#	Intersection	Traffic Control[2]	Existing (2020) Delay[1] (secs.) AM	Existing (2020) Delay[1] (secs.) PM	Existing (2020) Level of Service AM	Existing (2020) Level of Service PM	E+P Delay[1] (secs.) AM	E+P Delay[1] (secs.) PM	E+P Level of Service AM	E+P Level of Service PM
1	Cedar Av. & I-10 WB Ramps	TS	23.6	23.5	C	C	26.9	25.3	C	C
2	Cedar Av. & I-10 EB Ramps	TS	26.1	28.3	C	C	27.4	42.0	C	D
3	Cedar Av. & Orange Av.	TS	22.9	22.5	C	C	24.2	23.1	C	C
4	Cedar Av. & Slover Av.	TS	44.9	42.7	D	D	45.4	42.8	D	D
5	Cedar Av. & Driveway 1	CSS/**TS**[3]	14.0	14.6	B	B	17.6	30.6	B	B

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

1 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

2 CSS = Cross-street Stop; TS = Traffic Signal; **TS** = Improvement

3 The Project will construct a traffic signal as part of the Project design features.

5.5 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for E+P are presented on Table 5-2. As shown on Table 5-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows with the addition of Project traffic. Worksheets for E+P traffic conditions off-ramp queuing analysis are provided in Appendix 5.3.

5.6 FREEWAY FACILITY ANALYSIS

E+P mainline directional volumes for the AM and PM peak hours are provided on Exhibit 5-3. As shown in Table 5-3, the study area freeway mainline segments and merge/diverge ramp junctions are anticipated to continue to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for E+P traffic conditions. E+P freeway facility analysis worksheets are provided in Appendix 5.4.

5.7 PROJECT DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

This section provides a summary of Project deficiencies and recommended improvements. Based on the County of San Bernardino deficiency criteria discussed in Section 2.8 *Deficiency Criteria*, the following intersections were found to be deficient. Improvements necessary to improve project-related traffic deficiencies are also discussed below.

5.7.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

As shown in Table 5-1, the study area intersections are anticipated to continue to operate at an acceptable LOS during the peak hours with the addition of Project traffic. As such, no improvements have been recommended.

5.7.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown on Table 5-2, there are no peak hour queuing issues at the study area interchanges for E+P traffic conditions. As such, no improvements have been recommended.

5.7.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

As shown on Table 5-3, the study area freeway segments and merge/diverge ramp junctions are anticipated to operate at an acceptable LOS for E+P traffic conditions. As such no improvements have been recommended.

Table 5-2

Peak Hour Freeway Off-Ramp Queuing Summary for E+P Conditions

Intersection	Movement	Available Stacking Distance (Feet)	Existing (2020)				E+P			
			95th Percentile Queue (Feet)		Acceptable? [1]		95th Percentile Queue (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
Cedar Av. & I-10 WB Ramps	WBL/T/R	1,270	454 [2]	493 [2]	Yes	Yes	495 [2]	518 [2]	Yes	Yes
	WBR	480	320	408 [2]	Yes	Yes	321	435 [2]	Yes	Yes
Cedar Av. & I-10 EB Ramps	EBL	400	370	636 [2,3]	Yes	Yes	370	678 [2,3]	Yes	Yes
	EBL/T/R	1,900	315	580 [2]	Yes	Yes	369	620 [2]	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-10 Freeway mainline.

Table 5-3

Freeway Facility Analysis for E+P Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	Existing (2020)				E+P			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
I-10	Westbound	West of Cedar Av.	4	31.5	D	27.8	D	31.7	D	27.9	D
		On-Ramp at Cedar Av.	4	30.6	D	27.3	C	30.9	D	27.5	C
		Off-Ramp at Cedar Av.	5	22.2	C	20.9	C	22.2	C	20.9	C
		East of Cedar Av.	5	22.5	C	21.2	C	22.5	C	21.4	C
	Eastbound	West of Cedar Av.	4	24.7	C	27.9	D	25.1	C	28.0	D
		Off-Ramp at Cedar Av.	5	18.9	C	20.9	C	18.9	C	21.0	C
		On-Ramp at Cedar Av.	4	25.2	C	26.4	C	25.4	C	26.5	C
		East of Cedar Av.	4	25.1	C	26.8	D	25.2	C	27.3	D

* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

EXHIBIT 5-3: E+P FREEWAY MAINLINE VOLUMES

LEGEND:

100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

6 OPENING YEAR CUMULATIVE (2021) TRAFFIC CONDITIONS

This section discusses the methods used to develop Opening Year Cumulative (2021) Without and With Project traffic forecasts, and the resulting intersection operations, traffic signal warrant, off-ramp queuing, and freeway facility analyses.

6.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Opening Year Cumulative (2021) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Opening Year Cumulative conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways). This include the signalization of Driveway 1 on Cedar Avenue (to be implemented by the Project).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Opening Year Cumulative conditions only.

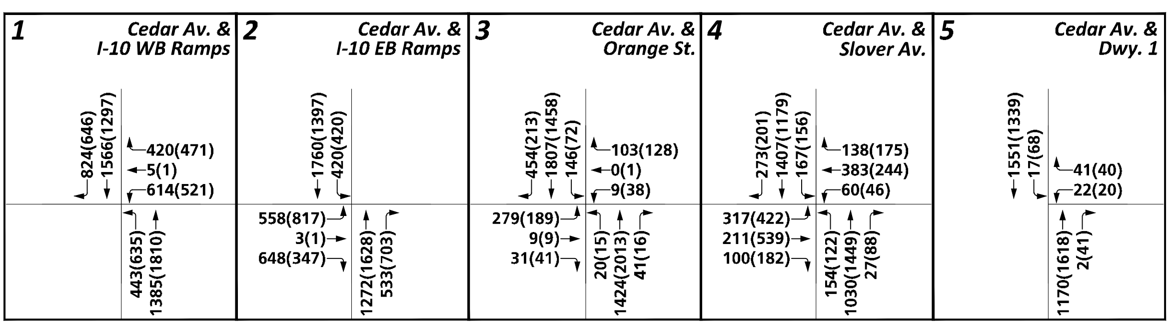
6.2 OPENING YEAR CUMULATIVE (2021) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Existing traffic volumes plus an ambient growth factor of 1.5% plus traffic from pending and approved but not yet constructed known development projects in the area. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2021) Without Project traffic conditions are shown on Exhibit 6-1.

6.3 OPENING YEAR CUMULATIVE (2021) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes Opening Year Cumulative (2021) Without Project traffic in conjunction with the addition of Project traffic. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Opening Year Cumulative (2021) With Project traffic conditions are shown on Exhibit 6-2.

EXHIBIT 6-1: OPENING YEAR CUMULATIVE (2021) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)

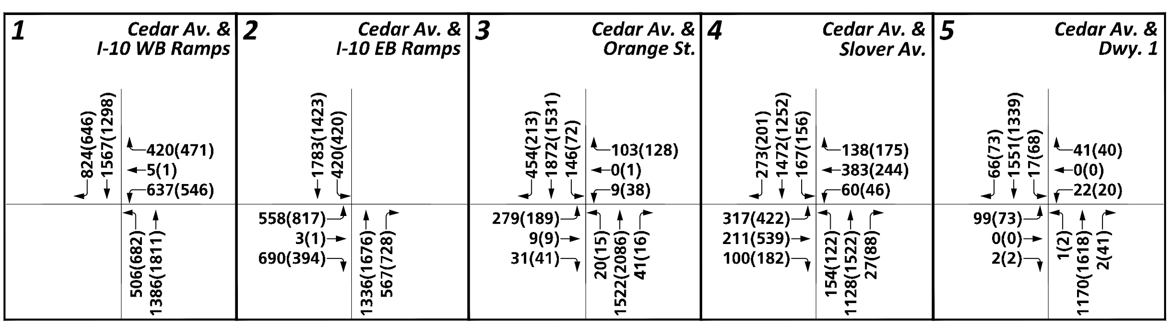


LEGEND:

10(10) = *AM(PM) PEAK HOUR INTERSECTION VOLUMES*
10.0 = *VEHICLES PER DAY (1000'S)*

N

EXHIBIT 6-2: OPENING YEAR CUMULATIVE (2021) WITH PROJECT TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) = AM(PM) PEAK HOUR INTERSECTION VOLUMES
10.0 = VEHICLES PER DAY (1000'S)

N

6.4 INTERSECTION OPERATIONS ANALYSIS

6.4.1 OPENING YEAR CUMULATIVE (2021) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Opening Year Cumulative (2021) Without Project conditions with roadway and intersection geometrics consistent with Section 6.1 *Roadway Improvements*. As shown on Table 6-1, the following study area intersections are anticipated to operate at an unacceptable LOS under Opening Year Cumulative (2021) Without Project traffic conditions:

- Cedar Avenue & I-10 Westbound Ramps (#1) – LOS E PM peak hour only
- Cedar Avenue & I-10 Eastbound Ramps (#2) – LOS E PM peak hour only
- Cedar Avenue & Orange Street (#3) – LOS E PM peak hour only
- Cedar Avenue & Slover Avenue (#4) – LOS F PM peak hour only
- Cedar Avenue & Driveway 1 (#5) – LOS E PM peak hour only

A summary of the peak hour intersection LOS for Opening Year Cumulative (2021) Without Project conditions is shown on Exhibit 6-3. The intersection operations analysis worksheets for Opening Year Cumulative (2021) Without Project traffic conditions are included in Appendix 6.1 of this TA.

6.4.2 OPENING YEAR CUMULATIVE (2021) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 6-1 and illustrated on Exhibit 6-4, there are no additional study area intersections that are anticipated to operate at a deficient LOS during one or both peak hours for Opening Year Cumulative (2021) With Project traffic conditions, in addition to the locations identified above for Opening Year Cumulative (2021) Without Project traffic conditions. It should be noted with the implementation of the Project design features as discussed in Section 1.7 *Recommendations* the intersection of Cedar Avenue & Driveway 1 is anticipated to operate at an acceptable LOS during the peak hours. The intersection operations analysis worksheets for Opening Year Cumulative (2021) With Project traffic conditions are included in Appendix 6.2 of this TA.

6.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

The only unsignalized study area intersection is anticipated to meet a peak hour volume-based traffic signal warrant under E+P traffic conditions. As such, no traffic signal warrants have been evaluated for Opening Year Cumulative (2021) Without Project and With Project traffic conditions.

Table 6-1

Intersection Analysis for Opening Year Cumulative (2021) Conditions

#	Intersection	Traffic Control[2]	2021 Without Project Delay[1] (secs.) AM	2021 Without Project Delay[1] (secs.) PM	2021 Without Project Level of Service AM	2021 Without Project Level of Service PM	2021 With Project Delay[1] (secs.) AM	2021 With Project Delay[1] (secs.) PM	2021 With Project Level of Service AM	2021 With Project Level of Service PM	Change in Delay[4] AM	Change in Delay[4] PM
1	Cedar Av. & I-10 WB Ramps	TS	52.5	**71.0**	D	**E**	**61.0**	**82.2**	**E**	**F**	--	11.2
2	Cedar Av. & I-10 EB Ramps	TS	42.1	**55.5**	D	**E**	53.1	**58.6**	D	**E**	--	3.1
3	Cedar Av. & Orange Av.	TS	40.5	**66.8**	D	**E**	50.8	**67.5**	D	**E**	--	0.7
4	Cedar Av. & Slover Av.	TS	37.1	**130.4**	D	**F**	39.4	**143.4**	D	**F**	--	13.0
5	Cedar Av. & Driveway 1	CSS/**TS**[3]	21.5	**36.5**	C	**E**	44.5	26.4	D	C	--	--

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

1 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

2 CSS = Cross-street Stop; TS = Traffic Signal; **TS** = Improvement

3 The Project will construct a traffic signal as part of the Project design features.

4 The change in delay is calculated between pre-Project and With Project scenarios for intersections that are operating at an unacceptable LOS for pre-Project conditions only.

EXHIBIT 6-3: OPENING YEAR CUMULATIVE (2021) WITHOUT PROJECT SUMMARY OF LOS

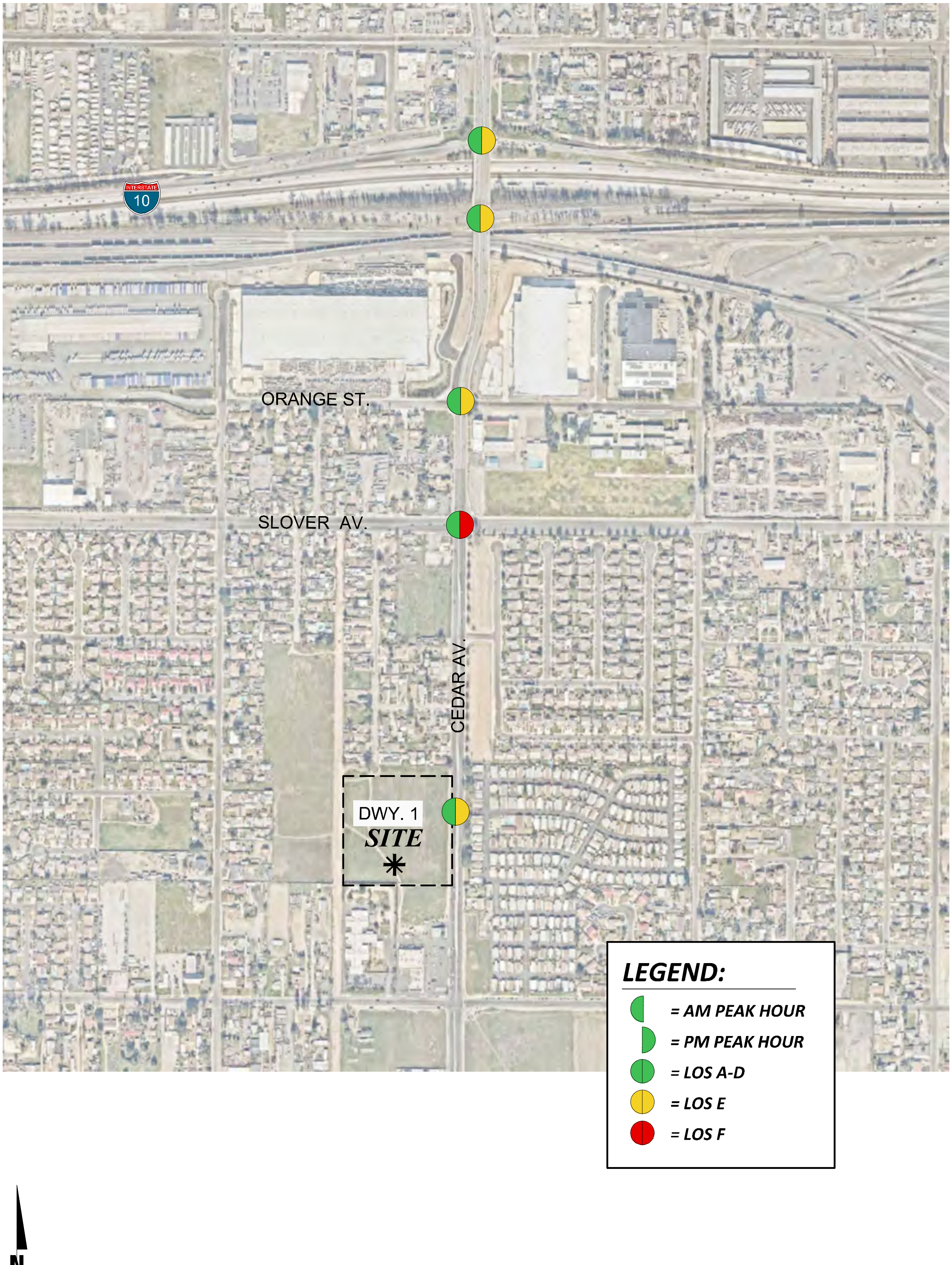
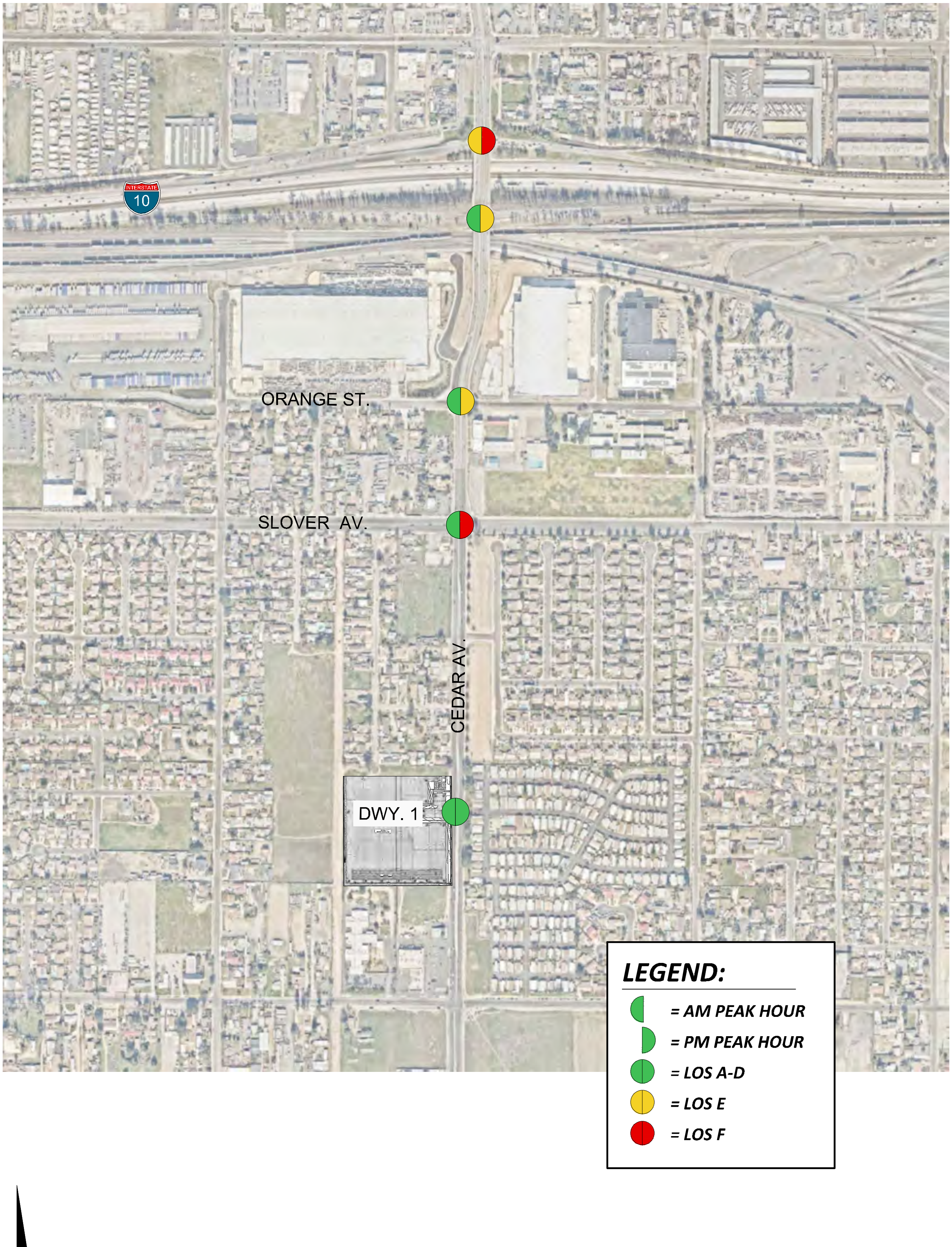


EXHIBIT 6-4: OPENING YEAR CUMULATIVE (2021) WITH PROJECT SUMMARY OF LOS



6.6 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for Opening Year Cumulative (2021) Without and With Project traffic conditions are shown on Table 6-2. As shown on Table 6-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Opening Year Cumulative (2021) Without Project and With Project traffic conditions. Worksheets for Opening Year Cumulative (2021) Without and With Project traffic conditions off-ramp queuing analysis are provided in Appendices 6.3 and 6.4, respectively.

6.7 FREEWAY FACILITY ANALYSIS

Opening Year Cumulative (2021) Without Project and With Project mainline directional volumes for the AM and PM peak hours are provided on Exhibits 6-5 and 6-6, respectively. As shown in Table 6-3, the study area freeway mainline segments and merge/diverge ramp junctions are anticipated to continue to operate at an acceptable LOS (i.e., LOS D or better) during the peak hours for Opening Year Cumulative (2021) Without Project and With Project traffic conditions. Opening Year Cumulative (2021) Without Project and With Project freeway facility analysis worksheets are provided in Appendices 6.5 and 6.6, respectively.

6.8 RECOMMENDED IMPROVEMENTS

This section provides a summary of Project deficiencies and recommended improvements. Based on the County of San Bernardino deficiency criteria discussed in Section 2.8 *Deficiency Criteria*, the following intersections were found to be deficient.

6.8.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the recommended improvement strategies to address Opening Year Cumulative (2021) traffic deficiencies are presented on Table 6-4. If not constructed by the Project, the Project Applicant shall contribute to these improvements through payment of County DIF fees or fair share contribution as identified on Table 1-3. Worksheets for Opening Year Cumulative (2021) Without and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 6.7 and Appendix 6.8.

6.8.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown previously on Table 6-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows for Opening Year Cumulative (2021) traffic conditions. As such, no improvements have been recommended.

6.8.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

As shown previously on Table 6-3, the study area freeway segments and merge/diverge ramp junctions are anticipated to operate at an acceptable LOS for Opening Year Cumulative (2021) traffic conditions. As such no improvements have been recommended.

Table 6-2

Peak Hour Freeway Off-Ramp Queuing Summary for Opening Year Cumulative (2021) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	2021 Without Project				2021 With Project			
			95th Percentile Queue (Feet)		Acceptable? [1]		95th Percentile Queue (Feet)		Acceptable? [1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
Cedar Av. & I-10 WB Ramps	WBL/T/R	1,270	915 [2]	806 [2]	Yes	Yes	950 [2]	844 [2]	Yes	Yes
	WBR	480	432 [2]	538 [2,3]	Yes	Yes	432 [2]	538 [2,3]	Yes	Yes
Cedar Av. & I-10 EB Ramps	EBL	400	585 [2,3]	745 [2,3]	Yes	Yes	585 [2,3]	778 [2,3]	Yes	Yes
	EBL/T/R	1,900	877 [2]	645 [2]	Yes	Yes	937 [2]	681 [2]	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-10 Freeway mainline.

Table 6-3

Freeway Facility Analysis for Opening Year Cumulative (2021) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2021 Without Project				2021 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
I-10	Westbound	West of Cedar Av.	4	31.5	D	27.8	D	32.6	D	28.8	D
		On-Ramp at Cedar Av.	4	30.6	D	27.3	C	31.2	D	28.2	C
		Off-Ramp at Cedar Av.	5	22.2	C	20.9	C	22.8	C	21.4	C
		East of Cedar Av.	5	22.5	C	21.2	C	23.1	C	21.7	C
	Eastbound	West of Cedar Av.	4	24.7	C	27.9	D	25.9	C	28.8	D
		Off-Ramp at Cedar Av.	5	18.9	C	20.9	C	19.6	C	21.4	C
		On-Ramp at Cedar Av.	4	25.2	C	26.4	C	25.7	C	26.9	C
		East of Cedar Av.	4	25.1	C	26.8	D	25.8	C	27.6	D

* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

Table 6-4

Intersection Analysis for Opening Year Cumulative (2021) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1]												Delay[2] (secs.)		Level of Service	
			Northbound			Southbound			Eastbound			Westbound						
			L	T	R	L	T	R	L	T	R	L	T	R	AM	PM	AM	PM
1	Cedar Av. & I-10 WB Ramps																	
	- Without Project[4]	TS	**<u>2</u>**	2	0	0	3	1	0	0	0	0	1	1	35.7	30.1	D	C
	- With Project[4]	TS	**<u>2</u>**	2	0	0	3	1	0	0	0	0	1	1	40.9	31.9	D	C
4	Cedar Av. & Slover Av.																	
	- Without Project	TS	1	2	0	1	2	**<u>1</u>**	**<u>2</u>**	2	**<u>0</u>**	1	2	0	46.3	50.6	D	D
	- With Project	TS	1	2	0	1	2	**<u>1</u>**	**<u>2</u>**	2	**<u>0</u>**	1	2	0	47.8	52.7	D	D

1 When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes

L = Left; T = Through; R = Right; **<u>1</u>** = Improvement

2 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

3 CSS = Cross-street Stop; TS = Traffic Signal; **<u>TS</u>** = Improvement

4 Improvements are consistent with the I-10 Freeway/Cedar Avenue interchange project.

EXHIBIT 6-5: OPENING YEAR CUMULATIVE (2021) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES

LEGEND:

100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

EXHIBIT 6-6: OPENING YEAR CUMULATIVE (2021) WITH PROJECT FREEWAY MAINLINE VOLUMES

LEGEND:

100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

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7 HORIZON YEAR (2040) TRAFFIC CONDITIONS

This section discusses the methods used to develop Horizon Year (2040) Without and With Project traffic forecasts, and the resulting intersection operations, traffic signal warrant, off-ramp queuing, and freeway facility analyses.

7.1 ROADWAY IMPROVEMENTS

The lane configurations and traffic controls assumed to be in place for Horizon Year (2040) conditions are consistent with those shown previously on Exhibit 3-1, with the exception of the following:

- Project driveways and those facilities assumed to be constructed by the Project to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the Project's frontage and driveways). This include the signalization of Driveway 1 on Cedar Avenue (to be implemented by the Project).
- Driveways and those facilities assumed to be constructed by cumulative developments to provide site access are also assumed to be in place for Horizon Year conditions only (e.g., intersection and roadway improvements along the cumulative development's frontages and driveways).
- Other parallel facilities, that although not evaluated for the purposes of this analysis, are anticipated to be in place for Horizon Year traffic conditions and would affect the travel patterns within the study area. One future connection includes but is not limited to a future planned interchange at Alder Avenue and the I-10 Freeway which may result in reduced through traffic along other parallel routes, such as Cedar Avenue.

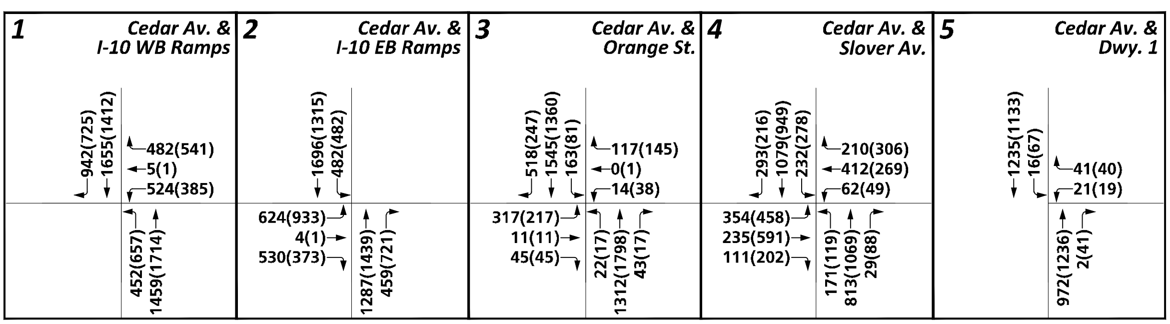
7.2 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the SBTAM (see Section 4.7 *Horizon Year (2040) Volume Development* of this TA for a detailed discussion on the post-processing methodology). The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) Without Project traffic conditions are shown on Exhibit 7-1.

7.3 HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUME FORECASTS

This scenario includes the refined post-process volumes obtained from the SBTAM, plus the traffic generated by the proposed Project. The weekday ADT and weekday AM and PM peak hour volumes which can be expected for Horizon Year (2040) With Project traffic conditions are shown on Exhibit 7-2.

EXHIBIT 7-1: HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC VOLUMES (IN PCE)

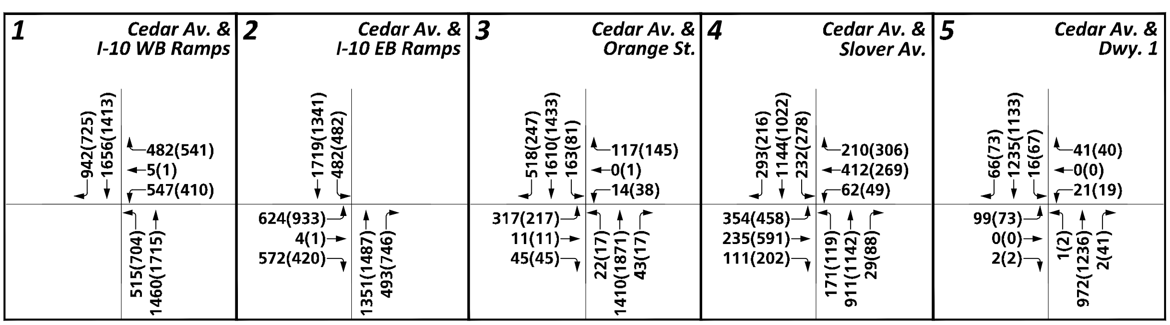


LEGEND:

10(10) = *AM(PM) PEAK HOUR INTERSECTION VOLUMES*
10.0 = *VEHICLES PER DAY (1000'S)*

N

EXHIBIT 7-2: HORIZON YEAR (2040) WITH PROJECT TRAFFIC VOLUMES (IN PCE)



LEGEND:

10(10) = ***AM(PM) PEAK HOUR INTERSECTION VOLUMES***
10.0 = ***VEHICLES PER DAY (1000'S)***

N

7.4 INTERSECTION OPERATIONS ANALYSIS

7.4.1 HORIZON YEAR (2040) WITHOUT PROJECT TRAFFIC CONDITIONS

LOS calculations were conducted for the study intersections to evaluate their operations under Horizon Year (2040) Without Project conditions with roadway and intersection geometrics consistent with Section 7.1 *Roadway Improvements*. As shown on Table 7-1, the following study area intersections are anticipated to operate at an unacceptable LOS under Horizon Year (2040) Without Project traffic conditions:

- Cedar Avenue & I-10 Westbound Ramps (#1) – LOS E AM peak hour; LOS F PM peak hour
- Cedar Avenue & I-10 Eastbound Ramps (#2) – LOS E PM peak hour only
- Cedar Avenue & Slover Avenue (#4) – LOS E AM peak hour; LOS F PM peak hour

Reductions to peak hour intersection deficiencies are anticipated due to lower traffic forecasts along Cedar Avenue related to new parallel routes that will be in place for Horizon Year traffic conditions. A summary of the peak hour intersection LOS for Horizon Year (2040) Without Project conditions is shown on Exhibit 7-3. The intersection operations analysis worksheets for Horizon Year (2040) Without Project traffic conditions are included in Appendix 7.1 of this TA.

9.4.2 HORIZON YEAR (2040) WITH PROJECT TRAFFIC CONDITIONS

As shown on Table 7-1 and illustrated on Exhibit 7-4, there are no additional study area intersections anticipated to operate at a deficient LOS during one or both peak hours for Horizon Year (2040) With Project traffic conditions, in addition to the locations identified above for Horizon Year (2040) Without Project traffic conditions. The intersection operations analysis worksheets for Horizon Year (2040) With Project traffic conditions are included in Appendix 7.2 of this TA.

7.5 TRAFFIC SIGNAL WARRANTS ANALYSIS

The only unsignalized study area intersection is anticipated to meet a peak hour volume-based traffic signal warrant under E+P traffic conditions. As such, no traffic signal warrants have been evaluated for Horizon Year (2040) Without Project and With Project traffic conditions.

7.6 OFF-RAMP QUEUING ANALYSIS

Queuing analysis findings for Horizon Year (2040) Without and With Project traffic conditions are shown on Table 7-2. As shown on Table 7-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows under Horizon Year (2040) Without Project and With Project. Worksheets for Horizon Year (2040) Without and With Project traffic conditions off-ramp queuing analysis are provided in Appendices 7.3 and 7.4, respectively.

Table 7-1

Intersection Analysis for Horizon Year (2040) Conditions

#	Intersection	Traffic Control[2]	2040 Without Project Delay[1] (secs.) AM	2040 Without Project Delay[1] (secs.) PM	2040 Without Project Level of Service AM	2040 Without Project Level of Service PM	2040 With Project Delay[1] (secs.) AM	2040 With Project Delay[1] (secs.) PM	2040 With Project Level of Service AM	2040 With Project Level of Service PM	Change in Delay[4] AM	Change in Delay[4] PM
1	Cedar Av. & I-10 WB Ramps	TS	**65.0**	**80.1**	**E**	**F**	**76.8**	**91.9**	**E**	**F**	11.8	11.8
2	Cedar Av. & I-10 EB Ramps	TS	38.8	**77.9**	D	**E**	46.5	**85.0**	D	**F**	--	7.1
3	Cedar Av. & Orange Av.	TS	29.5	37.6	C	D	33.2	44.4	C	D	--	--
4	Cedar Av. & Slover Av.	TS	**56.6**	**103.9**	**E**	**F**	**57.5**	**111.9**	**E**	**F**	0.9	8.0
5	Cedar Av. & Driveway 1	CSS/**TS**[3]	16.7	21.9	C	C	25.7	35.3	C	D	--	--

* **BOLD** = Level of Service (LOS) does not meet the applicable jurisdictional requirements (i.e., unacceptable LOS).

1 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

2 CSS = Cross-street Stop; TS = Traffic Signal; **TS** = Improvement

3 The Project will construct a traffic signal as part of the Project design features.

4 The change in delay is calculated between pre-Project and With Project scenarios for intersections that are operating at an unacceptable LOS for pre-Project conditions only.

Table 7-2

Peak Hour Freeway Off-Ramp Queuing Summary for Horizon Year (2040) Conditions

Intersection	Movement	Available Stacking Distance (Feet)	2040 Without Project				2040 With Project			
			95th Percentile Queue (Feet)		Acceptable?[1]		95th Percentile Queue (Feet)		Acceptable?[1]	
			AM Peak Hour	PM Peak Hour	AM	PM	AM Peak Hour	PM Peak Hour	AM	PM
Cedar Av. & I-10 WB Ramps	WBL/T/R	1,270	720 [2]	652 [2]	Yes	Yes	760 [2]	682 [2]	Yes	Yes
	WBR	480	454 [2]	567 [2,3]	Yes	Yes	454 [2]	587 [2,3]	Yes	Yes
Cedar Av. & I-10 EB Ramps	EBL	400	674 [2,3]	1,012 [2,3]	Yes	Yes	674 [2,3]	1,063 [2,3]	Yes	Yes
	EBL/T/R	1,900	735 [2]	881 [2]	Yes	Yes	809 [2]	922 [2]	Yes	Yes

[1] Stacking Distance is acceptable if the required stacking distance is less than or equal to the stacking distance provided. An additional 15 feet of stacking which is assumed to be provided in the transition for turn pockets is reflected in the stacking distance shown on this table, where applicable.

[2] 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

[3] Although 95th percentile queue is anticipated to exceed the available storage for the turn lane, the adjacent through lane has sufficient storage to accommodate any spillover without spilling back and affecting the I-10 Freeway mainline.

EXHIBIT 7-3: HORIZON YEAR (2040) WITHOUT PROJECT SUMMARY OF LOS

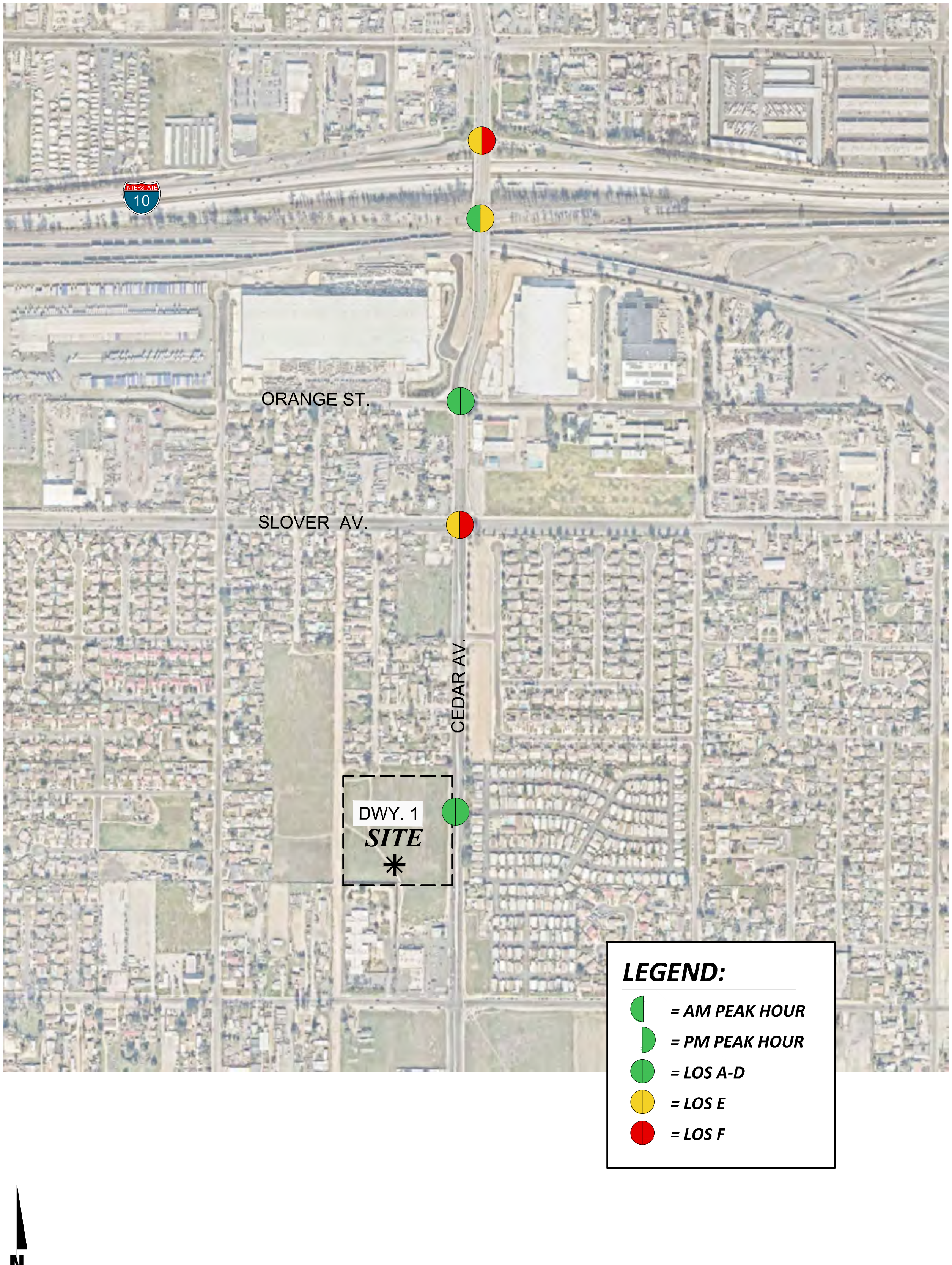
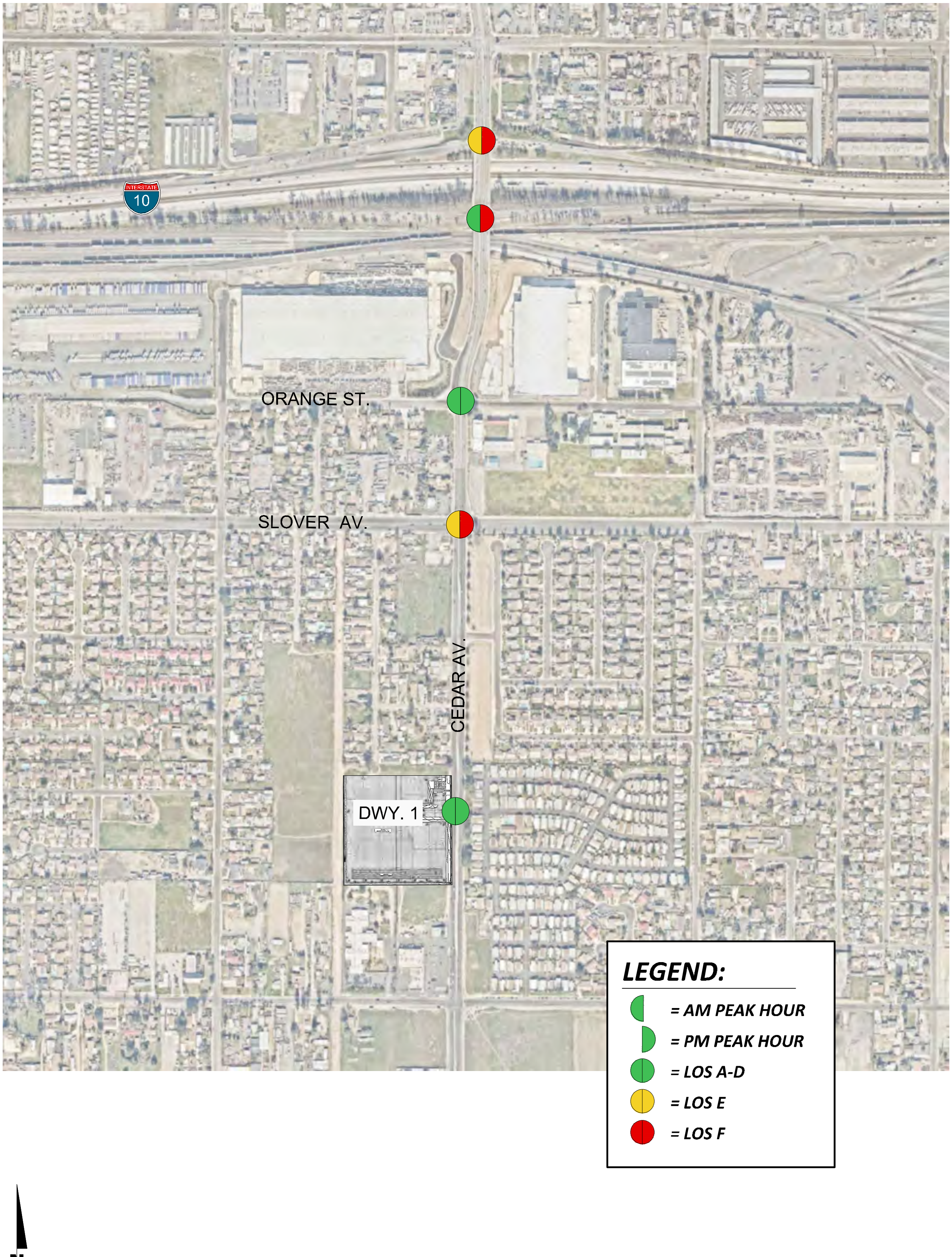


EXHIBIT 7-4: HORIZON YEAR (2040) WITH PROJECT SUMMARY OF LOS



13094 - los.dwg

7.7 FREEWAY FACILITY ANALYSIS

Horizon Year (2040) Without Project and With Project mainline directional volumes for the AM and PM peak hours are provided on Exhibits 7-5 and 7-6, respectively. As shown in Table 7-3, the following study area freeway mainline segments and merge/diverge ramp junctions are anticipated to operate at an unacceptable LOS (i.e., LOS E or worse) during the peak hours for Horizon Year (2040) Without Project and With Project traffic conditions:

- I-10 Freeway Westbound, West of Cedar Avenue (#1) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, On-Ramp at Cedar Avenue (#2) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, Off-Ramp at Cedar Avenue (#3) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, East of Cedar Avenue (#4) – LOS E AM and PM peak hours
- I-10 Freeway Eastbound, West of Cedar Avenue (#5) – LOS E PM peak hour only
- I-10 Freeway Eastbound, East of Cedar Avenue (#8) – LOS E PM peak hour only

Horizon Year (2040) Without Project and With Project freeway facility analysis worksheets are provided in Appendices 7.5 and 7.6, respectively.

7.8 HORIZON YEAR (2040) DEFICIENCIES AND RECOMMENDED IMPROVEMENTS

This section provides a summary of Project deficiencies and recommended improvements. Based on the County of San Bernardino deficiency criteria discussed in Section 2.8 *Deficiency Criteria*, the following intersections were found to be deficient.

7.8.1 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES AT INTERSECTIONS

The effectiveness of the recommended improvement strategies to address Horizon Year (2040) traffic deficiencies are presented on Table 7-4. If not constructed by the Project, the Project Applicant shall contribute to these improvements through payment of County DIF fees or fair share contribution as identified on Table 1-3. Worksheets for Horizon Year (2040) Without and With Project conditions, with improvements, HCM calculation worksheets are provided in Appendix 7.7 and Appendix 7.8.

7.8.2 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON OFF-RAMP QUEUES

As shown previously on Table 7-2, there are no movements that are anticipated to experience queuing issues during the weekday AM or weekday PM peak 95th percentile traffic flows for Horizon Year (2040) traffic conditions. As such, no improvements have been recommended.

EXHIBIT 7-5: HORIZON YEAR (2040) WITHOUT PROJECT FREEWAY MAINLINE VOLUMES

LEGEND:

100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

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EXHIBIT 7-6: HORIZON YEAR (2040) WITH PROJECT FREEWAY MAINLINE VOLUMES

LEGEND:

100/200 = AM/PM PEAK HOUR VOLUMES

NOTE: VOLUMES IN ACTUAL VEHICLES (NOT PCE)

N

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Table 7-3

Freeway Facility Analysis for Horizon Year (2040) Conditions

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2040 Without Project				2040 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
I-10	Westbound	West of Cedar Av.	4	**38.4**	**F**	**38.4**	**F**	**38.4**	**F**	**38.4**	**F**
		On-Ramp at Cedar Av.	4	**52.0**	**F**	**54.1**	**F**	**52.3**	**F**	**54.4**	**F**
		Off-Ramp at Cedar Av.	5	**77.8**	**F**	**80.1**	**F**	**77.6**	**F**	**79.5**	**F**
		East of Cedar Av.	5	**41.8**	**E**	**43.7**	**E**	**41.9**	**E**	**43.7**	**E**
	Eastbound	West of Cedar Av.	4	32.8	D	**36.1**	**E**	32.9	D	**36.9**	**E**
		Off-Ramp at Cedar Av.	5	22.4	C	25.5	C	23.8	C	25.6	C
		On-Ramp at Cedar Av.	4	29.8	D	32.8	D	30.0	D	32.9	D
		East of Cedar Av.	4	30.8	D	**35.3**	**E**	31.3	D	**35.4**	**E**

* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

Table 7-4

Intersection Analysis for Horizon Year (2040) Conditions With Improvements

#	Intersection	Traffic Control[3]	Intersection Approach Lanes[1] Northbound L	T	R	Southbound L	T	R	Eastbound L	T	R	Westbound L	T	R	Delay[2] (secs.) AM	PM	Level of Service AM	PM
1	Cedar Av. & I-10 WB Ramps																	
	- Without Project[4]	TS	**2**	2	0	0	3	1	0	0	0	0	1	1	36.7	35.3	D	D
	- With Project[4]	TS	**2**	2	0	0	3	1	0	0	0	0	1	1	42.6	38.2	D	D
2	Cedar Av. & I-10 EB Ramps																	
	- Without Project[4]	TS	0	3	1	**2**	2	0	1	1	**1**	0	0	0	28.6	34.8	C	C
	- With Project[4]	TS	0	3	1	**2**	2	0	1	1	**1**	0	0	0	34.4	37.7	C	D
4	Cedar Av. & Slover Av.																	
	- Without Project	TS	1	2	0	1	2	**1**	**2**	2	**0**	1	2	0	42.6	39.0	D	D
	- With Project	TS	1	2	0	1	2	**1**	**2**	2	**0**	1	2	0	45.5	39.7	D	D

1 When a right turn is designated, the lane can either be striped or unstriped. To function as a right turn lane there must be sufficient width for right turning vehicles to travel outside the through lanes.

L = Left; T = Through; R = Right; **1** = Improvement

2 Per the Highway Capacity Manual (6th Edition), overall average intersection delay and level of service are shown for intersections with a traffic signal or all way stop control. For intersections with cross street stop control, the delay and level of service for the worst individual movement (or movements sharing a single lane) are shown.

3 CSS = Cross-street Stop; TS = Traffic Signal; **TS** = Improvement

4 Improvements are consistent with the I-10 Freeway/Cedar Avenue interchange project.

7.8.3 RECOMMENDED IMPROVEMENTS TO ADDRESS DEFICIENCIES ON FREEWAY FACILITIES

There are 3 alternatives being considered by SBCTA for the I-10 Project: Alternative 1 is no build; Alternative 2 is the addition of a carpool or high occupancy vehicle (HOV) lane; and Alternative 3 includes 2 tolled express lanes in each direction of travel on the I-10 Freeway between Haven Avenue in the City of Ontario and Ford Street in the City of Redlands. (10) According to the website, the I-10 Project is a longer-term project, and is not anticipated for completion until Year 2024.

For the purposes of this analysis, Alternative 2 has been evaluated. Caltrans typically assumes a reduction of 14 percent to the freeway mainline through volumes in this region to account for vehicles utilizing the HOV lanes. The reduction to the I-10 Freeway mainline volumes has been applied to account for the proposed HOV lanes. The analysis has been performed assuming same on and off-ramp configurations as existing baseline conditions at the I-10 Freeway/Cedar Avenue interchange.

As shown in Table 7-5, the I-10 Freeway mainline segment operations are anticipated to improve operations, however the following freeway mainline segments or merge/diverge ramp junctions are anticipated to continue to operate at an unacceptable LOS during the peak hours:

- I-10 Freeway Westbound, West of Cedar Avenue (#1) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, On-Ramp at Cedar Avenue (#2) – LOS F AM and PM peak hours
- I-10 Freeway Westbound, Off-Ramp at Cedar Avenue (#3) – LOS F AM and PM peak hours

Worksheets for Horizon Year (2040) Without and With Project conditions freeway mainline level of service analysis, with improvements, are provided in Appendix 7.9 and Appendix 7.10.

Table 7-5

Freeway Facility Analysis for Horizon Year (2040) Conditions With Improvements

Freeway	Direction	Ramp or Segment	Lanes on Freeway[1]	2040 Without Project				2040 With Project			
				AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
				Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]	Density[2]	LOS[3]
I-10	Westbound	West of Cedar Av.	4	**38.4**	**F**	**38.4**	**F**	**38.4**	**F**	**38.4**	**F**
		On-Ramp at Cedar Av.	4	**40.6**	**F**	**40.7**	**F**	**40.9**	**F**	**41.0**	**F**
		Off-Ramp at Cedar Av.	5	**62.1**	**F**	**66.7**	**F**	**61.8**	**F**	**66.5**	**F**
		East of Cedar Av.	5	32.0	D	32.6	D	32.1	D	32.6	D
	Eastbound	West of Cedar Av.	4	26.6	D	28.9	D	26.8	D	29.0	D
		Off-Ramp at Cedar Av.	5	19.9	C	21.5	C	20.2	C	21.6	C
		On-Ramp at Cedar Av.	4	26.4	C	29.3	D	26.6	C	29.3	D
		East of Cedar Av.	4	25.2	C	27.9	D	25.2	C	28.3	D

* **BOLD** = Unacceptable Level of Service

[1] Number of lanes are in the specified direction and is based on existing conditions.

[2] Density is measured by passenger cars per mile per lane (pc/mi/ln).

[3] LOS = Level of Service

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8 LOCAL AND REGIONAL FUNDING MECHANISMS

Transportation improvements within the County of San Bernardino are funded through a combination of project improvements, DIF programs or fair share contributions, such as the County of San Bernardino DIF program. Identification and timing of needed improvements is generally determined through local jurisdictions based upon a variety of factors.

8.1 COUNTY OF SAN BERNARDINO DEVELOPMENT IMPACT FEE PROGRAM

The County of San Bernardino adopted the latest update to their DIF program in September 2014. Fees from new residential, commercial, and industrial development are collected to fund Measure "I" compliant regional facilities as well as local facilities. Under the County's DIF program, the County may grant to developers a credit against specific components of fees when those developers construct certain facilities and landscaped medians identified in the list of improvements funded by the DIF program.

After the County's DIF fees are collected, they are placed in a separate restricted use account pursuant to the requirements of Government Code sections 66000 *et seq*. The timing to use the DIF fees is established through periodic capital improvement programs which are overseen by the County's Public Works Department. Periodic traffic counts, review of traffic accidents, and a review of traffic trends throughout the County are also periodically performed by County staff and consultants. The County uses this data to determine the timing of the improvements listed in its facilities list. The County also uses this data to ensure that the improvements listed on the facilities list are constructed before the LOS falls below the LOS performance standards adopted by the County. In this way, the improvements are constructed before the LOS falls below the County's LOS performance thresholds. The County's DIF program establishes a timeline to fund, design, and build the improvements.

8.2 MEASURE "I" FUNDS

In 2004, the voters of San Bernardino County approved the 30-year extension of Measure "I", a one-half of one percent sales tax on retail transactions, through the year 2040, for transportation projects including, but not limited to, infrastructure improvements, commuter rail, public transit, and other identified improvements. The Measure "I" extension requires that a regional traffic impact fee be created to ensure development is paying its fair share. A regional Nexus study was prepared by the SBCTA and concluded that each jurisdiction should include a regional fee component in their local programs in order to meet the Measure "I" requirement. The regional component assigns specific facilities and cost sharing formulas to each jurisdiction and was most recently updated in November 2011. Revenues collected through these programs are used in tandem with Measure "I" funds to deliver projects identified in the Nexus Study. While Measure "I" is a self-executing sales tax administered by SBCTA, it bears discussion here because the funds raised through Measure "I" have funded in the past and will continue to fund new transportation facilities in San Bernardino County.

8.3 FAIR SHARE CONTRIBUTION

The conditions of approval may include participating in established programs through payment of applicable fees, construction of specific improvements, payment of a fair share contribution toward future improvements or a combination of these approaches. Improvements constructed by development may be eligible for a fee credit or reimbursement through the program where appropriate (to be determined at the County's discretion).

When off-site improvements are identified with a minor share of responsibility assigned to proposed development, the approving jurisdiction may elect to collect a fair share contribution or require the development to construct improvements. Detailed fair share calculations, for each peak hour, has been provided on Table 8-1 for the applicable deficient study area intersections.

Table 8-1

Project Fair Share Calculations for Intersection

#	Intersection		Existing	Project	2040 With Project Volume	Total New Traffic	Project % of New Traffic
1	Cedar Av. & I-10 WB Ramps						
		AM:	4,374	88	5,607	1,233	**7.1%**
		PM:	4,230	74	5,509	1,279	5.8%
2	Cedar Av. & I-10 EB Ramps						
		AM:	3,865	163	5,245	1,380	**11.8%**
		PM:	3,759	146	5,411	1,652	8.8%
3	Cedar Av. & Orange St.						
		AM:	3,062	163	4,269	1,207	**13.5%**
		PM:	2,634	146	4,124	1,490	9.8%
4	Cedar Av. & Slover Av.						
		AM:	2,715	163	4,163	1,448	**11.3%**
		PM:	2,893	146	4,740	1,847	7.9%

BOLD = Denotes highest fair share percentage.

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9 REFERENCES

1. **San Bernardino Associated Governments.** *Congestion Management Program for County of San Bernardino.* County of San Bernardino : s.n., Updated June 2016.
2. **County of San Bernardino.** *Transportation Impact Study Guidelines.* County of San Bernardino : s.n., July 9, 2019.
3. **California Department of Transportation.** *Guide for the Preparation of Traffic Impact Studies.* December 2002.
4. **Transportation Research Board.** *Highway Capacity Manual (HCM).* 6th Edition. s.l. : National Academy of Sciences, 2016.
5. **California Department of Transportation.** California Manual on Uniform Traffic Control Devices (CA MUTCD). [book auth.] California Department of Transportation. *California Manual on Uniform Traffic Control Devices (CA MUTCD).* 2014.
6. **Transportation, California Department of.** *Freeway Performance Measurement (PeMS).* [Online] http://pems.dot.ca.gov/.
7. **City of San Diego.** *Trip Generation Manual.* San Diego : City of San Diego Municipal Code, 2003.
8. **LSA.** *Wheeler Trucking Project Focused Traffic Memorandum.* s.l. : LSA, 2017.
9. **Southern California Association of Governments.** *2016 Regional Transportation Plan/Sustainable Communities Strategy.* April 2016.
10. **San Bernardino Associated Governments.** I-10 Corridor Project. *The I-10 & I-15 Corridor Projects.* [Online] www.1015projects.com.

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September 1, 2020

Ms. Cheryl A. Tubbs
Lilburn Corporation
1905 Business Center Drive
San Bernardino, CA 92408

SUBJECT: CEDAR AVENUE TRAILOR STORAGE (PROJ-2020-00035)

VEHICLE MILES TRAVELLED (VMT) ANALYSIS

Dear Ms. Cheryl A. Tubbs:

The following Vehicle Miles Travelled (VMT) Analysis has been prepared for the proposed Cedar Avenue Trucking Storage (**Project**), which is located west of Cedar Avenue, between Slover Avenue and Santa Ana Avenue, in the County of San Bernardino.

PROJECT OVERVIEW

The Project is proposed to consist of up to 8.940 acres of truck and trailer storage use, which includes a 2,400 square foot (sf) office. The facility is to provide on-site parking for trucks and trailers. It is anticipated that there will be two full time employees on-site.

BACKGROUND

Changes to California Environmental Quality Act (CEQA) Guidelines were adopted in December 2018, which require all lead agencies to adopt VMT as a replacement for automobile delay-based level of service (LOS) as the new measure for identifying transportation impacts for land use projects. This statewide mandate takes effect July 1, 2020.

It is our understanding that the County of San Bernardino utilizes the San Bernardino County Transportation Authority (SBCTA) VMT Screening Tool (**Screening Tool**). The Screening Tool allows users to input an assessor's parcel number (APN) to determine if a project's location meets one or more of the screening thresholds for land use projects identified in the Governor's Office of Planning and Research (OPR) Technical Advisory on Evaluating Transportation Impacts in CEQA (**Technical Advisory**). (2)

The focus of this memorandum is to more thoroughly evaluate each of the applicable screening thresholds to determine if the proposed Project would be expected to cause a less-than-significant impact to VMT without requiring a more detailed VMT analysis. If the screening thresholds are not met, then project generated VMT will be calculated and compared to the applicable VMT threshold as identified in the San Bernardino County Transportation Impact Study Guidelines (**County Guidelines**) (3)

PROJECT SCREENING

The County Guidelines provides details on appropriate "screening thresholds" that can be used to identify when a proposed land use project is anticipated to result in a less-than-significant impact without conducting a more detailed analysis. Screening thresholds are broken into the following three types:

- Transit Priority Area (TPA) Screening
- Low VMT Area Screening
- Project Type Screening

A land use project need only to meet one of the above screening thresholds to result in a less-than-significant impact.

TPA SCREENING

Consistent with guidance identified in the Technical Advisory, County Guidelines note that projects located within a Transit Priority Area (TPA) (i.e., within ½ mile of an existing "major transit stop"[1] or an existing stop along a "high-quality transit corridor"[2]) may be presumed to have a less than significant impact absent substantial evidence to the contrary. However, the presumption may not be appropriate if a project:

- Has a Floor Area Ratio (FAR) of less than 0.75;
- Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction (if the jurisdiction requires the project to supply parking);
- Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Planning Organization); or
- Replaces affordable residential units with a smaller number of moderate- or high-income residential units.

Based on the Screening Tool results presented in Attachment A, the Project site is not located within ½ mile of an existing major transit stop, or along a high-quality transit corridor.

The TPA screening threshold is not met.

[1] Pub. Resources Code, § 21064.3 ("'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.").
[2] Pub. Resources Code, § 21155 ("For purposes of this section, a high-quality transit corridor means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.").

LOW VMT AREA SCREENING

As noted in the Technical Advisory, "residential and office projects that locate in areas with low VMT and that incorporate similar features (density, mix of uses, and transit accessibility) will tend to exhibit similarly low VMT." (2) The Screening Tool uses the sub-regional San Bernardino Transportation Analysis Model (SBTAM) to measure VMT performance within individual traffic analysis zones (TAZ's) within the region. The Project's physical location, based on parcel number, is input into the Screening Tool to determine project generated VMT. The Project is located in Assessor Parcel Number (APN) 025703112 and TAZ 53742201. The parcel containing the proposed Project was selected and the Screening Tool was run for Production/Attraction (PA) Home-Based Work VMT per Worker measure of VMT. Based on the Screening Tool results (see Attachment A), it would appear that the Project TAZ may qualify as a low VMT area; however, the Project is located in an area currently shown as Commercial land use in the County's General Plan. Additionally, the socio-economic data (SED) for the base year SBTAM was compared to the proposed Project. Within TAZ 53742201, there is industrial employment which would exceed the proposed Project. The Project is not anticipated to generate more VMT per worker than the existing TAZ. As such, the Project is consistent with the existing socio-economic data and can be screened out via the Low VMT Area screening.

The Low VMT Area screening threshold is met.

PROJECT TYPE SCREENING

The County Guidelines identifies that local serving retail projects less than 50,000 square feet may be presumed to have a less than significant impact absent substantial evidence to the contrary. In addition to local serving retail, other types of local serving uses (e.g., day care centers, non-destination hotels, affordable housing, places of worship, etc.) may also be presumed to have a less than significant impact as their uses are local serving in nature and would tend to shorten vehicle trips.

The proposed Project is anticipated to provide overflow or excess truck trailer storage for nearby warehouses. Although the specific end user(s) are unknown at this time, it is reasonable to assume that the future tenant will select this location, at least in part, as to how it effects their transportation costs. Businesses who have shipping as a significant part of their operations are sensitive to transportation costs and by extension their relative proximity to customers and suppliers. Therefore, the proposed truck and trailer storage lot is anticipated to serve nearby warehouse and distribution facilities that would be looking to locate overflow trailer storage as close as possible to the primary warehouse or distribution facility. As a result, the trips are expected to be local serving.

The Project Type screening threshold is met.

CONCLUSION

Based on our review of applicable VMT screening thresholds, the Project meets the Project Type and Low VMT Area screening and would therefore be presumed to result in a less than significant VMT impact. The Project was not found to meet the TPA screening, however meeting the Project Type and Low VMT Area screening is sufficient to determine a less than significant impact; no additional VMT analysis is required.

If you have any questions, please contact me directly at aevatt@urbanxroads.com.

Respectfully submitted,

URBAN CROSSROADS, INC.

Aric Evatt, PTP
President

Robert Vu, PE
Transportation Engineer

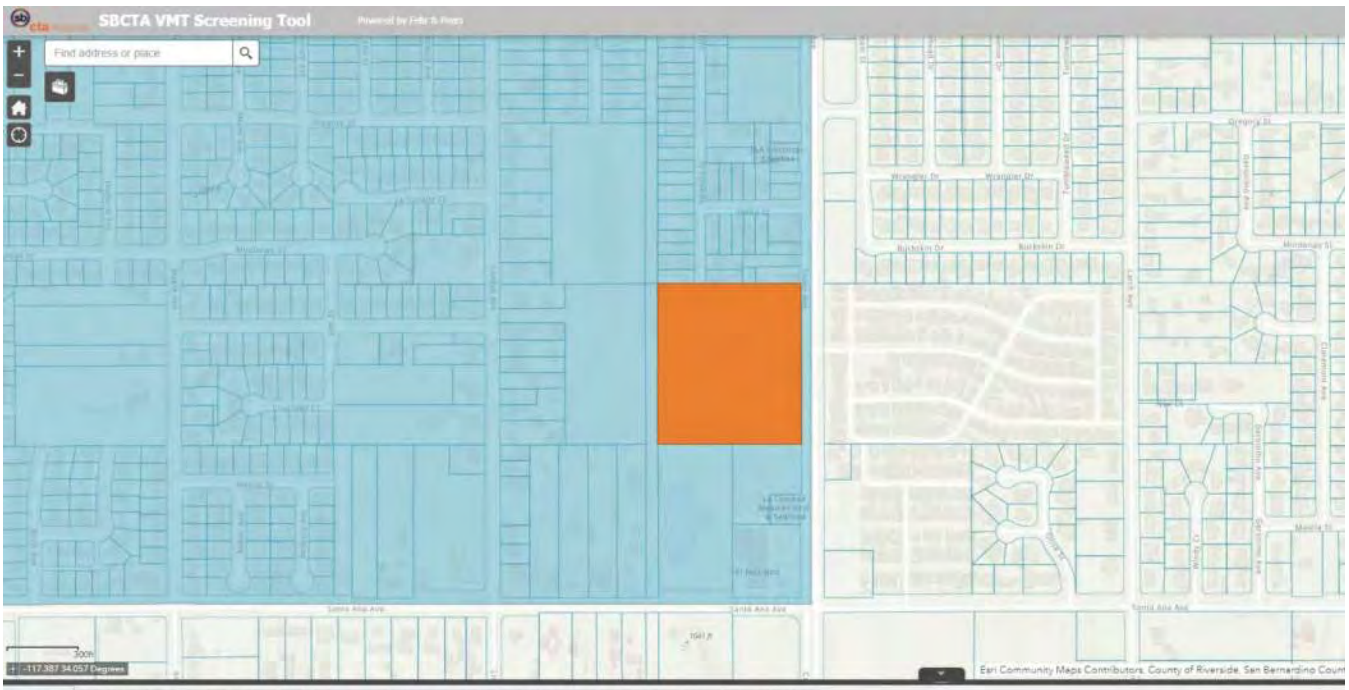
REFERENCES

1. **Institute of Transportation Engineers.** *Trip Generation Manual.* 10th Edition. 2017.

2. **Office of Planning and Research.** *Technical Advisory on Evaluating Transportation Impacts in CEQA.* State of California : s.n., December 2018.

3. **San Bernardino County.** *Transportation Impact Study Guidelines.* July 2019.

ATTACHMENT A:
SCREENING TOOL



Output Parcels | Selected Project Area | Low VMT Generating TAZs | San Bernardino Parcels (Zoom in to view) | City Boundaries | San Bernardino County Boundary | Transit Priority Area

Options | Filter by map extent | Zoom to | Clear selection | Refresh

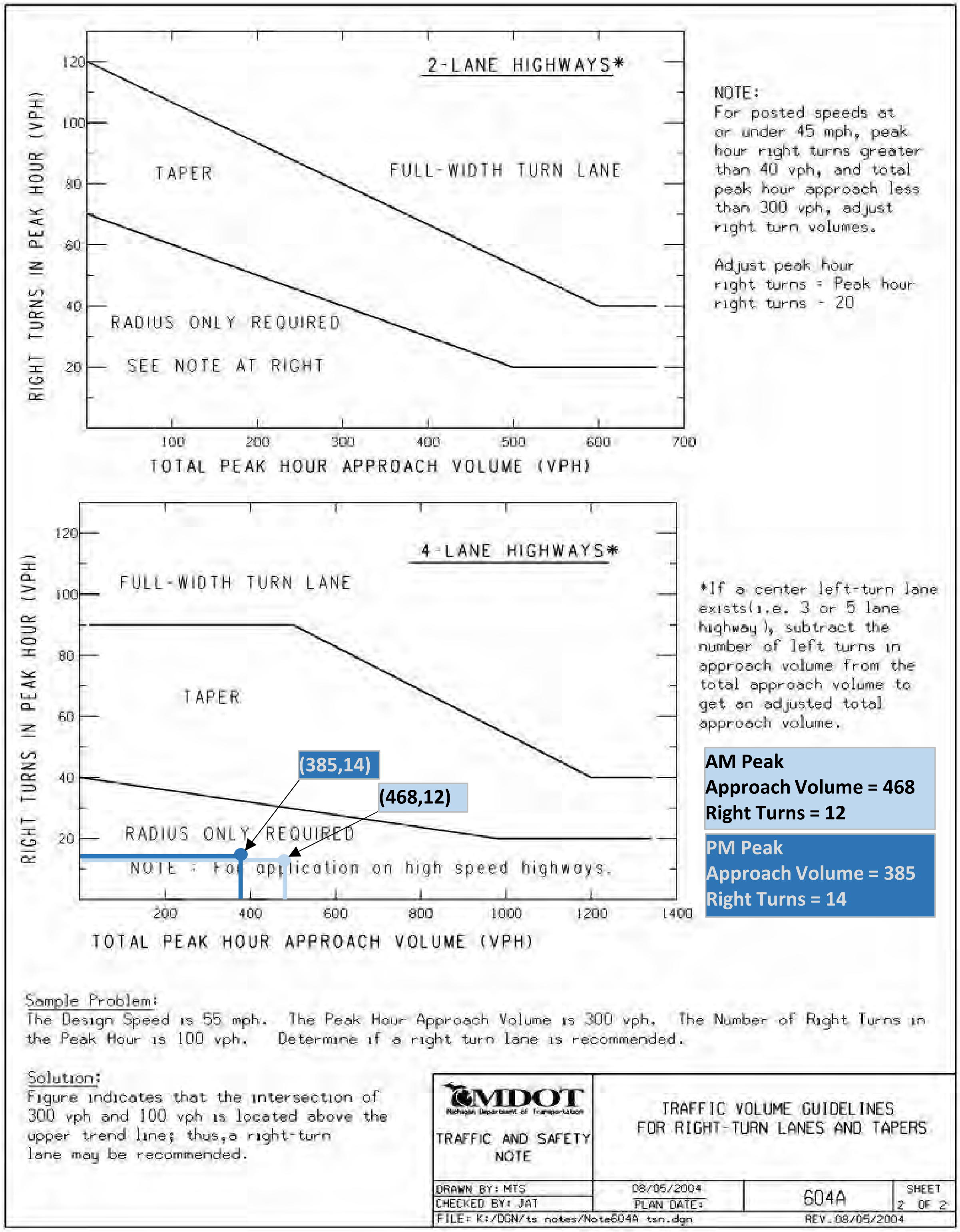
OBJECTID	Assessor Parcel Number (APN)	Traffic Analysis Zone (TAZ)	Community Region	Inside a Transit Priority Area (TPA)	TAZ VMT	Jurisdiction VMT	% Difference	VMT Metric	Threshold
1	025703112	53,742,201.00	Unincorporated San Bernardino County	No	16.60	17.10	-2.92%	PA VMT Per Worker	17.10

APPENDIX D

Turn Lane Warrant Analyses

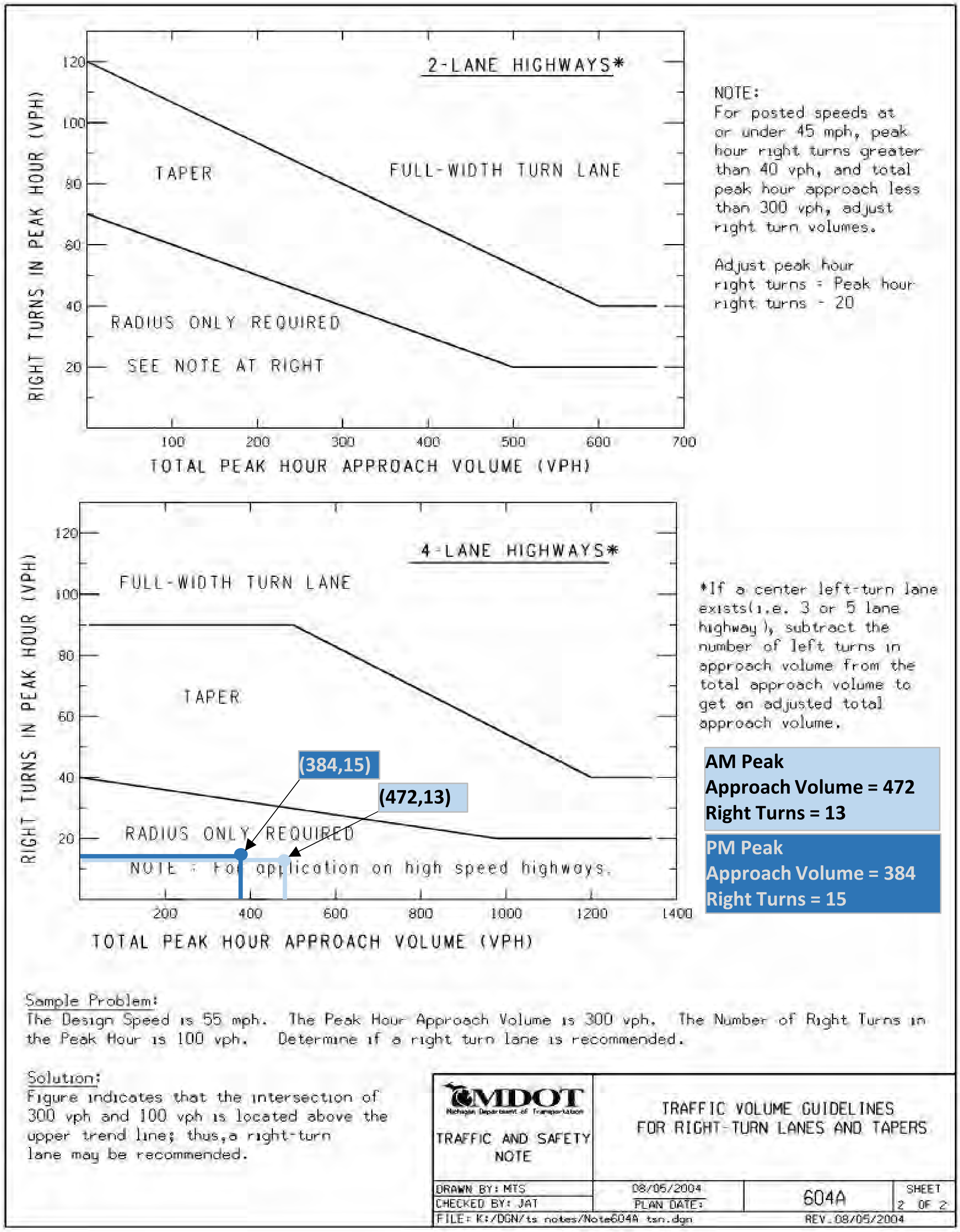
Right-Turn Lane Analysis

AM	Proposed Driveway Lot 1, MAX 2030
PM	



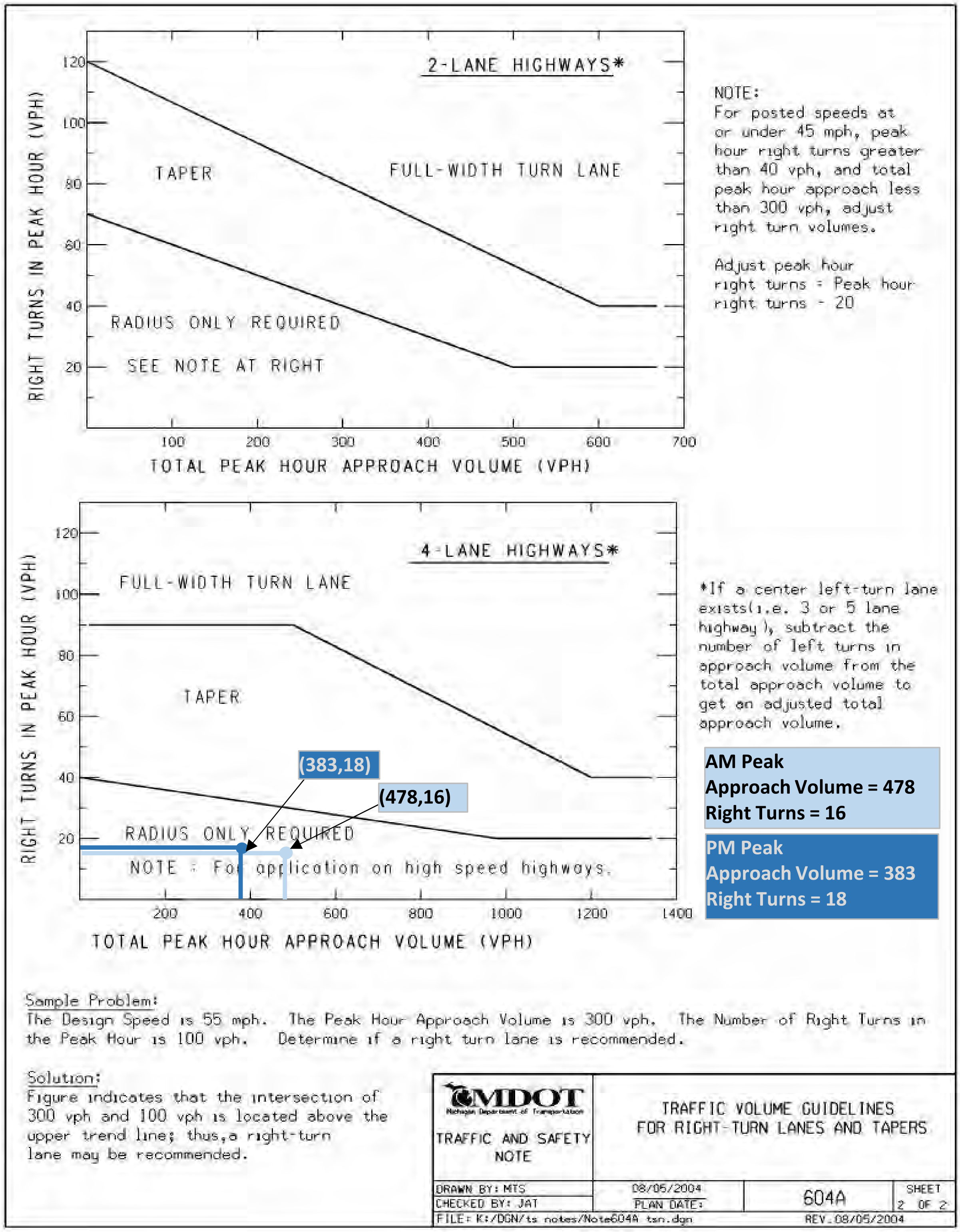
Right-Turn Lane Analysis

AM	Proposed Driveway Lot 2, MAX 2030
PM	



Right-Turn Lane Analysis

AM	Proposed Driveway Lot 3, MAX 2030
PM	



Memorandum

To: Planning Commission

CC:

From: Joe Pung
(616)554-0810
pungj@kentwood.us

Date: December 9, 2022

Re: Zoning Ordinance Amendments for Residential Architectural Design

---

Attached for you review is the current draft of proposed ordinance amendments for residential architectural design (Zoning Ordinance Sections 3.05.C and Section 3.22).

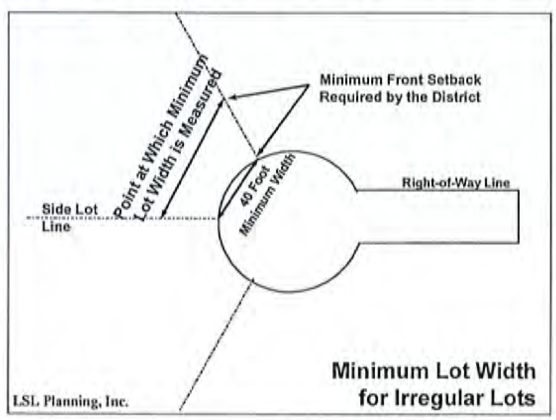
SECTION 3.05 BASIS FOR DETERMINING YARD REQUIREMENTS

A. The required front yard shall be measured from the right-of-way line to the nearest foundation or building wall of the building or structure; provided that where an existing setback line has been established by existing buildings occupying fifty (50) percent or more of the frontage within the same block or where unplatted, within two-hundred (200) feet of the proposed building, such established setback shall apply.

B. A corner lot shall have a front lot line and a street side lot line.

C. Projections into Yards
   1. Architectural features, as defined, not including vertical projections, may extend or project into a required side yard not more than four (4) inches for each one (1) foot of width of the side yard and may extend or project into a required front yard not more than four (4) feet.
   2. Unenclosed porches, steps, patios or similar construction ~~located at the ground level~~ may not project into a required front or rear yard setback for a distance to exceed ten (10) feet, and shall be no closer than five (5) feet from the front property line. No projection is allowed into a required side yard.
   3. Upper level projections such as awnings, balconies, bay windows, and canopies shall maintain a ground clearance of eight (8) feet above the adjacent grade and may extend into a required front or rear yard setback by no more than six (6) feet.
   4. Lightwells and egress window wells shall be permitted in any yard, provided:
      a) The well shall not project more than four (4) feet into any yard from the structure.
      b) In the front yard, a well may be no closer than five (5) feet from the front property line.
      c) Wells in the front yard shall have a three (3) foot high landscape or building material screen that is compatible with the materials used for the main building.
      d) The zoning administrator may allow hardscaping between the well and the sidewalk where the distance is less than ten (10) feet in a mixed-use context otherwise the space shall meet standard landscape requirements.
   5. Wheelchair ramps used for person with mobility impairments may be located in the front, side, or rear yards, provided the location does not create a hazard, or impede access for operations related to safety, such as access for fire personnel or equipment. In no case shall a ramp be placed nearer than three (3) feet from any side lot line.

D. Irregular Lots
   1. The minimum distance between side lot lines at the street right-of-way shall be forty (40) feet measured in a straight line.
   2. The minimum required lot width shall be measured at a straight line drawn between the two side lot lines. This line will be drawn from the points along the side lot lines at which the required front setback distance for the district is met. If the minimum lot width is not met at the required setback distance, the minimum required setback line shall be moved further into the lot to the point at which the minimum lot width is met.



Minimum Lot Width for Irregular Lots

(b) The existing wireless communications support structure or existing equipment compound is in compliance with the City's zoning ordinance or was approved by the appropriate zoning body or official for the City.

(c) The proposed collocation will not do any of the following:

(i) Increase the overall height of the wireless communications support structure by more than 20 feet or 10% of its original height, whichever is greater.

(ii) Increase the width of the wireless communication support structure by more than the minimum necessary to permit co-location.

(iii) Increase the area of the existing equipment compound to greater than 2,500 square feet.

(d) The proposed co-location complies with the terms and conditions of any previous final approval of the wireless communications support structure or equipment compound by the appropriate zoning body or official of the City.

Notwithstanding the foregoing, wireless communications equipment otherwise exempt must still comply with all other applicable City codes including a requirement that the building inspector determines that the co-location will not adversely impact the structure to which it is attached.

A co-location that does not meet subsections (c) or (d), above, is subject to Special Land Use review by the Planning Commission in accordance with Chapter 15 and Section 514 (2-6) of Act 366. Subject to Federal Aviation Administration Standards, any equipment placed in a residential district shall not be erected at a height that requires lighting. Any equipment placed adjacent to a residential district or use that requires lighting shall be a continuous red beacon at night.

Wireless communication equipment that is not attached to an existing structure (thus requiring the installation of a new wireless communications support structure), is subject to Special Land Use review consistent with Section 15.04 and the Kentwood Master Plan.

SECTION 3.22 REGULATIONS APPLICABLE TO ALL ~~SINGLE FAMILY~~ RESIDENTIAL DWELLINGS ~~OUTSIDE MANUFACTURED HOUSING COMMUNITIES~~

The following provisions shall not apply to dwellings located in manufactured home communities or Form Based Code districts. Provisions specific to a particular housing type shall apply in addition to the general provisions applicable to all housing types contained in Part B~~A~~.

A. The purpose and intent of these provisions is ~~three-fold~~:

~~1.~~ To create neighborhoods that are safe, livable, attainable, and sustainable, and create a sense of community for Kentwood's varied households. Each home contributes to a neighborhood's context. Building placement, design, and ~~the location of parking~~parking location are all components that affect how walkable and safe a neighborhood is for children, the elderly, and the general community. Front porches, windows, and entries provide "eyes on the street". ~~Design elements and façade design provide visual interest and humanize building scale.~~

2. Many of the following provisions have been used in past PUD approvals but ~~are~~ were not formally codified as general provisions. The intent of codifying these rules is to increase transparency in the development process, provide greater predictability for the development community, and increase consistency in decision-making.

~~3.~~

~~4.~~3. It is recognized that not every home and building site is the same. To that end, these provisions seek to provide flexibility for builders, homeowners, and City staff by instructing where administrative departures may be granted in lieu of the need for a zoning variance process.

~~5.~~4. It is recognized that the Building Code regulates appropriate construction materials to be used in residential construction. That Code, however, does not ~~take into consideration~~consider how all the various components contribute to building a neighborhood and a community. It is expected that materials will be compatible in character and scale with the structure on which it is being installed, have no visible fasteners, and be uniform in type and appearance. Installation according to the manufacturer's specification of durable building materials that do not result in warping or buckling, cracking, molding, fading, or oil canning ~~are~~ is expected in simple configurations with solid craftsmanship.

B. **All housing types.** These general provisions are applicable to all housing types.

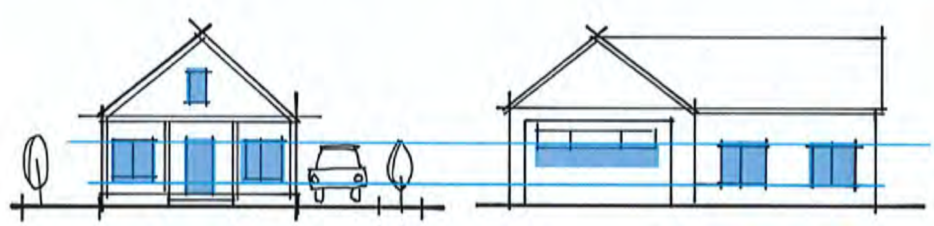
i. Transparency.

a. Residential dwellings shall have windows on the front walls and side walls of the structure which face a ~~public~~ street. The size and placement of windows on the facade shall be generally consistent.

i. For all residential dwellings at least twelve~~fifteen~~ percent (12~~5~~%) of the area of the front façade shall consist of clear glass windows and may include the/~~or~~ primary entrance door~~s~~, which permit a view from the dwelling to the street. Garage door windows may count towards the percentage.

ii. At least three (3) windows with a minimum of six (6) square feet each are required on side walls (those adjoining the front façade) that face a ~~public~~ street.

~~iii.~~



FRONT ELEVATION SIDE ELEVATION

~~iv.~~

~~v.~~iii. Lightwell facades shall have twelve percent (12%) minimum clear glass between the finish floor line of the lightwell and the finish floor line of the first floor.

~~vi.~~iv. Administrative Departures. The following shall be eligible for an administrative departure request:

a. Side wall transparency for single-story dwellings where it is determined that the standard cannot be met due to the interior design of the dwelling.
b. Placement is limited by the presence of a garage. If the garage is facing the street, a departure cannot be provided to the facade.
c. Building code requirements make adherence to this requirement infeasible.

2. **Exterior Materials.**

a. Exterior cladding may consist of brick, stone, vinyl or aluminum siding, glass, fiber cement siding, wood lap, stucco, or decorative split-faced block.

~~b. Metal siding or paneling may be allowed as a primary material where combined with a masonry foundation which extends a minimum two feet above adjacent grade. To ensure durability and visual character, metal siding or paneling shall be minimum 24 gauge with no visible fasteners. Any change in profile shall be non-corrugated and have rib depth of a minimum 1-inch. Departure from these requirements may be approved by the Planning Commission with a Special Land Use approval.~~

c. EIFS shall only be used for building accents.

d. Where more than one (1) façade material is proposed, the heavier material in appearance shall be incorporated below the lighter material (e.g. masonry below siding).

~~e. Brick, block, stone, or other materials that will be placed only on the façade of the building must wrap the sides of the structure with the same materials for a depth of at least five (5) feet.~~

~~f. Acceptable roof materials include three hundred (300) pound or better, asphalt composite shingles, wood shingles and shakes, metal tiles or standing seam, slate, and ceramic tile. The Director may permit "engineered" wood or slate with an approved sample and examples of successful, high quality local installations. Corrugated roofing materials are not permitted.~~

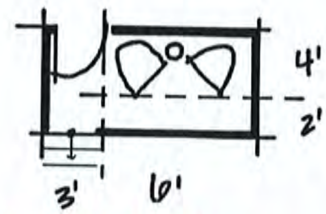
g. Administrative Departure. Other materials of equivalent or better quality, including high quality synthetic material, may be approved, if determined appropriate for the building, site, and area with an approved sample and examples of successful, high quality local installations.

3. **Design Elements.** The intent of this Section is to encourage the use of various design elements on residential lots and structures to create visual interest and support walkable neighborhoods. A menu of design elements applicable to all residential zone districts is provided. A minimum of ~~three (3)~~four (4) elements or sub-elements from the menu are required. Implementation of these design elements should demonstrate thoughtful design; considering scale, symmetry, balance, and compatibility. ~~Bonus provisions have been provided to encourage the application of more points.~~

a. **Landscaping. (2 PUD points)**
Three (3) trees measuring 2.5" caliper or greater on the lot and planted landscape area/s of a minimum of one hundred fifty (150) square feet in the front yard. A minimum of five-hundred (500) cubic feet of soil volume shall be provided per tree. Retained trees on the property can be credited towards this option.

b. **Front Porch. (3 PUD points)**
Front porch, not including steps, that is at least six (6) feet in depth to provide for usable seating and circulation, and is at least one-third (1/3) the width of the front façade of the residential structure (not including the garage) but in no case is it less than nine (9) feet wide.

9'x6' MINIMUM



c. **Structural Modifications. (1 PUD point each)**
   i. Dormers, the placement of which is balanced with the dwelling's façade.
   ii. Room bump-out (e.g. sunroom, bay window, etc.) on the façade of the building with a minimum depth of two (2) feet.
   iii. Dwelling is designed and constructed to meet the Type B Unit accessibility requirements of the ANSI A117.1 standard.

d. **Windows and Window Detailing. (1 PUD point each)**
   i. Increased transparency of twenty percent (20%) or higher on front façade.
   ii. Exterior trim not less than three (3) inches in width.
   iii. Shutters that are one-half the width of the window on each side and of a high-quality material that will not fade or peel.
   iv. Other enhancements, such as awnings.

e. **Roof Detailing. (1 PUD point each)**
   i. Eaves with a minimum of twelve-inch (12") overhang.
   ii. Exterior soffit detailing such as brackets, moldings, or changes in materials.
   iii. Gable end (rakes) with a minimum eight-inch (8") overhang.

f. **Materials. (1 PUD point each)**
   i. Brick, stone, or other decorative materials used on the façade of the building and wrap the sides of the structure with the same materials for a depth of at least ~~five~~ two (~~5~~2) feet.
   ii. Hardie Plank/fiber cement siding.
   iii. Metal siding, roofing, or paneling of 24 gauge or better with no visible fasteners. Any change in profile is non-corrugated and has a minimum rib depth of 1-inch.

g. Administrative Departure. The Zoning Administrator may accept alternative options that meet the intent of this provision to increase the visual diversity of residential structures within a neighborhood.

~~g.~~h. A minimum of one (1) design element must be different for every ten (10) detached dwelling units, or for each multi-family building. Landscaping and front porches shall be exempted from this requirement.

4. ~~Access to the basement or crawl space shall be from inside the dwelling unit.~~

5. ~~The dwelling shall meet all the requirements and specifications of the currently adopted Building Code, Housing Code, Electric Code, Plumbing Code, Energy Code, and the One and Two Family Code.~~

C. **Detached single-family.** A detached single-family dwelling and any additions or alterations thereto, shall meet the requirements of this Section in addition to all other regulations of this Chapter.

i. **Garages.** The following provisions shall apply to provide safe, unobstructed pedestrian through-movement on sidewalks, encourage the visibility of street activities from dwellings, ensure sufficient space for the parking of vehicles to avoid front-yard parking and street congestion, and reduce the visual dominance of garages and parking in neighborhoods.

a. For the purposes of this Section, the garage setback shall be considered independently from that of the residential dwelling.

~~a.~~b. Garages that are accessed through the front yard shall be placed a minimum of thirty-five (35) feet from the ~~back of sidewalk or~~ front lot line~~, where no sidewalk is present,~~ or from the edge of the right-of-way ~~or private~~ easement for private streets~~,~~. ~~as determined~~Administrative departures for private roads may be approved by the Zoning Administrator.
~~b.~~

c. Where garages are rear-loaded, off an alley or common drive through a rear yard, the minimum distance from the face of the garage to the ~~rear lot line~~edge of pavement is ~~twenty~~ fifteen (15~~20~~) feet. ~~For the purposes of this Section, the garage setback shall be considered independently from that of the residential dwelling.~~

d. The placement and size of attached garages shall be determined by the following:

Table 3.22.C.1.b. Garage Placement

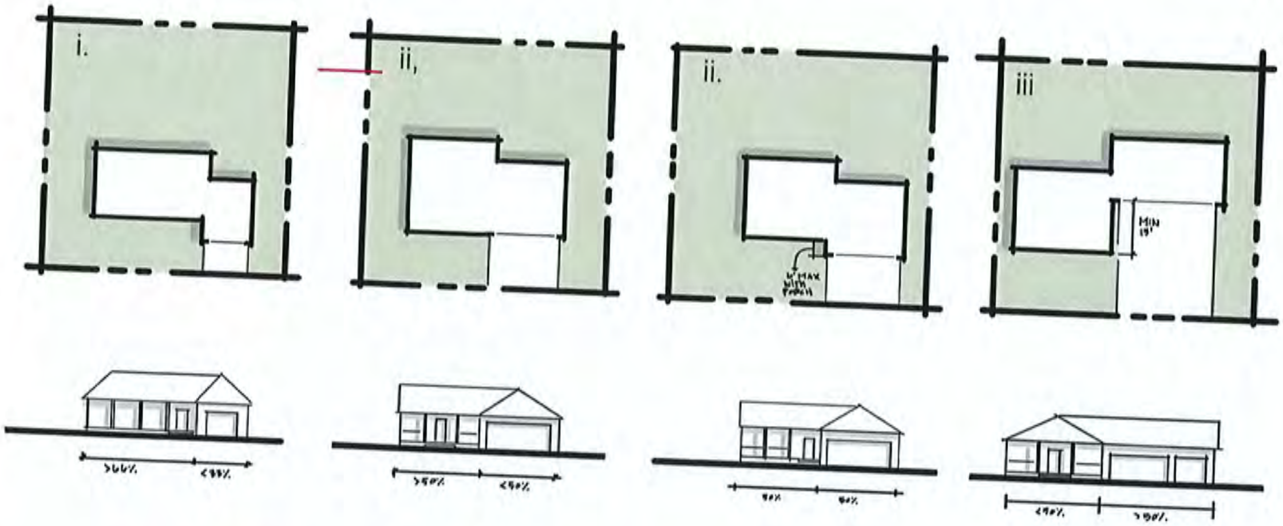
~~% Garage Face~~Garage as % of Front Façade Width	Garage Placement			
	Behind the house	~~15' behind face of house~~	Aligned with house face	In front of house
33% or less	yes	~~yes~~	yes	yes
34 - 50%	yes	~~yes~~	yes	no
51% or greater	Yes (min. 15 feet)	~~yes~~	no	no

i. Garages that are 33% or less of a dwelling unit's front facade may be placed forward of the dwelling unit.

ii. Garages that comprise 50% or less of the front façade of a dwelling unit may align with the façade. Garages 35% to 50% of the front facade may project up to 6 feet forward of the dwelling face if a front porch is provided in compliance with Section 3.22.B.3.b. Front yard setbacks still apply.

iii. Garages set back at least fifteen (15) feet behind the face of the dwelling unit are allowed and shall not be counted against front façade calculations.

iv. Garages cannot exceed 50% of the front façade width of a dwelling unit~~. Where this provision cannot be met, garages will be located in the rear yard.~~



d. ~~Garages may be placed an additional five (5) feet forward of the required garage setback if a front porch meeting the requirements of Section 3.22.B.d. is provided.~~

e. Where a third, single garage stall is desired, it shall be located at least two (2) feet behind the main façade of a two-stall garage. ~~Third garages that are less than twelve (12) feet wide shall be exempt from the dwelling to garage façade ratio.~~

f. Administrative Departure. An administrative departure may be granted where seventy-five percent (75%) of existing dwelling units within three hundred (300) feet on the same block ~~of the lot~~ have a dwelling to garage façade ratio that does not meet the above requirements.

ii. If the dwelling unit was transported to the building site, all wheels, axles, and towing devices shall be removed from the dwelling unit once placed on the lot.

~~iii. The roof of the dwelling unit shall have a minimum pitch of three (3) inches height to one (1) foot of run.~~

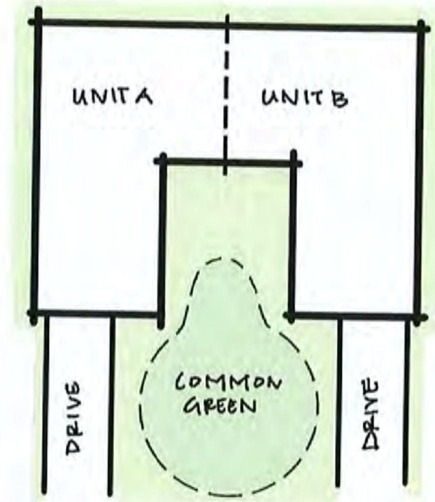
D. **Attached single-family, duplexes, and multi-family.** Attached single-family dwellings, duplexes, and multi-family dwellings (3 or more units) and any additions or alterations thereto, shall meet the requirements of this Section in addition to all other regulations of this Chapter.

1. **Parking Areas, Garages, and Carports.**

   a. For multi-family developments ~~U~~unenclosed parking areas and freestanding parking structures (detached garages or carports) shall not occupy more than thirty percent (30%) of any public street frontage.

b. For multi-family developments ~~P~~parking areas ~~that are~~ visible from the public street shall be sited to be perpendicular to the street to reduce visual impacts on the streetscape.

c. ~~Parking for duplexes shall not exceed twenty-five percent (25%) of a front yard~~Garages for duplexes are not allowed to be placed in the center of the front façade. Drive areas shall be separated to allow for a common green. A circular drive may be permitted for access management purposes.



d. For multi-family developments ~~Blank~~ blank walls lacking windows, articulation or modulation are not permitted when facing a street.

e. Garages that have direct access from a street shall be placed a minimum of thirty-five (35) feet from ~~the back of sidewalk or~~ front lot line~~, where no sidewalk is present,~~ or from ~~at~~ the edge of a ~~right-of-way or~~ private road easement, as determined by the Zoning Administrator.

a. Administrative Departure. An administrative departure may be granted to allow up to fifty percent (50%) of exposed parking areas or to adjust parking area orientation where a street frontage may be affected when a dense year-round landscape screen is provided.

2. Multi-Family Façade and Entrance Orientation.

a. The front façade of any new building shall face a primary public or private street.

b. The primary pedestrian building entrance shall be located in the front façade parallel to the street. Main building entrances and exits shall be located on the primary street, and may extend to both sides of a building. Entrances can be identified individually or shared.

c. The primary pedestrian entrance of a new main building shall be clearly identified using an awning, paving treatments, porches, change in roofline or other architectural feature and shall relate to locations of pedestrian activity.

d. A sidewalk shall be provided that connects building entrances to the street or sidewalk that parallels the street.

e. An administrative departure may be granted where the topography, lot depth, vegetation to preserved, or other site condition would prevent compliance with these provisions.

3. Multi-Family Facade Design.

a. Uninterrupted Facade. The maximum linear length of an uninterrupted building facade facing a street or park shall be thirty (30) feet. Visual breaks shall be vertical. Building wall offsets (projections and recesses), varying building materials, or other method shall be used to break up the mass of a single building.

b. A horizontal line on the façade shall distinguish the base of the building from the remainder to support human-scaled design. An expression line shall be created by a change in material, a change in design, porches, or by a continuous setback, or stepback/recess on upper floors.

c. Vents, air conditioners and other utility elements must be integrated (placement, color, orientation) into the architecture of the building or otherwise screened from view.

d. Administrative Departures may be granted for:

i. A reduction of up to five (5) feet of the uninterrupted facade requirement may be approved, depending on building design, entrance placement, and other factors that make the requirement impractical.

ii. Other methods to provide adequate articulation, provided that the visual effect of articulation is maintained. Examples of acceptable variations may include architectural or artistic details or features, a variation in color or materials and enhanced ornamentation around building entranceways.

4. Multi-Family Common Open Space. Where multiple buildings are constructed, the spaces between buildings shall be purposeful, intentional, accessible, useful, and visually prominent.

a. ~~Required c~~Common space must be located in one (1) or more usable areas that is accessible "in common" to residents. Spaces shall be created in side yards or front yards to create outdoor "rooms" that are framed by buildings and provide a sense of community.

b. Common space areas must be substantially covered with grass, ground cover, shrubs, plants, trees, or usable outdoor features such as patios, walkways, and/or recreational facilities.

c. One (1) tree must be planted for every one-thousand (1,000) square feet of ~~required~~ common area within the shared space.

~~d.~~ No driveways or off-street parking spaces may be located within the common open space. Bollards, curbs, wheel stops or other similar features shall be provided to ensure that required open space is not used for off-street parking, loading, or vehicle circulation.

SECTION 3.23 LOT WIDTH TO DEPTH RATIO

A. Except as may be permitted in B, below, no lot created after the adoption date of this Ordinance shall have a depth exceeding four (4) times its width, as measured at the front lot line.

Lot Width to Depth Ratio