

Correspondence Between Staff and Applicant

Approval Letter



Planning and Development Services Division

7447 East Indian School Road Scottsdale, Arizona 85251

9/23/2019

Michael Leary 10278 E Hillery Dr Scottsdale, AZ 85255

RE: Determination of a Planning Commission hearing

Dear Mr. Leary:

Your Development Application 19-ZN-2013#2, Core Center, is scheduled on the 10/16/2019 Planning Commission hearing agenda.

You may be required to make a presentation to the Planning Commission. If you choose to present your application to the Planning Commission utilizing a Power Point presentation, please submit the electronic file to your project coordinator by 1:00 p.m. on Monday 10/14/2019. Please limit your presentation to a maximum of 10 minutes.

A subsequent letter with your site post requirements will be sent shortly after the required text has been verified. Typically, this is approximately twenty-one (21) days before a hearing date.

The Planning and Development Services Division has had this application in review for 58 Staff Review Days.

Thank you,

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Brad Carr, AICP Principal Planner

C: Case File



August 5, 2019

Brad Carr, AICP Principal Planner City of Scottsdale 3939 N. Drinkwater Blvd. Scottsdale, AZ 85251



RE: 19-ZN-2013 #2 - Core Center 1st Review Comment Responses – Traffic Study Specific

Dear Mr. Carr:

CivTech has prepared this letter on behalf of Impact Church as both a cover letter to the hereto attached, *Core Center Trip Generation and Level of Service Analysis* – 2nd *Submittal* and to provide written responses to "1st Review" comments specific to the *Core Center Trip Generation and Level of Service Analysis, June 2019,* the "traffic study" component of the above-referenced rezoning application. Two sets of 1st review comments specific to the traffic study have been received from the City of Scottsdale (COS) to date. COS Comment No.'s 21 through 25 of your (1st Review) letter to Michael P. Leary, dated July 12, 2019 and five unnumbered comments CivTech received directly from COS Traffic Engineer Doug Ostler via e-mail, on July 29, 2019. Presented below are first the City's July 12th comments and then the July 29th comments, each comment followed by our written response. A full copy of each set of 1st review comments as they were received by CivTech has also been attached for reference.

JULY 12, 2019 TRAFFIC STUDY-SPECIFIC REVIEW COMMENTS & RESPONSES

COS Comment No. 21: Transportation staff is not fully supportive of the installation of a traffic signal at 84th Street/Hayden Road due to signal spacing. The proposed change from a church to offices and restaurants result in ~ 4x the daily and AM peak hour trips generated and ~10X the PM peak hour trips generated. This has profound impacts on traffic, particularly at the 84th Street/Hayden Road intersection. Signalization was not intended/planned for this location. DSPM 5-3.123 G3 indicates that "At Minor Arterial/Minor Arterial (or smaller designated streets) intersections the designer should evaluate using a roundabout as an alternative to a traffic signal for all new or significantly rebuilt intersections." The TIMA appears to include no indication that a roundabout option was evaluated. Please address these issues with the next submittal. (DSPM, Sec. 5-3.123)

CivTech Response:

The first submittal version of the traffic study was prepared in accordance with a scope established through discussion with City of Scottsdale Traffic Engineering staff in advance of

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initiating the analysis. Presenting a weekday daily and peak hour trip generation comparison and intersection level of service analysis was part of the agreed upon scope as was identifying roadway capacity and/or traffic control mitigation warranted by the proposed development. Both were provided with the initial submittal. The initial submittal did not however, recognize the opportunity or challenges with converting the intersection of 84th Street and Hayden Road to a roundabout as an alternative to signalizing the intersection in its current conventional configuration. That option has since been considered fairly extensively, the results of which are summarized below.

We have evaluated the appropriateness of a roundabout from an operational perspective using the roundabout warranting benchmarks specified in Section 5-3.124 of the City's Design Standards and Policies Manual (DSPM) which reads, "**Roundabouts are most appropriate...**

1. at locations with high turning movements,

Assuming the traffic count data we were required to collect for this analysis was representative of typical weekday conditions prior to the occupancy of the northwest corner property (4.0-acre +/- APN 215-48-065F) by CARMAX, turning movement volume accounted for approximately 15% of total daily volume entering this intersection. With the addition of CARMAX traffic (estimated to add another 310 turning movements per day, with 24 being made during the am peak hour and 27 during the pm peak hour), we expect this percentage to increase to 16%. Once CORE CENTER traffic and another year of background traffic growth is taken into account, the turning movement percentage is likely to increase to approximately 26%. This begs the question, "What does the City consider "high" in this context?" While 26% is certainly significant and would suggest that further consideration of roundabout appropriateness is warranted, it bears recognizing that 26% is nowhere near the 38-40% turning movement-to-total volume percentage that characterizes the Hayden/Northsight roundabout, a quarter-mile to the northeast.

2. where intersecting street traffic volume on the major street is less than ten times the volume on the minor street,

Assuming again, that the traffic count data we collected for this analysis is representative of typical weekday conditions prior to the occupancy of the northwest corner property by CARMAX, the number of vehicles entering the 84th Street and Hayden Road intersection from a major street (Hayden Road) approach is about 13 times that of vehicles entering from either of the two minor street approaches, well outside the range the City considers indicative on its own, of an intersection for which conversion to a roundabout should be considered further. However, with the addition of CORE CENTER traffic to the intersection, we expect the major-to-minor multiplier will drop to about 8%, within the City's indicated range of appropriateness for a roundabout.



3. and where safety is a primary concern."

Roundabouts are frequently recognized for their safety benefits particularly in the context of reducing the potential for head-on, right angle, and/or left turn collisions. Review of crash data provided by the City of Scottsdale indicates a total of nine (9) reported traffic accidents have occurred in the immediate vicinity of the 84th Street and Hayden Road intersection over the three-year period ending December 31, 2018, none of which resulted in a fatality or serious injury. Of the nine, one (1) was interpreted as a rear-end crash; three (3) were interpreted as side swipe crashes, two (2) were interpreted as left turn/angle accidents involving a northeast-bound driver attempting to turn left/north onto 84th Street being hit by an oncoming through vehicle traveling in the southwest-bound direction, two (2) were interpreted as right angle crashes involving a northbound driver exiting the CORE SCOTTSDALE development attempting to turn left or right onto Hayden Road and getting hit by a driver traveling northeast or southwest on Hayden Road; and one was interpreted as involving two vehicles traveling in the same direction but this was the extent to which the cause or effect could be determined.

Based on the accident history just described, several of the accidents may have been avoided if the intersection were configured as a roundabout but those same accidents might have been avoided if there were a traffic signal in place to periodically grant right of way to turning traffic as well. This accident history on its own is not significant enough to characterize the intersection as unsafe and in need of alternate traffic control purely for safety reasons.

The above-described application of the City's roundabout warranting quidelines yielded results that suggest that the appropriateness of a roundabout in lieu of a traffic signal or any other traffic control alternative cannot be fully determined without more input from the various stakeholders in the outcome of this decision and without consideration of more than just operational factors. For this reason, and at the request of the applicant, we have also prepared a couple of preliminary geometric design concept exhibits which illustrate some of the physical impacts the conversion of this intersection to a roundabout would likely have. The exhibits are included with responses to first review comments, in Appendix A. Both exhibits describe a two-lane by one-lane roundabout similar in configuration to that which exists at Hayden Road and Northsight Boulevard. Both concepts avoid the need for right of way from the north/non-CORE CENTER side of the intersection. The primary difference between the two concepts is that the concept presented in Exhibit A1 has a 169-foot inscribed circle diameter (ICD), identical to that of the Hayden/Northsight Roundabout and the concept presented in Exhibit A2 has a 150-foot diameter ICD. The larger ICD concept allows the circulating path radius (R2) to remain within the City's' specified 15-20 mph design speed range but positioned to avoid any need for north side right of way, would cut fairly deep into the CORE CENTER site and likely cause need for significant adjustments to vertical elements of the site plan, including the building



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proposed for location on the southeast quadrant of this intersection. The smaller ICD concept reduces the extent to which the intersection would need to be pushed south (and off of its current alignment) yet allows 22 mph travel along the R2 segment of the fastest path through the roundabout, higher than the City's standards support but still well within the range supported by nationally recognized (NCHRP Report 672) standards.

As to the comment regarding concern over the (quarter-mile) spacing that would result from installing a signal at 84th Street and Hayden Road, based on the understanding that the City is planning to convert the Hayden/Raintree intersection to a roundabout in the not too distant future, there will be an approximately one-mile stretch of Hayden Road with continuous flow endpoint intersections and either one or two signalized intersections in between. It seems therefore that the significance of the quarter-mile spacing of this signal from the 83rd Place and Hayden Road signal should not be as significant as it would be along a longer stretch of arterial with regularly spaced signals.

COS Comment No. 22: Please revise the traffic study to add a queue analysis for site driveways due to the substantial increase in projected trip generation as well as queue analysis for the intersection of 84th street and Hayden Road due to the proposed control change.

CivTech Response:

A queue analysis has been added to the Traffic Impact and Improvement Analysis section of the traffic study.

COS Comment No. 23: Please revise the traffic study to provide project site & total ADT on major street(s) within the study area. (DSPM, Sec. 5-1.701)

CivTech Response:

Site and Total ADT's for those segments of 84th Street and Hayden Road where traffic count date was collected for this analysis have been added to applicable traffic volume figures in the 2nd submittal version of the traffic study. As discussed with City traffic engineering staff on 8/1/2019, current ADT information about other roadway segments further away from the Project site is not available and therefore has not been added to the report.

COS Comment No. 24: Page 31, 1st bullet (84th Street & Hayden Road), 3rd sentence - the site plan depicts a redesign of the existing site driveway. The developer is responsible for correct alignment of their proposed new driveway to prevent negative offset of left turning vehicles. Should the intersection be signalized, the developer will be responsible for improvements associated with the traffic signal, including and not limited to providing a left turn lane on all approaches. Please revise the project plans to address this comment. (Zoning Ordinance, Sec. 1.204.)



CivTech Response:

The project plans have been revised to show curb line geometry and lane striping for the 84th Street driveway to achieve lane alignment north-south across Hayden Road. Two exhibits included with these review comment responses, Exhibit D1 and Exhibit D2, provide a little more detail of what was recommended for that area of the driveway near Hayden Road. Recognizing the site plan is still somewhat conceptual, a detailed assessment of internal circulation has not been performed as part this analysis.

COS Comment No. 25: Please revise the traffic study to add a queue analysis for site driveways due to the substantial increase in projected trip generation as well as queue analysis for the intersection of 84th street and Hayden Road due to the proposed control change

CivTech Response:

A queue analysis has been added to the Traffic Impact and Improvement Analysis section of the traffic study.

JULY 29, 2019 TRAFFIC STUDY-SPECIFIC REVIEW COMMENTS & RESPONSES

July 29th COS General Comment: In addition to the comments already provided, please address the following items related to evaluation of appropriate traffic control at the 84th Street and Hayden Road intersection:

CivTech Response:

All of the requested items have been addressed as requested.

July 29th COS Specific Comment No. 1: Please use the 24-hour counts that were collected at the 84th Street and Hayden Road intersection for evaluating the signal warrants in existing conditions.

CivTech Response:

The 24-hour counts collected for this analysis were used for the traffic signal warrant analysis. If detailed documentation beyond that which is provided in the Appendix of the traffic study is desired, it can be provided upon request.

July 29th COS Specific Comment No. 2: A reduction for right turning traffic is expected to be applied to the minor street approach volumes (see MUTCD Section 4C.01 Paragraph 8).

CivTech Response:

Reductions were taken for a portion of the right turn traffic on the minor street approaches. This reduction varied by approach.



July 29th COS Specific Comment No. 3: Staff recommends consideration of restricting left turns out of the driveway as an alternative to signalization, even if signal warrants are met (see MUTCD Section 4B.04 Paragraph 2J). This restriction would be for the driveway by means of a pork-chop median or channelization, etc.; 84th Street would remain full access. Note: this does not retract comment 21 in the comment letter. You may state the circumstances and/or reference discussion(s) indicating compliance with DSPM 5-30123 G3.

CivTech Response: The turn restriction alternative has been considered, discussion of which appears below and in the Traffic Impact and Improvement Analysis section of the 2nd Submittal version of the traffic study.

The turn restriction alternative would effectively reassign the task of accommodating CORE SCOTTSDALE and CORE CENTER traffic wanting to head southwest on Hayden Road upon exiting the site, to another intersection. In other words, this option which involves construction of a raised channelizing island in the CORE SCOTTSDALE/CORE CENTER driveway such that the only allowable exit movement from the CORE SCOTTSDALE/CORE CENTER development becomes a right turn onto northeast-bound Hayden Road towards Frank Lloyd Wright Boulevard. Exiting CORE SCOTTSDALE/CORE CENTER traffic wanting to head southwest on Hayden Road would therefore first have to make a right turn onto northeast-bound Hayden Road, and then find an alternate route back to southwest-bound Havden Road, It is anticipated most of the exiting traffic in this situation would attempt a northeast-to-southwest-bound U-turn at the next closest median break to the northeast (adjacent to the Burger King/Home Depot and Go AZ Motorcycles dealership driveways). Due to the limited curb to curb clearance on the southbound side of the Hayden Road median, U-turns cannot be made without either jumping curb on the opposite side of Hayden Road (evidence of which can be see all along this segment) or, traveling to the middle of the median break and using some of the intersecting driveway pavement. Attached Exhibit E1 illustrates path of a passenger vehicle executing the right turn followed by U-turn movement.

July 29th COS Specific Comment No. 4: Correct reference to Sarival Avenue (instead of Hayden Road) on page 17 of the study.

CivTech Response: The requested correction has been made.

July 29th COS Specific Comment No. 5: Using the 24-hour counts that were collected at the 84th Street and Hayden Road intersection, state the 24-hour volume on Hayden Road in existing conditions as well as the projected ADT added by the site.

CivTech Response:

The requested ADT information has been added to the applicable traffic study figures.



We appreciate the City's consideration of these comments. Please call me if you have any questions about this statement and/or if we can be of further assistance.

Sincerely,

CivTech Inc.

100e)

Tove C. White, P.E., PTOE Project Manager/ Senior Traffic Engineer

Attachments:

EXHIBIT A1: CORE CENTER ROUNDABOUT DESIGN CONCEPT (169' ICD) EXHIBIT A2: CORE CENTER ROUNDABOUT DESIGN CONCEPT (150' ICD) EXHIBIT D1: 84TH STREET LANE ALIGNMENT ACROSS HAYDEN ROAD, SHEET 1 OF 2 EXHIBIT D2: 84TH STREET LANE ALIGNMENT ACROSS HAYDEN ROAD, SHEET 1 OF 2 EXHIBIT E1: EXITING RIGHT TURN FOLLOWED BY DOWNSTREAM U-TURN Copy of 1st Review Comments letter, dated 7/12/2019 Copy of 1st Review Comments follow-up e-mail message, dated 7/29/2019 Core Center Trip Generation and Level of Service Analysis – 2nd Submittal, August 2019















7/12/2019

Michael P. Leary, LTD 10278 E Hillery Dr Scottsdale, AZ 85255

RE: 19-ZN-2013#2 Core Center H4145 (Key Code)

Dear Mr. Leary:

The Planning & Development Services Division has completed the review of the above referenced development application submitted on 6/5/2019. The following **1**st **Review Comments** represent the review performed by our team, and is intended to provide you with guidance for compliance with city codes, policies, and guidelines related to this application.

Zoning Ordinance and Scottsdale Revise Code Significant Issues

The following code and ordinance related issues have been identified in the first review of this application, and shall be addressed in the resubmittal of the revised application material. Addressing these items is critical to scheduling the application for public hearing, and may affect the City Staff's recommendation. Please address the following:

Zoning:

- 1. Please revise the Project Narrative to include a discussion of the use of the PCP district bonus provisions. Discussion should include the proposed bonus to be requested, the justification for the proposed bonus, calculations for the estimated value of the bonus, as well as a plan for community benefit related to the estimated value of the bonus. (Zoning Ordinance, Sec. 5.4008. and 7.1200.)
- 2. Please revise the project plans to demonstrate compliance with the setback and stepback requirements of the PCP zoning district. The setback requirement is a minimum of 25 feet from the curb line along N. Hayden Road. The stepback requirements starts at the minimum setback line. (Zoning Ordinance, Sec. 5.4007.D. & 5.4007.E.)
- 3. Please revise the project plans to include the calculations for floor area ratio (FAR) in compliance with the Zoning Ordinance, Sec. 5.4007.A.
- 4. The site and Core Apartments as part of case 19-ZN-2013 appears to not have complied with stipulation 7 "PEDESTRIAN CONNECTIONS. The site shall provide a minimum of three (3) pedestrian connections to existing properties surrounding the site. A minimum of one (1) connection having a minimum with of six (6) feet shall be provided to each of the west, south and east sides of the site. Pedestrian connections shall be reviewed and approved by

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city transportation staff." Please revise the project plans to identify compliance with these requirements.

- 5. Please submit a revised copy of the Citizen Review Report summary to include details of the most recent public outreach efforts, including any additional public comments that may have been received. (Zoning Ordinance, Sec. 1.305.C.2.b.)
- 6. Please provide conceptual elevations in conformance with the district requirements with the next submittal. (Zoning Ordinance, Sec. 1.303.)

2001 General Plan & Greater Airpark Character Area Plan (GAPCAP) Analysis:

7. The first submittal narrative/ development master plan- a document that is intended to provide overall coordination of urban design character, buffering to adjacent uses, transportation systems, and infrastructure necessary for the proposed development – includes unnecessary/oppositional statements that are not material in any manner to the application request; please see applicant responses to General Plan Growth Area Element Goal #2, Bullet #1, and Community Mobility Element Goal #5, Bullet#3 regarding light-rail transit and equestrians. Please revise the Project Narrative to include only necessary statements are in direction relation to the proposed development be included in the development master plan upon resubmittal.

To this end, please ensure that responses that are completed with "refer to prior responses" (found throughout the document) indicate by numerical identification, and page number, reference to the response the applicant is directing the reader to. Additionally, please remove responses that indicate "not applicable".

8. The General Plan Character and Design Element (Goal 4, bullets 10, 14, and 15) encourage "streetscapes for major roadways that promote the city's visual quality and character; and blend into the character of the surrounding area. The Greater Airpark Character Area Plan Character and Design Element (Goal CD2, Policy CD 2.1.6, CD 2.2, and CD2.7), and Economic Vitality Element (Goal 5, bullet 6) promotes vibrant Signature Corridors in the Greater Airpark to provide a distinct identify and design theme in the area. Although the first submittal discusses Hayden Road being designated as a Signature Corridor, there appears to be no indication as to what that means as a result of this development proposal – details of such are expected of a formal Development Plan. Please note Hayden Road at the subject site's frontage is a designated Signature Corridor and Buffered Roadway – an area in which 50' foot minimum setback, measured from back of curb line, is expected to be maintained as per CD2.7 of the GACAP.

Please respond both graphically and narratively as to how the proposed development will provide this dimension and enhance the Streetscape in response to the cited considerations. Please consider additions of areas of pedestrian lighting, public art, bus shelters, and other public amenities to enhance the pedestrian environment and streetscape.

- Please respond to Goal 10, along with any applicable bullets, of the of the General Plan Preservation and Environmental Planning Element, and Goal EP5 of the Greater Airpark Character Area Plan addressing how the proposed development may, if at all, utilize green building alternatives that support sustainable desert living.
 - a. Please note, Scottsdale is progressively attempting to install in capital projects, and request from private development applications, Low Impact Development (LID) and Green Infrastructure (GI) as a method of stormwater control, water harvesting, and

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cleansing for the first flush requirements of the City's Floodplain Ordnance. Accordingly, please consider utilization of this resource. More information on this initiative can be found at:

https://sustainability.asu.edu/sustainable-cities/resources/lid-handbook/

10. As a respond to Goal 1 of the Community Involvement Element, with a resubmittal, please provide an updated Citizen Involvement Report that describes the key issues that have been identified through the public involvement process.

Fire:

- 11. Please revise the project plans to demonstrate hydrant spacing, existing and proposed (Fire Ord. 4283, 507.5.1.2)
- 12. Please revise the project plans to demonstrate the location of Fire Department Connection(s). (Fire Or. 4283, 912)

Drainage:

13. Please submit a copy of the revised Drainage Report with the remainder of the resubmittal material identified in Attachment A. Please see comments within the red-lined 1st submittal of the Drainage Report and Preliminary G&D and address accordingly.

Water and Wastewater:

- 14. Please submit a revised Water and Wastewater Design Report with the remainder of the resubmittal material identified in Attachment A. Please see comments within the red-lined 1st submittal of the Report. The Preliminary Basis of Design Report must be accepted by the Water Resources Department prior to scheduling of first hearing of project.
- 15. Please submit flow monitoring results of northern 8-inch sewer in Hayden Road with next submittal.

Airport:

16. The subject site is within Airport noise compatibility study AC-2 area. Please note that a signed Avigation Easement along with the required legal descriptions and graphic, and a copy of the Noise Disclosure statement will be required with the final plans submittal.

Engineering:

- 17. All waste shall be placed in suitable containers to facilitate waste removal in a sanitary condition. Please revise the project plans accordingly. (SRC, Sec. 24-13)
- 18. Off-site transportation, stormwater and water resources improvements along property frontages to existing supporting infrastructure, with associated dedications, is required. Please update the project plans accordingly. (SRC, Sec. 48-7, 47-10 & 49-219)

Significant Policy Related Issues

The following policy related issues have been identified in the first review of this application. While these issues may not be critical to scheduling the application for public hearing, they may affect the City Staff's recommendation pertaining to the application and should be addressed with the resubmittal of the revised application material. Please address the following:

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Transportation:

- 19. The entry drive should be redesigned to be in conformance with COS Standard Detail #2257, CH-2. The proposed raised median creates offset lanes alignments with the existing driveway to the northwest. An entry drive of 48 feet of pavement width transitioning to 55 feet is unnecessary. Please revise the project plans accordingly. (DSPM, Sec. 5-3.200 & 5-3.205)
- 20. The north end of the site is designed poorly. The driveway leading from Hayden Road directs vehicles into the pedestrian courtyard. The short turning radius on the site drive leading to this driveway will create issues with vehicle queuing and blocking inbound traffic. Please revise the project plans to correct these issues. (Zoning Ordinance, Sec. 1.204.)

Traffic Study:

- 21. Transportation staff is not fully supportive of the installation of a traffic signal at 84th Street/Hayden Road due to signal spacing. The proposed change from a church to offices and restaurants result in ~ 4x the daily and AM peak hour trips generated and ~10X the PM peak hour trips generated. This has profound impacts on traffic, particularly at the 84th Street/Hayden Road intersection. Signalization was not intended/planned for this location. DSPM 5-3.123 G3 indicates that "At Minor Arterial/Minor Arterial (or smaller designated streets) intersections the designer should evaluate using a roundabout as an alternative to a traffic signal for all new or significantly rebuilt intersections." The TIMA appears to include no indication that a roundabout option was evaluated. Please address these issues with the next submittal. (DSPM, Sec. 5-3.123)
- 22. Please revise the traffic study to add a queue analysis for site driveways due to the substantial increase in projected trip generation as well as queue analysis for the intersection of 84th Street and Hayden Road due to the proposed control change (signalization). (Zoning Ordinance, Sec. 1.303.)
- 23. Please revise the traffic study to provide project site & total ADT on major street(s) within the study area. (DSPM, Sec. 5-1.701)
- 24. Page 31, 1st bullet (84th Street & Hayden Road), 3rd sentence the site plan depicts a redesign of the existing site driveway. The developer is responsible for correct alignment of their proposed new driveway to prevent negative offset of left turning vehicles. Should the intersection be signalized, the developer will be responsible for improvements associated with the traffic signal, including and not limited to providing a left turn lane on all approaches. Please revise the project plans to address this comment. (Zoning Ordinance, Sec. 1.204.)

Engineering:

- 25. Please review the Context Aerial with corrections provided by Engineering for existing easement conflicts that will need to be modified or released prior to permit issuance, including:
 - Any GLO easements in conflict with proposed development and not required by city LAIPS or TMP will need to be abandoned by property owner prior to any permit issuance. Specifically for this project, the supplied ALTA survey identified GLOs per the following recording information: docket 1443 page 63 and docket 3025 page 473. Please call out required abandonments on site plan. (DSPM, Sec. 1-2.400)

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- b. Water lines located outside of a public right-of-way or street tract must be placed in a minimum 20' wide easement:
 - i. Horizontally, a minimum of 6' is required between the water line and the edge of easement.
 - ii. The easement will be free of obstructions, shall not be in a fenced area, and shall be accessible always to city service equipment such as trucks and backhoes.
 - iii. Easements outside of paved areas shall have a 10' wide hardened patch with a cross-slope not greater than 10% and a longitudinal slope not greater than 20%. Hardened paths shall consist of native soil compacted to 95% to a depth of 1'.
 - iv. Revegetation within the easement shall consist of low growing shrubs. Update site plan accordingly.
- c. Existing cross access and emergency services access easement through project parcel to abutting parcel in conflict with proposed development will need to be relocated to provide cross access to southern and eastern abutting parcels. Please update the project plans accordingly. (DSPM, Sec. 5-3.201)
- 26. Please revise the project plans to comply with the following location and design requirements for non-residential, mixed-use, and multi-family residential refuse and recycling enclosures. Please locate and position the enclosure(s): (DSPM, Sec. 2-1.309)
 - a. A minimum of one (1) enclosure shall be provided for every 20,000 square feet of office/retail space.
 - b. So that the approach pad for the enclosure(s) is located that the refuse truck route to and from the public street has a minimum unobstructed vertical clearance of 13 feet 6 inches (14 feet is recommended), and unobstructed minimum vertical clearance above the approach pad and refuse enclosure of 25 feet. (The vertical clearances are subject to modification based on enclosure container size, location, and positioning as determined by the Sanitation Director, or designee.);
 - c. In a location that is easily accessible for collection, and does not require the refuse truck to "backtrack";
 - d. A maximum 100 feet distance from building service exit to refuse enclosure;
 - e. So that collection vehicles do not back up more than 35 feet;
 - f. So that the path of travel for the refuse truck accommodates a minimum vehicle turning radius of 45 feet, and a minimum length of 40 feet;
 - g. So that the approach pad is level, with a maximum of 2 percent slope;
 - So that the enclosure(s) are not placed between the on-site buildings and adjacent lower density residential unless there is no reasonable alternative. In these situations, orient the enclosure(s) towards the interior of the property;
 - i. So that the enclosure(s) are not placed next to drainage ways or basins, unless there is no reasonable alternative;
 - j. So that the enclosure(s) are not placed between the street and the front of the building, unless there is no reasonable alternative; and

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- k. So that the enclosure(s) are not placed at the end of a dead-end parking aisle.
- 27. Compactors may be used as an alternative to refuse or recycling containers. To determine adequacy and site location of compactors, if proposed, please provide the following on a refuse plan:
 - a. Compactor type,
 - b. Compactor capacity state on site plan compactor capacity conversion equating to the city's required 1 enclosure for every 20,000 square feet with no recycling,
 - c. Compactor location, addressing the following:
 - i. Place the refuse compactor container and approach pad so that the refuse truck route to and from the public street has a minimum unobstructed vertical clearance of thirteen (13) feet six (6) inches (fourteen (14) feet is recommended), and unobstructed minimum vertical clearance above the concrete approach slab and refuse compactor container storage area concrete slab of twenty-five (25) feet,
 - ii. Place the refuse compactor container in a location that does not require the bin to be maneuvered or relocated from the bin's storage location to be loaded on to the refuse truck,
 - iii. Provide a refuse compactor container approach area that has a minimum width of fourteen (14) feet and length of sixty (60) feet in front of the container, and
 - iv. Demonstrate path of travel for refuse truck accommodates a minimum vehicle turning radius of 45', and vehicle length of 40'.
- 28. Although not a requirement, recycling is an amenity found to be desired by Scottsdale residents. Please note if recycling containers will be provided for the development project.
- 29. Please revise the project plans with a 6' width accessible pedestrian route from the main entry of the development to each Hayden. (DSPM, Sec. 2-1.310)
- 30. Please revise the project plans to provide an eight (8) foot wide minimum, curb-separated sidewalk along the project boundary. (DSPM, Sec. 5-3.102 and 5-3.110)

Technical Corrections

The following technical ordinance or policy related corrections have been identified in the first review of the project. While these items are not as critical to scheduling the case for public hearing, they will likely affect a decision on the final plans submittal (construction and improvement documents) and should be addressed as soon as possible. Correcting these items before the hearing may also help clarify questions regarding these plans. Please address the following:

<u>Site</u>:

31. Please revise the project plans to identify pedestrian connections to the surrounding commercial businesses. (Zoning Ordinance, Sec. 1.303.)

Transportation:

32. Please revise the project plans to identify what measures will be provided to ensure a safe pedestrian crossing of the main entry drive. (Zoning Ordinance, Sec. 1.303.)

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33. The proposed entry drive is showing a raised median. Please note that this will require the reconstruction of the existing curb returns on Hayden Road. Please revise the project plans to identify this. (Zoning Ordinance, Sec. 1.204.)

Traffic Study:

- 34. Potential errors were noticed in the study which may not necessarily affect the final recommendations of the study nor necessitate a revised study. Please verify the following items prior to a future resubmittal:
 - a. Page 7, 3rd paragraph (Hayden Road), 1st Sentence Hayden Road is a minor arterial within the vicinity of the site, not a major arterial.
 - b. Page 7, 4th paragraph (83rd Place), 2nd & 3rd sentences these two sentences likely belong in the next paragraph (83rd Way/Costco Driveway) Please verify.
 - c. Page 7, 5th paragraph (83rd Way/Costco Driveway), 2nd & 3rd sentences these two sentences likely belong in the prior paragraph (83rd Place). Please verify.
 - d. Page 8, 4th paragraph (Costco/Hayden), last sentence missing "lane" after "deceleration".
 - e. Page 13-14, 83rd Place & Hayden Road, last sentence intersection is operating acceptably per DSPM 5-1.801 B.1, please verify recommendation to monitor the intersection.
 - f. Page 14, 2nd full paragraph (84th Street & Hayden Road), 2nd sentence. See DSPM 5-1.801 B for correct threshold requirements (Generally LOS D or better overall, individual/approach should be LOS D or better, must be LOS E or better). This comment may be applicable to other locations that are not marked. Please revise the Traffic Study and project plans to address this.

Other:

35. Please revise the Zoning Boundary Exhibit to include half of the right-of-way for N. Hayden Road as it fronts the site. All zoning boundaries include adjacent right-of-way. (Zoning Ordinance, Sec. 1.303.)

Please resubmit the revised application requirements and additional/supplemental information identified in Attachment A, Resubmittal Checklist, and a written summary response addressing the comments/corrections identified above as soon as possible for further review. The City will then review the revisions to determine if the application is to be scheduled for a hearing date, or if additional modifications, corrections, or additional/supplemental information is necessary.

PLEASE CALL 480-312-7767 TO SCHEDULE A RESUBMITTAL MEETING WITH ME PRIOR TO YOUR PLANNED RESUBMITTAL DATE. DO NOT DROP OFF ANY RESUBMITTAL MATERIAL WITHOUT A SCHEDULED MEETING. THIS WILL HELP MAKE SURE I'M AVAILABLE TO REVIEW YOUR RESUBMITTAL AND PREVENT ANY UNNECESSARY DELAYS. RESUBMITTAL MATERIAL THAT IS DROPPED OFF MAY NOT BE ACCEPTED AND RETURNED TO THE APPLICANT.

The Planning & Development Services Division has had this application in review for 28 Staff Review Days since the application was determined to have the minimal information to be reviewed.

19-ZN-2013#2

These **1**st **Review Comments** are valid for a period of 180 days from the date on this letter. The Zoning Administrator may consider an application withdrawn if a revised submittal has not been received within 180 days of the date of this letter (Section 1.305. of the Zoning Ordinance).

If you have any questions, or need further assistance please contact me at 480-312-7713 or at bcarr@ScottsdaleAZ.gov.

Sincerely,

Bral Com

Brad Carr, AICP Principal Planner

ATTACHMENT A Resubmittal Checklist

Case Number: 19-ZN-2013#2

Please provide the following documents, in the quantities indicated, with the resubmittal (all plans larger than $8 \frac{1}{2} \times 11$ shall be folded):

Digital submittals shall include one copy of each item identified below.

One copy:	COVER LETTER – Respond to all the issues identified in the first review comment
	letter.
One copy:	Revised Narrative for Project

One copy: Revised Traffic Impact Mitigation Analysis (TIMA)

Context Aerial with the proposed Site Plan superimposed

	Color	1	24" x 36"	11" x 17"	8 ½" x 11"
\boxtimes	Site Plan:				
	1	_ 24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Open Space Pl	an:			
	1	_ 24" x 36"	. <u></u>	11" x 17"	8 ½" x 11"
\boxtimes	Elevations:				
	Color	1	24" x 36"	11″ x 17″	8 ½" x 11"
	B/W	1	24" x 36"	11" x 17"	8 ½" x 11"
\boxtimes	Elevation Wor	<u>ksheet(s):</u>			
	1	_ 24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Perspectives:				
	Color	1	24" x 36"	11" x 17"	8 ½" x 11"
\boxtimes	Color Site Plan	<u>:</u>			
	Color	1	24" x 36"	11" x 17"	8 ½″ x 11″

19-ZN-2013#2 8/8/2019 Landscape Plan:

	B/W	1	_ 24" x 36"	11"	x 17"	8 ½" x 11"
\boxtimes	Site Cross Sec	tions:				
	1	24" x 36"		11" x 17"		8 ½" x 11"
\square	Preliminary G	rading & Dra	ainage Plan:			
	1	24" x 36"		11" x 17"		8 ½" x 11"
\boxtimes	Pedestrian & Y	Vehicular Ci	rculation Plan			
	1	24" x 36"		11" x 17"		8 ½" x 11"
\boxtimes	Dimensioned Zoning Boundary Exhibit					
	1	24" x 36"		11" x 17"		8 ½" x 11"
\boxtimes	Slope Analysis	(superimpo	osed on a topogi	<u>aphy map)</u>		
	Development The Developm			lipped together	separately, an	d not be bounded.
	Color		_ 11" x 17"	1 8 1/2	" x 11"	
			or copy on archi sion hearing.)	val (acid free par	per) (To be sul	bmitted after the

Technical Reports: Please include one (1) digital copy of each report

□ _ _ _ copy of Revised Drainage Report

 \square <u>1</u> copy of Revised Water and Wastewater Design Report

<u>Resubmit the revised Drainage Report and Water and Wastewater Design Report to your Project</u> <u>Coordinator.</u>

> 19-ZN-2013#2 8/8/2019

Tove White

From:	Ostler, Douglas <dostler@scottsdaleaz.gov></dostler@scottsdaleaz.gov>
Sent:	Monday, July 29, 2019 11:58 AM
То:	Tove White
Cc:	Kercher, Phillip; Guntupalli, Kiran; Carr, Brad
Subject:	Core Center Traffic Study Comments, 19-ZN-2013 #2

Tove,

Transportation staff had additional discussions and review of the proposed CORE Center project and associated TIMA. In addition to the comments already provided, please address the following items related to evaluation of appropriate traffic control at the 84th Street and Hayden Road intersection:

- Please use the 24-hour counts that were collected at the 84th Street and Hayden Road intersection for evaluating the signal warrants in existing conditions.
- A reduction for right turning traffic is expected to be applied to the minor street approach volumes (see MUTCD Section 4C.01 Paragraph 8).
- Staff recommends consideration of restricting left turns out of the driveway as an alternative to signalization, even if signal warrants are met (see MUTCD Section 4B.04 Paragraph 2J). This restriction would be for the driveway by means of a pork-chop median or channelization, etc.; 84th Street would remain full access.
 - Note: this does not retract comment 21 in the comment letter. You may state the circumstances and/or reference discussion(s) indicating compliance with DSPM 5-30123 G3.
- Correct reference to Sarival Avenue (instead of Hayden Road) on page 17 of the study.
- Using the 24-hour counts that were collected at the 84th Street and Hayden Road intersection, state the 24-hour volume on Hayden Road in existing conditions as well as the projected ADT added by the site.

Thanks!

Doug Ostler -- Traffic Engineer Office: 480-312-7250 Direct: 480-312-7724



Trip Generation Comparison and Analysis 2nd Submittal

15301 North Hayden Road Scottsdale, Arizona

August 2019 Project No. 19-0480

Prepared For: **Impact Church** 9943 E. Bell Road Scottsdale, Arizona 85260

For Submittal to: The City of Scottsdale

Prepared By:



10605 North Hayden Road Suite 140 Scottsdale, Arizona 85260 480-659-4250

> 19-ZN-2013#2 8/8/2019

CORE CENTER TRIP GENERATION AND LEVEL OF SERVICE ANALYSIS 2ND SUBMITTAL

15301 North Hayden Road Scottsdale, Arizona

Prepared for:

Impact Church 9943 E Bell Road Scottsdale, AZ 85260

For Submittal to:

City of Scottsdale

Prepared By:



CivTech Inc.

10605 North Hayden Road Suite 140 Scottsdale, Arizona 85260 Office: (480) 659-4250 Fax: (480) 659-0566



August 2019

CivTech Project No. 19-0480

19-ZN-2013#2 8/8/2019

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EXECUTIVE SUMMARY

CORE CENTER is an approximately 194,000-square foot mixed-use (restaurant/retail/office) development project proposed for a 6.62-acre parcel located along the southeast side of Hayden Road, between 83rd Way and Northsight Boulevard in Scottsdale Arizona, property previously proposed in conjunction with plans for the now developed (multi-family residential) parcel to the south, as the relocation site for Impact Church. The previously proposed ("Hayden One") development plan proposing church and multi-family residential uses was approved by the City in 2014.

Two existing driveways will provide access to CORE CENTER; a full movement driveway located directly across from 84th Street and a right in/right out only driveway located approximately 350 feet east of 84th Street. The 84th Street driveway currently serves as the only point of access for the adjacent multi-family development; ultimately CORE CENTER and the multi-family developments will share both driveways.

Since a full Traffic Impact and Mitigation Analysis (TIMA) of developing the project site and adjacent multi-family parcel in accordance with the Hayden One development plan has already been performed by CivTech and approved by the City (as part of the above-referenced 2014 approval), the City has not asked that a full TIMA be performed for the CORE CENTER development proposal. Instead the City has indicated a less comprehensive analysis document (report) will satisfy the TIMA requirements for this project. Specifically, the City has asked that the analysis include a trip generation comparison between the Hayden One and CORE CENTER development plans, and that it address anticipated impacts of the CORE CENTER project on capacity and level of service (LOS) at each of the two proposed site access points and at the nearby roundabout intersection of Hayden Road and Northsight Boulevard. Consistent with the Hayden One TIMA, this report addresses the traffic impacts of the proposed development on weekday traffic conditions, exclusively.

The following conclusions have been documented in this report:

GENERAL

- The previously proposed Impact Church component of the Hayden One development had the potential to generate approximately 738 external trips over the course of a typical weekday, with 46 of those trips occurring during the AM peak hour (29 in/17 out) and 45 occurring during the PM peak hour (22 in/23 out).
- The currently proposed CORE CENTER mixed-use development has the potential to generate up to 4,406 external trips over the course of a typical weekday, with 183 of those trips occurring during the AM peak hour (150 in/33 out) and 426 occurring during the PM peak hour (199 in/227 out).
- The CORE CENTER plan has the potential to generate 3,668 more external trips daily, 137 more external trips during the AM peak hour (150 more inbound/16 more outbound) and 381 more external trips during the PM peak hour (177 more inbound/ 204 more outbound). Accommodating the additional weekday traffic that a mixed-use development of the intensity proposed with the CORE CENTER plan will require an alternate form of traffic control at the





intersection of 84th Street than the tw0-way stop sign control that exists today. Potentially viable alternatives considered in the course of completing this analysis and related communication with City staff included implementing turn restrictions (i.e. eliminating the existing opportunity to turn left out of the site onto southwest-bound Hayden Road), converting the intersection to a roundabout, and installing a traffic signal.

- The turn restriction alternative would effectively reassign the task of accommodating CORE SCOTTSDALE and CORE CENTER traffic wanting to head southwest on Hayden Road upon exiting the site, to another intersection. In other words, this option which involves construction of a raised channelizing island in the CORE SCOTTSDALE/CORE CENTER driveway such that the only allowable exit movement from the CORE SCOTTSDALE/CORE CENTER development becomes a right turn onto northeast-bound Hayden Road towards Frank Lloyd Wright Boulevard. Exiting CORE SCOTTSDALE/CORE CENTER traffic wanting to head southwest on Hayden Road would therefore first have to make a right turn onto northeast-bound Hayden Road, and then find an alternate route back to southwest-bound Hayden Road. It is anticipated most of the exiting traffic in this situation would attempt to make a northeast-to-southwestbound U-turn at the next closest median break to the northeast (adjacent to the Burger King/ Home Depot and Go AZ Motorcycles dealership driveways). Due to the limited curb to curb clearance on the southbound side of the Hayden Road median, U-turns cannot be made without either jumping curb on the opposite side of Hayden Road (evidence of which can be see all along this segment) or, traveling to the middle of the median break and using some of the intersecting driveway pavement. An exhibit illustrating the right turn followed by U-turn path of a passenger vehicle is provided with the 1st Review Comment Responses in **Appendix A**.
- From an operational standpoint, a roundabout is not out of the question dismissible based solely on the roundabout appropriateness benchmarks outlined in the City's Design Standards and Policies Manual (DSPM). Accordingly, a couple of geometric design concepts for converting this intersection to a roundabout have been prepared for consideration by the City and the CORE CENTER developer from a broader context. Further discussion of this alternative can be found in the *Traffic Impact and Improvements Analysis* section of this report, and exhibits illustrating each of the two roundabout design concepts prepared for the City's and applicant's consideration are provided with the 1st Review Comment Responses in **Appendix A**.
- \circ $\;$ Signalization is the most viable alternative of those considered.
 - Traffic volumes at this intersection already satisfy peak-hour warrant threshold volumes 3-4 hours a day, four-hour warrant threshold volumes 3-7 hours a day, and 8-hour warrant threshold volumes 3-8 hours a day depending in each case on whether the southbound approach is considered "one lane" as it is functioning today or, two lane, as it could be restriped to effect and depending further on how much right turn volume is deducted from the total minor approach volume before the threshold volume comparison is made.



- With the addition of CARMAX traffic to the southbound approach (traffic that did not exist when the traffic count data was collective for this analysis, but has since taken over the 4-acre previously vacant site on the northwest corner of the intersection) and the CORE CENTER traffic to the northbound approach, we fully anticipate peak hour and four hour warrants being fully satisfied, even with a significant percentage of right turn volume discounting. We further anticipate that eight-hour warrant threshold volumes will be satisfied at least four hours a day and as many as eight hours a day by the time CORE CENTER is fully built out and leased.
- Based on intersection capacity and LOS analysis performed using the City's signal phasing and timing, it is reasonable to expect the City will continue to give priority to through traffic on Hayden Road over turning movement traffic on intersecting side street and driveway approaches and that, as such, signalizing this intersection is not going to eliminate long delays for traffic wanting to turn left onto Hayden Road from 84th Street during peak hours; it should however, facilitate significantly shorter average delays to side street traffic than would leaving the existing stop sign control in place.
- Based on the understanding that the City is planning to convert the Hayden/Raintree intersection to a roundabout in the not too distant future, there will be an approximately one-mile stretch of Hayden Road with continuous flow endpoint intersections and either one or two signalized intersections in between. It seems therefore that the significance of the quarter-mile spacing of this signal from the 83rd Place and Hayden Road signal may not be as significant as it would be along a longer stretch of arterial with regularly spaced signals.

EXISTING CONDITIONS

- All intersections considered in this analysis currently operate with an overall level of service LOS D or better during both peak hours. The following intersections have one or more approaches operating with levels of service LOS E or LOS F.
 - The southbound left turn at the signalized intersection of **83rd Place and Hayden Road** operates at LOS E during the AM peak hour and LOS D/E during the PM peak hour. This is due primarily to a combination of a long cycle length (120 seconds), lack of a protected left turn phase for this movement (although there is one for the northbound left turn movement), and the traffic signals along Hayden Road appropriately favoring through traffic on Hayden Road over minor street approach traffic. Based on generally accepted left turn phase warranting criteria, (related to the product of left turn volumes on the subject approach and conflicting volumes on the opposite approach) a separate left turn phase is not yet warranted. CORE CENTER is not expected to add any volume to the southbound approach to this intersection. Being as the City has already recognized the need for and added separate left turn phasing for the northbound approach that when and if the City determines the



southbound approach needs protected left turn phasing as well, the City will make the change.

- The southbound movements at the unsignalized intersection of 84th Street and Hayden Road operate at LOS F during the PM peak hour. This is partly due to the centerline only striping on the north leg/southbound approach, even though 84th Street is wide enough to provide two southbound lanes while leaving a single, relatively wide northbound lane for traffic turning north onto 84th Street from Hayden Road, much of which is single unit truck traffic. It is therefore recommended that the southbound approach be restriped to designate an exclusive southbound left turn lane and a shared southbound through/right turn lane. Being as southbound through traffic is almost non-existent during most hours of the day, the shared lane will function like a right turn only lane which could at least reduce delays experienced by southbound right turn traffic.
- It will take more than restriping to cause more than a marginal improvement in level of service for southbound 84th Street traffic wanting to turn left onto Hayden Road. The larger cause of delay for traffic making these movements is the infrequency of adequate gaps in Hayden Road traffic during the PM peak hour due to the continuous westbound traffic flow effect of Hayden/Northsight roundabout. Signalizing the intersection is one option; however not the recommended option for the existing condition as, while under the current lane configuration on the southbound approach, existing volumes satisfy as many as three volume-based traffic signal warrants, they would satisfy fewer warrants under the recommended two-lane approach described above. Therefore, restriping the southbound approach is the only recommended mitigation for existing traffic conditions at this intersection.
- At the signalized intersection of Hayden Road and Frank Lloyd Wright Boulevard, eastbound left turns, northbound left turns and southbound left turns movements all operate in the LOS E range during one or both peak hours. This is to be expected at a large, very busy intersection that is located within 700 feet of a very busy traffic interchange. Recognizing that the City can monitor and adjust the allocation of green time at this intersection remotely and in near real time as needed to maximize its efficiency, and that analysis results do not indicate that traffic at this intersection is queuing back to the point that it is interfering with traffic operations at other intersections, no further mitigation is recommended.

OPENING YEAR CONDITIONS

- The proposed development is expected to have very little impact on capacity, level of service or delay at any study area intersection except for the intersection of 84th Street and Hayden Road.
- The southbound left turn at the signalized intersection of 83rd Place and Hayden Road will continue to operate at LOS E during the AM peak hour and LOS D/E during the PM peak hour until and unless signal timing is adjusted and/or a protected phase for southbound left turn



movements is added to the signal operation; however there is no indication either of these measures will become warranted in the context of the City's overall objectives for this intersection by the addition of CORE CENTER traffic to the area.

- The southbound movements at the unsignalized intersection of 84th Street and Hayden Road will continue to operate at LOS E or LOS F during the PM peak hour without an alternate form of traffic control to the existing stop sign control on northbound and southbound approaches. A comprehensive assessment of four intersection traffic control alternatives (1) retaining the two-way stop control, (2) adding turn restrictions to eliminate outbound left turn movements at the CORE SCOTTSDALE/CORE CENTER driveway, (3) converting the intersection to a roundabout and (4) signalizing the intersection, indicate that signalization is most appropriate alternative for the post-development condition. Regardless of which of these alternatives is ultimately pursued, restriping of both northbound and southbound applicant's civil engineer and site architect, curb line and striping geometry has been developed that will facilitate though and left turn lane alignment across 84th Street under either a full movement, two-way stop sign controlled (not recommended) or, signal controlled scenario. The recommended geometry is reflected on the current site plan.
- The proposed widening of the 84th Street aligning CORE SCOTTSDALE/CORE CENTER driveway will cut into the existing right turn deceleration lane on the eastbound approach to this driveway such that the resultant striped portion of the turn lane will be approximately 84 feet, less than the City's standard turn lane length minimum of 100 feet. However, the approach taper portion of the existing turn lane is approximately 120 feet long, 30 feet longer than the City's standard Detail 2225, and the existing turn lane adjacent to the turn lane stipe is approximately 12 feet wide (a foot wider than the City's 11 foot-wide standard. This being the case, the length of that portion of the turn lane that will remain after the widening of the CORE SCOTTSDALE/CORE CENTER driveway that is at least 11 feet wide, clear of the adjacent through lane will be well over 100 feet long, meaning that no extension of the turn lane will be necessary to comply with the critical elements of the City's turn lane standards.
- The northwest-bound (Northsight Boulevard) approach of the roundabout at Northsight Boulevard and Hayden Road is expected to operate at LOS E during the PM peak hour in the opening year with the Project. with a volume to capacity ratio (V/C) of 0.89 for the northbound left turn movement. This intersection operates efficiently during most hours of the day and the surrounding area is largely built out so no mitigation is recommended for the opening year condition.



INTRODUCTION

CORE CENTER is an approximately 194,000-square foot mixed-use (restaurant/retail/office) development project proposed for a 6.62-acre parcel located along the southeast side of Hayden Road, between 83rd Way and Northsight Boulevard in Scottsdale Arizona. A vicinity map identifying the site from both a regional and local (roadway network) context is provided in **Figure 1**. The subject property, originally developed as an auto dealership (which has since been razed) was more recently proposed in conjunction with plans for the now developed (multi-family residential) parcel to the south, as the relocation site for Impact Church. The previously proposed ("Hayden One") development plan was approved by the City in 2014.

Two existing driveways will provide access to CORE CENTER; a full movement driveway located directly across from 84th Street and a right in/right out only driveway located approximately 350 feet east of 84th Street. The 84th Street driveway currently serves as the only point of access for the adjacent multi-family development; ultimately CORE CENTER and the multi-family developments will share both driveways.

STUDY REQUIREMENTS

Since a full Traffic Impact and Mitigation Analysis (TIMA) of developing the project site and adjacent multi-family parcel in accordance with the Hayden One development plan has already been performed by CivTech and approved by the City (as part of the above-referenced 2014 approval), the City has not asked that a full TIMA be performed for the CORE CENTER development proposal. Instead the City has indicated a less comprehensive analysis document (report) will satisfy the TIMA requirements for this project. Specifically, the City has asked that the analysis include a trip generation comparison between the Hayden One and CORE CENTER development plans, and that it address anticipated impacts of the CORE CENTER project on capacity and level of service (LOS) at each of the two proposed site access points and at the nearby roundabout intersection of Hayden Road and Northsight Boulevard. Consistent with the Hayden One TIMA, this report addresses the traffic impacts of the proposed development on weekday traffic conditions.

The specific objectives of the study are:

- To quantify the trip generation potential of the CORE CENTER project and compare that potential to what the Project site would have generated if developed to serve as the relocated site of Impact Church as previously proposed.
- To determine whether the existing street system and traffic controls within the study area are adequate to accommodate existing peak hour traffic demands and if and significant deficiencies are identified, to recommend potentially viable mitigation measures.
- To determine whether the existing street system and traffic controls within the study area are adequate to accommodate the increase in traffic that will be caused by the CORE CENTER development.
- and if and significant deficiencies are identified, to recommend potentially viable mitigation measures.





STUDY AREA

The study area generally extends along Hayden Road, from 83rd Place to the southwest to Frank Lloyd Wright Boulevard to the northeast. The following specific intersections along Hayden Road have been analyzed for this report:

- 83rd Place & Hayden Road
- 83rd Way/Costco Driveway & Hayden Road
- 84th Street & Hayden Road
- Project Site Northeast Access & Hayden Road
- Burger King Driveway & Hayden Road
- Northsight Boulevard & Hayden Road
- Hayden Road & Frank Lloyd Wright Boulevard

HORIZON YEAR

The horizon year considered in this analysis is the anticipated opening year of the project, 2020. For the purposes of this analysis, it was assumed that full buildout and occupancy of the CORE CENTER project could be reached in the opening year.




CORE CENTER - Trip Generation Comparison and Analysis

Figure I: Vicinity Map CivTech 19-ZN-2013#2

8/8/2019

EXISTING CONDITIONS

LAND USE

The Project site is currently vacant of any vertical development. The off-site portions of both proposed site access drives have already been constructed. The on-site portion of the main access drive is largely complete all the way south to the adjacent multi-family parcel and currently serves as the only access for that (CORE SCOTTSDALE apartments) development. In addition to the apartments which were recently developed on the property to the south, land use in the immediately surrounding area includes a Home Depot store and a Burger King restaurant directly to the east, a Costco store directly to the west, and a U-Haul Center and other auto related uses along 84th Street across Hayden Road to the north. The Scottsdale Municipal Airport is located approximately 0.3 miles northwest of the site. The Loop 101/Frank Lloyd Wright traffic interchange is located approximately 0.6 mile (travel distance) to the northeast

EXISTING ROADWAY NETWORK

The existing roadway network within the study area includes Hayden Road, 83rd Place, 83rd Way, 84th Street, Northsight Boulevard and Frank Lloyd Wright Boulevard.

Hayden Road is a minor arterial street that runs generally north-south except in the vicinity of the Scottsdale airport (and the Project site) where it takes on an airport runway paralleling southwestnortheast alignment. Within the City of Scottsdale, Hayden Road is continuous from McKellips Road (on its true/80th Street alignment) to the south side of Frank Lloyd Wright Boulevard, on approximately the 87th Street alignment. Hayden Road picks up again on its true alignment on the north side of Frank Lloyd Wright Boulevard at the Greenway-Hayden Loop/Frank Lloyd Wright intersection and continues north continuously to just past Pinnacle Peak Road. Through the Scottsdale Airpark area, Hayden Road provides two vehicle lanes in each direction separated by a raised center median and sidewalk varying in width from six to eight feet along both sides. There are no bike lanes along this segment. The posted speed limit on Hayden Road within the vicinity of the site is 45 miles per hour (mph) and the current average daily traffic (ADT) volume in the immediate vicinity of 84th Street is approximately 18,900 vehicles per day.

83rd Way/Costco Driveway is a generally north-south local roadway within the vicinity of the site. Northwest of Hayden Road, there is one lane in each direction of travel, southeast of Hayden Road is a right-in/right-out driveway to Costco. 83rd Way begins northeast of Hayden Road at the intersection of 84th Street and continues southwest until transitioning to southeast and terminating at the intersection with Hayden Road. The posted speed limit is 25 mph. Current ADT count data for 83rd Way was not available at the time of this analysis.

83rd Place is a northwest-southeast local roadway within the vicinity of the site. Northwest of Hayden Road, there is one lane in each direction of travel, southeast of Hayden Road there is one lane in each direction of travel separated by a two-way-left-turn lane (TWLTL). 83rd Place begins northwest of Hayden Road and continues southeast until terminating just south of Raintree Drive. There is no posted speed limit on 83rd Place. Current ADT count data for 83rd Place was not available at the time of this analysis.



84th Street is a north-south local roadway within the vicinity of the site. There is one lane in each direction of travel. 84th Street begins at the existing apartment complex, located on the parcel of land bordering the proposed site to the south, and continues north for approximately 0.33 miles before terminating at a cul-de-sac just north of 83rd Way. There is no posted speed limit on 84th Street. Prior to the occupancy of the property on the northwest corner of the intersection of 84th Street and Hayden Road by CARMAX, 84th Street was carrying about 1700 vehicles per day. It is anticipated that with the move in of CARMAX, the ADT will rise to about 2,000 vehicles per day.

Northsight Boulevard is a generally north-south roadway classified as a major collector by the City of Scottsdale. North of Hayden Road, there is one lane in each direction of travel separated by a raised median in some locations and a painted median/two-way left turn lane in others. This segment of road provides a bypass for vehicles wanting to head west on Frank Lloyd Wright Boulevard while avoiding the congestion of the intersection of Hayden Road and Frank Lloyd Wright Boulevard. South of Hayden Road, there are two lanes and a bike lane in each direction of travel separated by a raised median. Northsight Boulevard begins at the intersection with Frank Lloyd Wright Boulevard and continues south until transitioning into Thunderbird Road, an east-west minor arterial roadway. The posted speed limit is 40 mph. Current ADT count data for this segment of Northsight Boulevard was not available at the time of this analysis.

Frank Lloyd Wright Boulevard is a generally east-west roadway classified as a major arterial by the City of Scottsdale. There are three lanes in each direction of travel separated by a raised median. Within the City of Scottsdale, Frank Lloyd Wright Boulevard begins at the intersection with Scottsdale Road and continues east until transitioning into 114th Street just north of Shea Boulevard. The posted speed limit is 45 mph. Current ADT count data for this segment of Frank Lloyd Wright Boulevard was not available at the time of this analysis.

EXISTING INTERSECTION CONFIGURATIONS

The intersection of **83rd Place and Hayden Road** is a four-legged signalized intersection with permissive-protected phasing on the northbound approach and permissive phasing on the southbound, eastbound and westbound approaches. Hayden Road is considered the east/west road at this intersection for the purposes of this analysis. The northbound approach consists of a dedicated left turn lane, one through lane and a dedicated right turn lane. The eastbound and westbound approaches each consist of a dedicated left turn lane, one through lane and a dedicated left turn lane and a shared through/right turn lane. The southbound approach consists of a dedicated left turn lane. The southbound approach consists of a dedicated left turn lane and a shared through/right turn lane. There are pedestrian crosswalks across all legs of the intersection.

The intersection of **Costco Driveway and Hayden Road** is a four-legged unsignalized intersection with stop sign controls on the northbound and southbound approaches; Hayden Road is considered the east/west road for the purposes of this analysis. The northbound approach consists of a dedicated right turn lane and a sign stating that left turns (onto westbound Hayden Road) are prohibited. Exiting Costco traffic has the option of exiting/turning right onto northbound 83rd Place and turning left with the help of a protected left turn phase at the signalized intersection of 83rd Place and Hayden Road. The westbound approach consists of a dedicated left turn lane, one through lane and one shared through/right turn lane. The southbound approach consists of one shared left





turn/through/right turn lane. The eastbound approach consists of one dedicated left turn lane, two through lanes and a dedicated right turn deceleration lane.

The intersection of **84th Street and Hayden Road** is a four-legged unsignalized intersection with stop sign controls on the northbound and southbound approaches; Hayden Road is considered the east/west road for the purposes of this analysis. The northbound approach consists of a dedicated left turn lane and a shared through/right turn lane. The westbound approach consists of a dedicated left turn lane, one through lane and one shared through/right turn lane. The southbound approach consists of a dedicated consists of a wide shared left turn/through/right turn lane. The eastbound approach consists of a dedicated left turn lane, two through lanes and a dedicated right turn deceleration lane.

The intersection of **Northeast Access and Hayden Road** is a three-legged unsignalized intersection with a stop sign control on the northbound approach; Hayden Road is considered the east/west road. The northbound approach consists of a dedicated right turn lane. The westbound approach consists of two through lanes. The eastbound approach consists of two through lanes and a dedicated right turn deceleration lane.

The intersection of **Burger King Driveway and Hayden Road** is a four-legged unsignalized intersection with stop sign controls on the northbound and southbound approaches; Hayden Road is considered the east/west road for the purposes of this analysis. The northbound and southbound approaches each consist of one shared left turn/through/right turn lane. The eastbound and westbound approaches each consist of a dedicated left turn lane, two through lanes and a dedicated right turn lane.

The intersection of **Northsight Boulevard and Hayden Road** is a four-legged yield-controlled roundabout; Hayden Road is the east/west road. The northbound approach consists of a shared left turn/through lane and a dedicated right turn lane. The eastbound and westbound approaches each consist of a shared left turn/through lane and a shared through/right turn lane. The southbound approach consists of one shared left turn/through/right turn lane. There are two-stage (and in the case of the south leg, three-stage) pedestrian crosswalks across all legs of the intersection.

The intersection of **Hayden Road and Frank Lloyd Wright Boulevard** is a four-legged signalized intersection with protected left turns on the eastbound and westbound approaches and split phasing on the northbound and southbound approaches; Hayden Road is the north/south road. The northbound approach consists of one dedicated left turn lane, one shared left turn/through lane and one dedicated right turn lane. The westbound approach consists of dual left turn lanes, three through lanes and a dedicated right turn lane. The southbound approach consists of a dedicated left turn lane and a shared through/right turn lane. The eastbound approach consists of a dedicated left turn lane, three through lanes and a dedicated right turn lane. The eastbound approach consists of a dedicated left turn lane, three through lanes and a dedicated right turn lane. The reastbound approach consists of a dedicated left turn lane, three through lanes and a dedicated right turn lane. The reastbound approach consists of a dedicated left turn lane, three through lanes and a dedicated right turn lane. The reastbound approach consists of a dedicated left turn lane, three through lanes and a dedicated right turn lane. There are pedestrian crosswalks across all legs of the intersection.

The existing intersection lane configurations and traffic controls are illustrated in **Figure 2**.







Figure 2: Existing Lane Configurations and Traffic Controls



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CORE CENTER - Trip Generation Comparison and Analysis

EXISTING TRAFFIC VOLUMES

CivTech engaged Field Data Services of Arizona, Inc. to record peak hour traffic volumes at each of the study intersections and 24-hour approach volumes at the intersection of 84th Street and Hayden Road. Peak hour volume turning movement counts were recorded from 7:00-9:00 AM and 4:00-6:00 PM on Tuesday, April 2, 2019. The approach counts were recorded on Thursday, April 25, 2019. The existing total daily two-way traffic volume on Hayden Road at 84th Street is approximately 18,700 vehicles per day, generally consistent with what the City recorded in 2016, per the City's periodically published segment traffic count map. The existing two-way traffic count on 84th Street north of Hayden Road is approximately 1,750 vehicles per day and the existing two-way traffic volume on the south leg of the 84th Street and Hayden Road accessing the CORE SCOTTSDALE apartment complex is approximately 1,300 vehicles per day. Existing peak hour traffic volumes are presented in **Figure 3** for the weekday AM and PM peak hours. Raw traffic count data sheets for both the peak hour and 24-hour counts are included in **Appendix B**.





Figure 3: Existing Traffic Volumes



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CORE CENTER - Trip Generation Comparison and Analysis

EXISTING LEVEL OF SERVICE ANALYSIS

Peak hour level of service analysis has been performed for the study intersections based on existing intersection lane configuration and using existing traffic volumes. All intersections have been analyzed using the methodologies presented in the *Highway Capacity Manual (HCM), Special Report 209,* and Updated 2016 and using Synchro software, version 10.0 under the HCM 6th edition methodology.

The concept of level of service (LOS) uses qualitative measures that characterize operational conditions within the traffic stream. The individual levels of service are described by factors that include speed, travel time, freedom to maneuver, traffic interruptions, and comfort and convenience. Six levels of service are defined for each type of facility for which analysis procedures are available. They are given letter designations A through F, with LOS A representing the best operating conditions and LOS F the worst. Each level of service represents a range of operating conditions. Levels of service for intersections are defined in terms of delay ranges. **Table 1** lists the level of service criteria for signalized and unsignalized intersections, respectively.

Level-of-Service	Unsignalized Control Delay (sec/veh)	Signalized Control Delay (sec/veh)
A	≤ 10	≤ 10
В	> 10-20	> 10-15
C	> 20-35	> 15-25
D	> 35-55	> 25-35
E	> 55-80	> 35-50
F	> 80 (or v/c > 1)	> 50 (or v/c > 1)

Table 1 – Level of Service Criteria for Controlled Intersections

Source: Exhibits 19-8, 20-2, 21-8, and 22-8, Highway Capacity Manual 2017

Synchro 10.0 software calculates the LOS per HCM 2016 methodology. The 2016 HCM documents the signalized LOS calculation methodology which takes into account lane geometry, traffic volumes and cycle length/phasing to compute LOS. Synchro analysis worksheets report individual movement delay/LOS and overall delay/LOS for signalized intersections; unsignalized intersection worksheets report the worst-case delay/LOS and the average overall intersection delay. Signal timing for the two existing signalized intersections were obtained from the City of Scottsdale. Results of the existing level of service analyses are shown in **Table 2** for both AM and PM peak hours. The existing signal timing sheets and the existing conditions analysis worksheets have been included in **Appendix C**.



ID	Intersection	Intersection	Approach/	Existing LOS	Mitigated LOS
1U	Intersection	Control	Movement	AM (PM)	AM (PM)
1	83 rd Place & Hayden Road	Signal	NB SB EB WB Overall	D (D) E (D) A (A) A (A) A (A)	[Not Mitigated]
2	Costco Driveway & Hayden Road	2-way stop (NB/SB)	NB Right SB Shared EB Left WB Left	B (C) C (A) A (A) A (C)	[Not Mitigated]
3	84 th Street & Hayden Road	2-way stop (NB/SB)	NB Left NB Thru/Right SB Shared SB Left SB Thru/Right EB Left WB Left	C (E) B (C) C (F) - (-) - (-) A (A) A (B)	C (E) B (C) - (-) C (F) B (B) A (A) A (B)
4	Northeast Access & Hayden Road	1-way stop (NB)	NB Right	- (-)	[Not Mitigated]
5	Burger King Driveway & Hayden Road	2-way stop (NB/SB)	NB Shared SB Shared EB Left WB Left	B (D) C (C) A (A) A (B)	[Not Mitigated]
6	Northsight Boulevard & Hayden Road	Roundabout	NB SB EB WB Overall	A (C) B (B) A (B) A (A) A (A)	[Not Mitigated]
7	Hayden Road & Frank Lloyd Wright Boulevard	Signal	NB SB EB WB Overall	D (D) E (E) E (D) C (C) D (D)	[Not Mitigated]

Table	2 –	Existing	Peak	Hour	Levels	of S	ervice	(LOS)
	_							()

The results of the existing conditions analysis summarized in **Table 2** indicates that all intersections operate with an overall level of service LOS D or better. The following intersections have one or more approaches operating with levels of service LOS E or LOS F.

• The southbound left turn at the signalized intersection of **83rd Place and Hayden Road** operates at LOS E during the AM peak hour and LOS D/E during the PM peak hour. This is due primarily to a combination of a long cycle length (120 seconds), lack of a protected left turn phase for this movement (although there is one for the northbound left turn movement), and the traffic signals along Hayden Road appropriately favoring through traffic on Hayden Road over minor street approach traffic. Based on generally accepted left turn phase warranting criteria, (related to the product of left turn volumes on the subject approach and



conflicting volumes on the opposite approach) a separate left turn phase is not yet warranted. CORE CENTER is not expected to add any volume to the southbound approach to this intersection. Being as the City has already recognized the need for and added separate left turn phasing for the northbound approach that when and if the City determines the southbound approach needs protected left turn phasing as well, the City will make the change.

- The southbound movements at the unsignalized intersection of 84th Street and Hayden Road operate at LOS F during the PM peak hour. This is partly due to the centerline only striping on the north leg/southbound approach, even though 84th Street is wide enough to provide two southbound lanes while leaving a single, relatively wide northbound lane for traffic turning north onto 84th Street from Hayden Road, much of which is single unit truck traffic. It is therefore recommended that the southbound approach be restriped to designate an exclusive southbound left turn lane and a shared southbound through/right turn lane. Being as southbound through traffic is almost non-existent during most hours of the day, the shared lane will function like a right turn only lane which could at least reduce delays experienced by southbound right turn traffic.
- It will take more than restriping to cause more than a marginal improvement in level of service for southbound 84th Street traffic wanting to turn left onto Hayden Road. The larger cause of delay for traffic making these movements is the infrequency of adequate gaps in Hayden Road traffic during the PM peak hour due to the continuous westbound traffic flow effect of Hayden/Northsight roundabout. Signalizing the intersection is one option; however not the recommended option for the existing condition as, while under the current lane configuration on the southbound approach, existing volumes satisfy as many as three volume-based traffic signal warrants, they would satisfy fewer warrants under the recommended two-lane approach described above. Therefore, restriping the southbound approach is the only recommended mitigation for existing traffic conditions at this intersection.
- At the signalized intersection of Hayden Road and Frank Lloyd Wright Boulevard, eastbound left turns, northbound left turns and southbound left turns movements all operate in the LOS E range during one or both peak hours. This is to be expected at a large, very busy intersection that is located within 700 feet of a very busy traffic interchange. Recognizing that the City can monitor and adjust the allocation of green time at this intersection remotely and in near real time as needed to maximize its efficiency, and that analysis results do not indicate that traffic at this intersection is queuing back to the point that it is interfering with traffic operations at other intersections, no further mitigation is recommended.

TRAFFIC SIGNAL WARRANT ANALYSIS

A traffic signal warrant analysis was performed for the intersection of **84th Street and Hayden Road**. The analysis has considered existing conditions as determined though collection of hourly traffic count data on each of the four approaches to his intersection April 2019 (raw data for which is included in **Appendix B**), and future conditions, with and without the proposed development using projected traffic volumes indicated in Figure 7 and Figure 8, with some additional consideration being given to the impact that the occupancy by CARMAX of the four-acre parcel on the northwest corner of the intersection will have on southbound approach traffic volumes. The traffic signal warrant



analysis was performed in accordance with standard traffic signal warranting criteria found in the *Manual on Uniform Traffic Control Devices, 2009 Edition* (MUTCD). The MUTCD describes eight conditions under which a traffic signal might be warranted, designated Warrants 1 through 8, and indicates that, "The investigation of the need for a traffic control signal shall include an analysis of the applicable factors contained in the [eight] traffic signal warrants and other factors related to existing operation and safety at the study location" while cautioning that, "The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal."

The MUTCD suggests that traffic control signals should not be installed unless one or more of the signal warrants are met. However, the satisfaction of a warrant or warrants is not in itself justification for a signal. Every situation is unique and warrant guidelines must be supplemented by the effects of specific site conditions and the application of good engineering judgment. Installation of a traffic signal should improve the overall safety and/or operation of an intersection and should be considered only when deemed necessary by careful traffic analysis and after less restrictive solutions have been attempted. It was this criterion to which the anticipated approach traffic volumes at the one (1) study intersection were compared to determine whether or not a traffic signal is currently warranted.

Warrant 1: Eight-Hour Vehicular Volume

The Eight-Hour Vehicular Volume Warrant is intended for locations where either of the following two conditions, or a combination of both, exist for each of any 8 hours of an average day and is, thus, the principal reason to consider the installation of a traffic signal: a large volume of intersecting traffic or traffic volumes so heavy on the major street that entering vehicles suffer extensive delay or conflict.

Condition A: Minimum Vehicular Volume

Condition A, the Minimum Vehicular Volume, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal. The need for a traffic control signal shall be considered if the vehicles per hour given in both of the 100 percent columns of Condition A in **Table 4C-1** of the MUTCD (reproduced below) occur on the major-street and the higher-volume minor-street approaches, respectively, to the intersection for each of any 8 hours of an average day.

Condition B: Interruption of Continuous Traffic

Condition B, the Interruption of Continuous Traffic, is intended for application at locations where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street. The need for a traffic control signal shall be considered if the vehicles per hour given in both of the 100 percent columns of Condition B in **Table 4C-1** of the MUTCD occur on the major-street and the higher-volume minor-street approaches, respectively, to the intersection for each of any 8 hours of an average day.

Combination of Conditions: A and B

The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the





traffic problems. The need for a traffic control signal shall be considered if the vehicles per hour given in both of the 80 percent columns of Conditions A and Condition B in **Table 4C-1** of the MUTCD occur on the major-street and the higher-volume minor-street approaches, respectively, to the intersection for each of any 8 hours of an average day.

Condition A—Minimum Vehicular Volume										
						Vehicles per hour on higher-				
Number of lanes	for	Vehicles	per hou	ir on ma	jor street	volume				
moving traffic on	each approach	(total of	both ap	proache	s)	minor-s	•	proach	n (one	
						directio	n only)			
<u>Major Street</u>	Minor Street	<u>100%</u> ^a	<u>80%^b</u>	<u>70%</u> c	<u>56%</u> d	<u>100%</u> ^a	<u>80%^b</u>	<u>70%</u> c	<u>56%^d</u>	
1	1	500	400	350	280	150	120	105	84	
2 or more	1	600	480	420	336	150	120	105	84	
2 or more	2 or more	600	480	420	336	200	160	140	112	
1 2 or more		500	400	350	280	200	160	140	112	
Condition B— I	nterruption of (Continu	ous Tra	ffic						
						Vehicles	s per ho	our on h	nigher-	
Number of lanes	for	Vehicles per hour on major street				volume				
moving traffic on	each approach	(total of both approaches)			minor-street approach (one					
					direction only)					
Major Street	Minor Street	<u>100%</u> ^a	<u>80%^b</u>	<u>70%</u> c	<u>56%</u> ^d	<u>100%</u> ª	<u>80%^b</u>	<u>70%</u> c	<u>56%</u> ^d	
1	1	750	600	525	420	75	60	53	42	
2 or more	1	900	720	630	504	75	60	53	42	
2 or more	2 or more	900	720	630	504	100	80	70	56	
1	2 or more	750	600	525	420	100	80	70	56	

^a Basic minimum hourly volume.

^b Used for combination of Conditions A and B after adequate trial of other remedial measures.

^c May be used when the major-street speed exceeds 70 km/h or exceeds 40 mph or in an isolated community with a population of less than 10,000.

^d May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major- street speed exceeds 70 km/h or exceeds 40 mph or in an isolated community with a population of less than 10,000.



Warrant 2: Four-Hour Vehicular Volume



Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor) (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal. The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) all fall above the applicable curve in Figure 4C-2 (this and all other referenced figures are attached) for the existing combination of approach lanes.

Since the posted speed limit on Hayden Road exceeds 40 mph, Figure 4C-2 was used.



Warrant 3: Peak-Hour Vehicular Volume

The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. It shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.

The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:

- A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15minute periods) of an average day:
 - 1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach; or 5 vehicle-hours for a two-lane approach; and
 - 2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes; and
 - 3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.
- B. The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor-street approach (one direction only) for 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 or 4C-4 for the existing combination of approach lanes.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor) (COMMUNITY LESS THAN 10.000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

If the posted speed limit on the major street exceeds 40 mph, Figure 4C-4 may be used in place of Figure 4C-3 to satisfy the criteria in the second category of the Standard. Since the posted speed limit on Hayden Road is 45 mph, Figure 4C-4 was used for this analysis.



Signal warrant analyses results for the intersection of 84th Street and Hayden Road indicate that under the current shared single lane configuration on the southbound approach, existing volumes satisfy as many as three volume-based traffic signal warrants, depending on how much of the right turn traffic volume is reduced before the threshold volume comparisons are made, and that under a two-lane southbound approach the peak hour volume warrant is met even if a significant percentage of right turn traffic is deducted before the threshold volume comparison is made. Worksheets used for the signal warrant analysis are included in **Appendix D**.



PROPOSED DEVELOPMENT

LAND USE & LOCATION

CORE CENTER is a 194,000-square foot mixed-use (restaurant/retail/office) development project proposed for a 6.62-acre parcel located along the southeast side of Hayden Road, between 83rd Way and Northsight Boulevard in Scottsdale Arizona. The subject property, originally developed as an auto dealership (which has since been razed) was more recently proposed in conjunction with plans for the now developed (multi-family residential) parcel to the south, as the relocation site for Impact Church. The previously proposed ("Hayden One") development plan was approved by the City in 2014.

SITE ACCESS

Two existing driveways will provide access to CORE CENTER; a full movement driveway located directly across from 84th Street and a right in/right out only driveway located approximately 350 feet east of 84th Street. The 84th Street driveway currently serves as the only point of access for the adjacent multi-family development; ultimately CORE CENTER and the multi-family developments will share both driveways. A current site plane, updated since the first submittal of this report to recognize the need for alignment of lanes across Hayden Road at 84th Street and to improve internal circulation along the internal access drive leading to the more northeasterly (right in/right out only) driveway is presented in **Figure 4.**





Figure 4: Site Plan and Access



CORE CENTER - Trip Generation Comparison and Analysis

TRIP GENERATION COMPARISON

The City has asked that a weekday daily and peak hour trip generation comparison be made between old (Hayden One) and new (CORE CENTER) development plans. Since the adjacent multi-family development is effectively a component of both old and new development plans, and because its actual trip generation potential is accounted for in the existing traffic conditions analysis, this comparison focuses on the differences between the previously proposed church and the currently proposed office/retail/restaurant mix, exclusively. The Hayden One TIMA assumed that the subject 6.62 acres would be developed to create an 81,000 square foot church. The current, CORE CENTER development plan proposes a mix of commercial uses, comprised of approximately 124,000 SF of general office space, 35,000 SF of retail space and 35,000 SF of quality restaurant space.

The trip generation potential of the CORE CENTER project was estimated for this analysis utilizing the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition and Trip Generation Handbook, 3rd Edition. The ITE Trip Generation Manual contains data collected by various transportation professionals for a wide range of different land uses. The data are summarized in the ITE Trip Generation Manual and average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each recognized land use. The Manual provides information for estimating daily and peak hour trips. The Trip Generation Handbook provides guidance in accounting for pass-by trips; internally captured trips which are trips that begin and end on-site due to the captive market effect of complimentary land uses within a single development; and trips made using alternate modes of transportation. The trip generation potential of the Impact Church as it was presented in the Hayden One TIMA was estimated using earlier editions of these publications but for the purpose of this analysis which is to compare what is now proposed to what was previously approved, the estimates presented in the approved Hayden One TIMA will be used. **Table 3** compares the weekday daily and peak hour trip generation potentials of previously approved land use to those of the currently proposed land use. Detailed trip generation calculations are provided in **Appendix E**.



				Trips Generated						
	ITE Size			Daily	AM Peak Hour			PM	PM Peak Hour	
Land Use	Code	Quantity	Units	Total	In	Out	Total	In	Out	Total
Previously Approv	Developn	nent Plan	,							
Church	560	81,000	SF	738	29	17	46	22	23	45
Т	otal Ex	ternal Vehic	le Trips	738	29	17	46	22	23	45
Currently Propose	d (COR	E CENTER)	Develop	ment Pla	n					
General Office	710	124,000	SF	1,308	123	20	143	22	118	140
Shopping Center	820	35,000	SF	1,322	20	13	33	64	69	133
Quality Restaurant	931	35,000	SF	2,934	22	4	26	183	90	273
		То	tal Trips	5,564	165	37	202	269	277	546
Internal Capture Reduction				(936)	(8)	(3)	(11)	(59)	(39)	(98)
	(222)	(7)	(1)	(8)	(11)	(11)	(22)			
т	4,406	150	33	183	199	227	426			
Trip Generat	Total External Vehicle Trips Trip Generation Increase /(Reduction)				+150	+16	+137	+177	+204	+381

As summarized in **Table 3**, the previously proposed Impact Church component of the Hayden One development had the potential to generate approximately 738 external trips over the course of a typical weekday, with 46 of those trips occurring during the AM peak hour (29 in/17 out) and 45 occurring during the PM peak hour (22 in/23 out). The currently proposed CORE CENTER mixed-use development has the potential to generate up to 4,406 external trips over the course of a typical weekday, with 183 of those trips occurring during the AM peak hour (150 in/33 out) and 426 occurring during the PM peak hour (199 in/227 out). The CORE CENTER plan has the potential to generate 3,668 more external trips daily, 137 more external trips during the AM peak hour (150 in/37 more inbound/16 more outbound) and 381 more external trips during the PM peak hour (177 more inbound/ 204 more outbound).



SITE TRIP DISTRIBUTION AND ASSIGNMENT

A single trip distribution pattern was assumed for the proposed development. It is expected that the proposed development will generate trips based on future population. A small percentage of the trips were assumed to be going to/coming from the existing apartment complex just south of the proposed CORE CENTER mixed-use development. The resulting trip distribution percentages for the study area are shown in **Table 4**.

Direction (To/From)	Percentage
West on Frank Lloyd Wright Boulevard (west of Northsight Boulevard)	20%
East on Frank Lloyd Wright Boulevard (east of Hayden Road)	35%
South on Northsight Boulevard (south of Hayden Road)	15%
South on 84 th Street (south of Hayden Road)	2%
West on Hayden Road (west of 83 rd Place)	18%
South on 83 rd Place (south of Hayden Road)	10%
Total	100%

Table 4 – Site Trip Distribution

Figure 5 illustrates the trip distribution percentages noted in **Table 4** on the roadway network within the study area. The percentages presented in **Figure 5** were applied to the site trips generated to determine the AM and PM peak hour site traffic at the intersections within the study area. **Figure 6** presents the resulting site generated traffic for the proposed development.





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Figure 6: Site Generated Traffic Volumes



CORE CENTER - Trip Generation Comparison and Analysis

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FUTURE BACKGROUND TRAFFIC

In order to estimate background traffic volumes, a growth rate was needed to estimate growth in ambient traffic, or traffic in the surrounding area not including new trips estimated to be generated by the site. A growth rate of 2% per year was found on Northsight Boulevard southeast of 87th Street. A 2% per year growth rate translates to a 1.02 growth factor for the opening year 2020. Along with growing the existing traffic counts, some of the existing northbound right turns at the 84th Street access point were re-routed to use the northeast right in/right out driveway since it can be reasonably assumed that some of the trips from the apartment will utilize this driveway to travel northeast on Hayden Road. Calculated background traffic volumes are presented in **Figure 7** and background traffic calculations are included in **Appendix F**.

TOTAL TRAFFIC

Total traffic was determined by adding the site generated traffic to the projected background traffic. Total peak hour traffic volumes for the opening year of 2020 are shown in **Figure 8**.





Figure 7: 2020 Background Traffic Volumes



CORE CENTER - Trip Generation Comparison and Analysis

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Figure 8: 2020 Total Traffic Volumes



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CORE CENTER - Trip Generation Comparison and Analysis

TRAFFIC IMPACT AND IMPROVEMENT ANALYSIS

Upon initial determination that existing traffic volumes at the 84th Street and Hayden Road intersection satisfy multiple traffic signal warrants and not anticipating that either the applicant or the City of Scottsdale would consider a roundabout to be a suitable alternative to traffic signal control at this intersection given that roundabouts are not generally considered appropriate for intersections where major street traffic flow is heavily favored over minor approach level of service, the traffic impact analysis upon which conclusions and recommendations represented in the first submittal version of this report was performed assumed stop sign control and traffic signal control were the only options the City would consider for this intersection. The City has since requested a more comprehensive understanding as to the appropriateness of a roundabout at this intersection as well as to the appropriateness of restricting certain turning movements to avoid the need for any other changes to the existing traffic signal control. Such analysis has now been performed and based on the results of the additional analysis traffic signal control continues to be the recommended form of traffic control for this intersection. Discussion of stop sign control without restricting turning movements, traffic signal control, roundabout control, and stop sign control with restricted turning movements are each addressed in this section of the report.

Results of intersection capacity analysis for this intersection and all other study intersections under both the minor approach stop sign controlled 84th Street and Hayden Road intersection scenario that exists today and the traffic signal controlled 84th Street and Hayden Road intersection scenario recommended for the post CORE CENTER development condition are summarized in **Table 5** and **Table 6**. Detailed worksheets documenting the 2020 opening year level of service analysis can be found in **Appendix G**.



		2020 Peak Hour LOS – Unmitigated 84 ^w St & Hayden Rd Alternative 2020 2020					
ID	Intersection	Traffic Control	Approach/ Movement	Without CORE CENTER LOS AM (PM)	With CORE CENTER LOS AM (PM)		
1	83 rd Place & Hayden Road	Signal	NB SB EB WB Overall	D (D) E (D) A (A) A (A) B (B)	D (D) E (D) A (A) A (B) B (B)		
2	Costco Driveway & Hayden Road	2-Way Stop (NB/SB)	NB Right Turn SB Left/Thru/Right EB Left Turn WB Left Turn	B (C) C (A) A (A) A (C)	B (C) C (A) A (A) A (C)		
3	84 th Street & Hayden Road	2-Way Stop (NB/SB)	NB Left Turn NB Thru/Right SB Left/Thru/Right EB Left Turn WB Left Turn	C (E) B (C) C (F) A (A) A (B)	C (F) B (D) D (F) A (A) A (C)		
4	Northeast Access & Hayden Road	1-way stop (NB)	NB Right Turn	A (A)	B (C)		
5	Burger King/Home Depot Driveway & Hayden Road	2-Way Stop (NB/SB)	NB Left/Thru/Right SB Left/Thru/Right EB Left Turn WB Left Turn	C (D) C (C) A (A) A (B)	C (D) D (C) A (A) A (B)		
6	Northsight Boulevard & Hayden Road	Roundabout	NB SB EB WB Overall	A (D) B (B) A (B) A (A) A (A)	A (E) B (C) A (B) A (B) A (B)		
7	Hayden Road & Frank Lloyd Wright Boulevard	Signal	NB SB EB WB	D (E) E (E) E (D) C (C)	D (E) E (E) E (D) C (C)		
			Overall	D (D)	D (D)		

The results of the Synchro analysis summarized in **Table 5** indicate that all intersections within the study area are expected to operate with overall acceptable levels of service LOS D or better in the opening year. The following intersection are expected to have one or more approaches operating at LOS E.

• The southbound left turn at the signalized intersection of **83rd Place and Hayden Road** will continue to operate at LOS E during the AM peak hour and LOS D/E during the PM peak hour



until and unless signal timing is adjusted and/or a protected phase for southbound left turn movements is added to the signal operation; however there is no indication either of these measures will become warranted in the context of the City's overall objectives for this intersection by the addition of CORE CENTER traffic to the area.

- The southbound movements at the unsignalized intersection of 84th Street and Hayden • Road will continue to operate at LOS E or LOS F during the PM peak hour without an alternate form of traffic control to the existing stop sign control on northbound and southbound approaches. A comprehensive assessment of four intersection traffic control alternatives – (1) retaining the two-way stop control, (2) adding turn restrictions to eliminate outbound left turn movements at the CORE SCOTTSDALE/CORE CENTER driveway, (3) converting the intersection to a roundabout and (4) signalizing the intersection, indicate that signalization is most likely to multiple alternative evaluation indicate that signalizing the intersection will be both warranted in, and the most appropriate alternative for the post-development condition. Regardless of which of these alternatives is ultimately pursued, restriping of both northbound and southbound approaches to the intersection will be needed. In the course of working with the applicant's civil engineer and site architect, curb line and striping geometry has been developed that will facilitate though and left turn lane alignment across 84th Street under either a full movement, two-way stop sign controlled (not recommended) or, signal controlled scenario. The recommended geometry is reflected on the current site plan.
- The northbound approach of the roundabout at **Northsight Boulevard and Hayden Road** is expected to operate at LOS E during the PM peak hour in the opening year with the Project. with a volume to capacity ratio (V/C) of 0.89 for the northbound left turn movement. This intersection operates efficiently during most hours of the day and the surrounding area is largely built out so no mitigation is recommended for the opening year condition.

Table 6 indicates how the recommended mitigation measures are anticipated to affect traffic conditions at the intersection of 84th Street and Hayden Road.



ID	Intersection	Traffic Control	Approach/ Movement	2020 Unmitigated LOS AM (PM)	2020 Mitigated LOS AM (PM)
		2-way stop (NB/SB)	NB Left Turn NB Thru/Right SB Left/Thu/Right EB Left Turn WB Left Turn	C (F/455.8) B (D) D (F/*) A (A) A (C)	- (-) - (-) - (-) - (-) - (-)
3	84 th Street & Hayden Road	Signal	NB Left Turn NB Thru/Right SB Left Turn SB Thru/Right EB Left Turn EB Through EB Right Turn WB Left Turn WB Thru/Right	- (-) - (-) - (-) - (-) - (-) - (-) - (-) - (-) - (-)	E/55.6 (E/58.1) E/56.5 (E/63.7) E/58.2 (E/75.2) E/53.7 (D) A (B) A (C) A (A) A (A) A (B) A (A)
			Overall	- (-)	A (B)

Table 6 – 2020 Peak Hour Level of Service – Unmitigated vs. Mitigated

The values in **Table 6** following the LOS E and LOS F indicators are the average delays, in seconds per vehicle, that would be experienced by drivers waiting to make the indicated movement through/across the intersection during the indicated time period. These values have been provided to emphasize the need for an alternate form of traffic control at this intersection to accommodate the proposed development. Average delay values for all movements during each peak hour under both mitigated (signal control) and unmitigated (stop sign control) conditions are provided in **Appendix G**. Proposed lane configurations and traffic controls are illustrated in **Figure 9**.

QUEUE LENGTH ANALYSIS

Adequate storage for the queuing of vehicles waiting to turn at an intersection or driveway should be provided as necessary to avoid spillback of turning adjacent through traffic lanes and/or upstream driveways or intersections. The only existing or proposed intersections where CORE CENTER traffic is expected to increase turning movement volumes significantly are the existing intersection of 84th Street and Hayden Road and the existing but not yet used intersection of the CORE CENTER northeast driveway and Hayden Road. A queuing analysis of opening year conditions to generate recommendations for minimum queue storage lengths for the various turning traffic lanes at these intersections. Turn lane storage recommendations were reached based on a combination of long-recognized but frequently overly conservation in the case of signalized intersections methodology documented in *A Policy on Geometric Design of Highways and Streets* (the AASHTO "Green Book"), as further described below and the results of the Synchro software assisted intersection level of service analysis which predicts and reports 50th-percentile queue storage lengths and 95th-percentile queue storage lengths that are considerate of the specific manner in which traffic signal phasing and



timing being employed along the study segment are impacting the production and frequency of suitable gaps for tuning movements to be made.

The AASHTO method for unsignalized intersections yields the queue length required to hold the average number of turning vehicles expected to arrive during a two-minute period of the higher turning movement peak hour.

Storage Length (unsignalized intersection) = [(veh/hr)/(30 periods/hr)] x 25 feet

The AASHTO method for signalized intersections used for this analysis yields the queue length that would be required to hold 1.5 time the average number of vehicles expected to arrive during a single signal cycle of the higher turning movement volume peak hour.

Storage Length (signalized intersection) = [1.5 x (veh/hr)/(cycles/hr)] x 25 feet

The projected 2020 total traffic volumes indicated in **Figure 8** were utilized for the queue storage calculations. Resultant turn lane storage provisions and recommendations are presented in **Table 7**.

	Assumed		Queue Storage Length, in Feet					
Intersection	Traffic Control	Turning Movement	Currently Provided ⁽¹⁾	AASHTO Calculated	HCM Calculated ⁽²⁾	Recommended		
84 th Street Driveway & Hayden Road	Signal	NB Left Turn SB Left Turn EB Left Turn WB Left Turn EB Right Turn	45 ft - 135 ft 140 ft 100 ft	175 ft 100 ft 25 ft 225 ft 75 ft	80 ft 115 ft 25 ft 80 ft 25 ft	175 ft 150 ft 135 ft 140 ft 100 ft		
Northeast Driveway & Hayden Road	1-way stop (NB)	EB Right Turn	130 ft	25 ft	25 ft	130 ft		

Table 7 – Site Access Turn Lane Queue Storage Requirements

(1) Measured from stop bar off 2019 aerial photos

(2) HCM 95th percentile queue as reported in Synchro analysis reports in vehicles/lane, multiplied by 25 feet per vehicle.

As summarized in **Table 7**, additional turn lane storage should be provided on the northbound, westbound and southbound approaches to the 84th Street and Hayden Road intersection to accommodate projected traffic volumes under a signalized intersection scenario. The additional left turn storage on the northbound (CORE CENTER) approach needed to comply with the **Table 7** recommendations will be provided with the Project according to the current conceptual site plan shown in Figure 4. The recommended southbound left turn storage length appears to be achievable by restriping 84th Street north of Hayden Road to a full three lane configuration for the first 150 feet north of Hayden Road (two southbound lanes – a left turn lane and a shared through/right turn lane and on northbound lane) and then transitioning back to a two lane configuration such that on street parking can continue to be permitted further to the north. A similar striping approach has been implemented along the paralleling segment of 83rd Place in order to provide designated southbound left turn storage at the 83rd Place/Hayden Road intersection.



As to consideration of a roundabout, we have evaluated the appropriateness of a roundabout from an operational perspective using the roundabout warranting benchmarks specified in Section 5-3.124 of the City's Design Standards and Policies Manual (DSPM) which reads, **"Roundabouts are most appropriate...**

1. at locations with high turning movements,

Assuming the traffic count data we were required to collect for this analysis was representative of typical weekday conditions prior to the occupancy of the northwest corner property (4.0-acre +/- APN 215-48-065F) by CARMAX, turning movement volume accounted for approximately 15% of total daily volume entering this intersection. With the addition of CARMAX traffic (estimated to add another 310 turning movements per day, with 24 being made during the am peak hour and 27 during the pm peak hour), we expect this percentage to increase to 16%. Once CORE CENTER traffic and another year of background traffic growth is taken into account, the turning movement percentage is likely to increase to approximately 26%. While 26% is certainly significant and would suggest that further consideration of roundabout appropriateness is warranted, it bears recognizing that 26% is nowhere near the 38-40% turning movement-to-total volume percentage that characterizes the Hayden/Northsight roundabout, a quarter-mile to the northeast.

2. where intersecting street traffic volume on the major street is less than ten times the volume on the minor street,

Assuming that the traffic count data we collected for this analysis is representative of typical weekday conditions prior to the occupancy of the northwest corner property by CARMAX, the number of vehicles entering the 84th Street and Hayden Road intersection from a major street (Hayden Road) approach is about 13 times that of vehicles entering from either of the two minor street approaches, well outside the range the City considers indicative on its own, of an intersection for which conversion to a roundabout should be considered further. However, with the addition of CORE CENTER traffic to the intersection, we expect the major-to-minor multiplier will drop to about 8%, within the City's indicated range of appropriateness for a roundabout.

3. and where safety is a primary concern."

Roundabouts are frequently recognized for their safety benefits particularly in the context of reducing the potential for head-on, right angle, and/or left turn collisions. Review of crash data provided by the City of Scottsdale indicates a total of nine (9) reported traffic accidents have occurred in the immediate vicinity of the 84th Street and Hayden Road intersection over the three-year period ending December 31, 2018, none of which resulted in a fatality or serious injury. Of the nine, one (1) was interpreted as a rear-end crash; three (3) were interpreted as side swipe crashes, two (2) were interpreted as left turn/angle accidents involving a northeast-bound driver attempting to turn left/north onto 84th Street being hit by an oncoming through vehicle traveling in the southwest-bound driver exiting the CORE SCOTTSDALE development attempting to turn left or right onto Hayden Road and getting hit by a driver traveling





northeast or southwest on Hayden Road; and one was interpreted as involving two vehicles traveling in the same direction but this was the extent to which the cause or effect could be determined.

Based on the accident history just described, several of the accidents may have been avoided if the intersection were configured as a roundabout but those same accidents might have been avoided if there were a traffic signal in place to periodically grant right of way to turning traffic. This accident history on it' own is not significant enough to characterize the intersection as unsafe and in need of alternate traffic control purely for safety reasons.

The above-described application of the City's roundabout warranting guidelines yielded results that suggest that the appropriateness of a roundabout in lieu of a traffic signal or any other traffic control alternative cannot be fully determined without more input from the various stakeholders in the outcome of this decision and without consideration of more than just operational factors. For this reason, and at the request of the applicant, we have also prepared a couple of preliminary geometric design concept exhibits which illustrate some of the physical impacts the conversion of this intersection to a roundabout would likely have. The exhibits are included with responses to first review comments, in **Appendix A**. Both exhibits describe a two-lane by one-lane roundabout similar in configuration to that which exists at Hayden Road and Northsight Boulevard. Both concepts avoid the need for right of way from the north/non-CORE CENTER side of the intersection. The primary difference between the two concepts is that the concept presented in Exhibit A1 has a 169-foot inscribed circle diameter (ICD), identical to that of the Hayden/Northsight Roundabout and the concept presented in Exhibit A2 has a 150-foot diameter ICD. The larger ICD concept allows the circulating path radius (R2) to remain within the City's' specified 15-20 mph design speed range but positioned to avoid any need for north side right of way, would cut fairly deep into the CORE CENTER site and likely cause need for significant adjustments to vertical elements of the site plan, including the building proposed for location on the southeast quadrant of this intersection. The smaller ICD concept reduces the extent to which the intersection would need to be pushed south (and off of its current alignment) yet allows 22 mph travel along the R2 segment of the fastest path through the roundabout, higher than the City's standards support but still well within the range supported by nationally recognized (NCHRP Report 672 standards).

The City has also asked that this analysis consider a turn restriction alternative. The turn restriction alternative would effectively reassign the task of accommodating CORE SCOTTSDALE and CORE CENTER traffic wanting to head southwest on Hayden Road upon exiting the site, to another intersection. In other words, this option which involves construction of a raised channelizing island in the CORE SCOTTSDALE/CORE CENTER driveway such that the only allowable exit movement from the CORE SCOTTSDALE/CORE CENTER development becomes a right turn onto northeast-bound Hayden Road towards Frank Lloyd Wright Boulevard. Exiting CORE SCOTTSDALE/CORE CENTER traffic wanting to head southwest on Hayden Road would therefore first have to make a right turn onto northeast-bound Hayden Road. It is anticipated most of the exiting traffic in this situation would attempt a northeast-to-southwest-bound U-turn at the next closest median break to the northeast (adjacent to the Burger King/Home Depot and Go AZ Motorcycles dealership driveways). Due to the limited curb to curb clearance on the southbound side of the Hayden Road median, U-turns cannot be made without



either jumping curb on the opposite side of Hayden Road (evidence of which can be see all along this segment) or, traveling to the middle of the median break and using some of the intersecting driveway pavement. An exhibit illustrating the right turn followed by U-turn path of a passenger vehicle, labeled **Exhibit E1** is included with 1st Review Comment Responses in **Appendix A**.





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CONCLUSIONS

The following conclusions have been documented in this report:

GENERAL

- The previously proposed Impact Church component of the Hayden One development had the potential to generate approximately 738 external trips over the course of a typical weekday, with 46 of those trips occurring during the AM peak hour (29 in/17 out) and 45 occurring during the PM peak hour (22 in/23 out).
- The currently proposed CORE CENTER mixed-use development has the potential to generate up to 4,406 external trips over the course of a typical weekday, with 183 of those trips occurring during the AM peak hour (150 in/33 out) and 426 occurring during the PM peak hour (199 in/227 out).
- The CORE CENTER plan has the potential to generate 3,668 more external trips daily, 137 more external trips during the AM peak hour (150 more inbound/16 more outbound) and 381 more external trips during the PM peak hour (177 more inbound/ 204 more outbound). Accommodating the additional weekday traffic that a mixed-use development of the intensity proposed with the CORE CENTER plan will require an alternate form of traffic control at the intersection of 84th Street than the tw0-way stop sign control that exists today. Potentially viable alternatives considered in the course of completing this analysis and related communication with City staff included implementing turn restrictions (i.e. eliminating the existing opportunity to turn left out of the site onto southwest-bound Hayden Road), converting the intersection to a roundabout, and installing a traffic signal.
 - The turn restriction alternative would effectively reassign the task of accommodating 0 CORE SCOTTSDALE and CORE CENTER traffic wanting to head southwest on Hayden Road upon exiting the site, to another intersection. In other words, this option which involves construction of a raised channelizing island in the CORE SCOTTSDALE/CORE CENTER driveway such that the only allowable exit movement from the CORE SCOTTSDALE/CORE CENTER development becomes a right turn onto northeast-bound Hayden Road towards Frank Lloyd Wright Boulevard. Exiting CORE SCOTTSDALE/CORE CENTER traffic wanting to head southwest on Hayden Road would therefore first have to make a right turn onto northeast-bound Hayden Road, and then find an alternate route back to southwest-bound Hayden Road. It is anticipated most of the exiting traffic in this situation would attempt to make a northeast-to-southwestbound U-turn at the next closest median break to the northeast (adjacent to the Burger King/ Home Depot and Go AZ Motorcycles dealership driveways). Due to the limited curb to curb clearance on the southbound side of the Hayden Road median, U-turns cannot be made without either jumping curb on the opposite side of Hayden Road (evidence of which can be see all along this segment) or, traveling to the middle of the median break and using some of the intersecting driveway pavement. An exhibit illustrating the right turn followed by U-turn path of a passenger vehicle is provided with the 1st Review Comment Responses in **Appendix A**.





- From an operational standpoint, a roundabout is not out of the question dismissible based solely on the roundabout appropriateness benchmarks outlined in the City's Design Standards and Policies Manual (DSPM). Accordingly, a couple of geometric design concepts for converting this intersection to a roundabout have been prepared for consideration by the City and the CORE CENTER developer from a broader context. Further discussion of this alternative can be found in the *Traffic Impact and Improvements Analysis* section of this report, and exhibits illustrating each of the two roundabout design concepts prepared for the City's and applicant's consideration are provided with the 1st Review Comment Responses in **Appendix A**.
- Signalization is the most viable alternative of those considered.
 - Traffic volumes at this intersection already satisfy peak-hour warrant threshold volumes 3-4 hours a day, four-hour warrant threshold volumes 3-7 hours a day, and 8-hour warrant threshold volumes 3-8 hours a day depending in each case on whether the southbound approach is considered "one lane" as it is functioning today or, two lane, as it could be restriped to effect and depending further on how much right turn volume is deducted from the total minor approach volume before the threshold volume comparison is made.
 - With the addition of CARMAX traffic to the southbound approach (traffic that did not exist when the traffic count data was collective for this analysis, but has since taken over the 4-acre previously vacant site on the northwest corner of the intersection) and the CORE CENTER traffic to the northbound approach, we fully anticipate peak hour and four hour warrants being fully satisfied, even with a significant percentage of right turn volume discounting. We further anticipate that eight-hour warrant threshold volumes will be satisfied at least four hours a day and as many as eight hours a day by the time CORE CENTER is fully built out and leased.
 - Based on intersection capacity and LOS analysis performed using the City's signal phasing and timing, it is reasonable to expect the City will continue to give priority to through traffic on Hayden Road over turning movement traffic on intersecting side street and driveway approaches and that, as such, signalizing this intersection is not going to eliminate long delays for traffic wanting to turn left onto Hayden Road from 84th Street during peak hours; it should however, facilitate significantly shorter average delays to side street traffic than would leaving the existing stop sign control in place.
 - Based on the understanding that the City is planning to convert the Hayden/Raintree intersection to a roundabout in the not too distant future, there will be an approximately one-mile stretch of Hayden Road with continuous flow endpoint intersections and either one or two signalized intersections in between. It seems therefore that the significance of the quarter-mile spacing of this signal from the 83rd Place and Hayden Road signal


may not be as significant as it would be along a longer stretch of arterial with regularly spaced signals.

EXISTING CONDITIONS

- All intersections considered in this analysis currently operate with an overall level of service LOS D or better during both peak hours. The following intersections have one or more approaches operating with levels of service LOS E or LOS F.
 - The southbound left turn at the signalized intersection of **83rd Place and Hayden Road** operates at LOS E during the AM peak hour and LOS D/E during the PM peak hour. This is due primarily to a combination of a long cycle length (120 seconds), lack of a protected left turn phase for this movement (although there is one for the northbound left turn movement), and the traffic signals along Hayden Road appropriately favoring through traffic on Hayden Road over minor street approach traffic. Based on generally accepted left turn phase warranting criteria, (related to the product of left turn volumes on the subject approach and conflicting volumes on the opposite approach) a separate left turn phase is not yet warranted. CORE CENTER is not expected to add any volume to the southbound approach to this intersection. Being as the City has already recognized the need for and added separate left turn phasing for the northbound approach that when and if the City determines the southbound approach needs protected left turn phasing as well, the City will make the change.
 - o The southbound movements at the unsignalized intersection of 84th Street and Hayden Road operate at LOS F during the PM peak hour. This is partly due to the centerline only striping on the north leg/southbound approach, even though 84th Street is wide enough to provide two southbound lanes while leaving a single, relatively wide northbound lane for traffic turning north onto 84th Street from Hayden Road, much of which is single unit truck traffic. It is therefore recommended that the southbound approach be restriped to designate an exclusive southbound left turn lane and a shared southbound through/right turn lane. Being as southbound through traffic is almost non-existent during most hours of the day, the shared lane will function like a right turn only lane which could at least reduce delays experienced by southbound right turn traffic.
 - It will take more than restriping to cause more than a marginal improvement in level of service for southbound 84th Street traffic wanting to turn left onto Hayden Road. The larger cause of delay for traffic making these movements is the infrequency of adequate gaps in Hayden Road traffic during the PM peak hour due to the continuous westbound traffic flow effect of Hayden/Northsight roundabout. Signalizing the intersection is one option; however not the recommended option for the existing condition as, while under the current lane configuration on the southbound approach, existing volumes satisfy as many as three volume-based traffic signal warrants, they would satisfy fewer warrants under the recommended two-lane approach described



above. Therefore, **restriping the southbound approach is the only recommended mitigation for existing traffic conditions at this intersection.**

 At the signalized intersection of Hayden Road and Frank Lloyd Wright Boulevard, eastbound left turns, northbound left turns and southbound left turns movements all operate in the LOS E range during one or both peak hours. This is to be expected at a large, very busy intersection that is located within 700 feet of a very busy traffic interchange. Recognizing that the City can monitor and adjust the allocation of green time at this intersection remotely and in near real time as needed to maximize its efficiency, and that analysis results do not indicate that traffic at this intersection is queuing back to the point that it is interfering with traffic operations at other intersections, no further mitigation is recommended.

OPENING YEAR CONDITIONS

- The proposed development is expected to have very little impact on capacity, level of service or delay at any study area intersection except for the intersection of 84th Street and Hayden Road.
- The southbound left turn at the signalized intersection of 83rd Place and Hayden Road will continue to operate at LOS E during the AM peak hour and LOS D/E during the PM peak hour until and unless signal timing is adjusted and/or a protected phase for southbound left turn movements is added to the signal operation; however there is no indication either of these measures will become warranted in the context of the City's overall objectives for this intersection by the addition of CORE CENTER traffic to the area.
- The southbound movements at the unsignalized intersection of 84th Street and Hayden Road will continue to operate at LOS E or LOS F during the PM peak hour without an alternate form of traffic control to the existing stop sign control on northbound and southbound approaches. A comprehensive assessment of four intersection traffic control alternatives (1) retaining the two-way stop control, (2) adding turn restrictions to eliminate outbound left turn movements at the CORE SCOTTSDALE/CORE CENTER driveway, (3) converting the intersection to a roundabout and (4) signalizing the intersection, indicate that signalization is most appropriate alternative for the post-development condition. Regardless of which of these alternatives is ultimately pursued, restriping of both northbound and southbound applicant's civil engineer and site architect, curb line and striping geometry has been developed that will facilitate though and left turn lane alignment across 84th Street under either a full movement, two-way stop sign controlled (not recommended) or, signal controlled scenario. The recommended geometry is reflected on the current site plan.
- The proposed widening of the 84th Street aligning CORE SCOTTSDALE/CORE CENTER driveway will cut into the existing right turn deceleration lane on the eastbound approach to this driveway such that the resultant striped portion of the turn lane will be approximately 84 feet, less than the City's standard turn lane length minimum of 100 feet. However, the approach taper portion of the existing turn lane is approximately 120 feet long, 30 feet longer





than the City's standard 90 foot-long taper for a 40-50 mph posted speed condition per City of Scottsdale (COS) Standard Detail 2225, and the existing turn lane adjacent to the turn lane stipe is approximately 12 feet wide (a foot wider than the City's 11 foot-wide standard. This being the case, the length of that portion of the turn lane that will remain after the widening of the CORE SCOTTSDALE/CORE CENTER driveway that is at least 11 feet wide, clear of the adjacent through lane will be well over 100 feet long, meaning that no extension of the turn lane will be necessary to comply with the critical elements of the City's turn lane standards.

• The northwest-bound (Northsight Boulevard) approach of the roundabout at Northsight Boulevard and Hayden Road is expected to operate at LOS E during the PM peak hour in the opening year with the Project. with a volume to capacity ratio (V/C) of 0.89 for the northbound left turn movement. This intersection operates efficiently during most hours of the day and the surrounding area is largely built out so no mitigation is recommended for the opening year condition.



LIST OF REFERENCES

Highway Capacity Manual. Transportation Research Board, Washington, D.C., 2000.

Manual on Uniform Traffic Control Devices. U.S. Department of Transportation, Federal Highways Administration, Washington, D.C., 2009.

Trip Generation Manual, 10th Edition, Institute of Transportation Engineers, Washington, D.C., 2016.

Trip Generation Handbook, 3rd Edition, Institute of Transportation Engineers, Washington, D.C., 2014.

Design Standards & Policies Manual, Geometrics, City of Scottsdale, Arizona, 2018.



TECHNICAL APPENDICES

- APPENDIX A: 1ST REVIEW COMMENTS AND RESPONSES
- APPENDIX B: EXISTING TRAFFIC COUNTS
- APPENDIX C: EXISTING PEAK HOUR ANALYSIS AND SIGNAL TIMING
- APPENDIX D: SIGNAL WARRANT ANALYSIS
- APPENDIX E: TRIP GENERATION
- APPENDIX F: BACKGROUND TRAFFIC CALCULATIONS
- APPENDIX G: 2020 PEAK HOUR ANALYSIS







1st REVIEW COMMENTS AND RESPONSES

APPENDIX A



August 5, 2019

Brad Carr, AICP Principal Planner City of Scottsdale 3939 N. Drinkwater Blvd. Scottsdale, AZ 85251



RE: 19-ZN-2013 #2 - Core Center 1st Review Comment Responses – Traffic Study Specific

Dear Mr. Carr:

CivTech has prepared this letter on behalf of Impact Church as both a cover letter to the hereto attached, *Core Center Trip Generation and Level of Service Analysis – 2nd Submittal* and to provide written responses to "1st Review" comments specific to the *Core Center Trip Generation and Level of Service Analysis, June 2019,* the "traffic study" component of the above-referenced rezoning application. Two sets of 1st review comments specific to the traffic study have been received from the City of Scottsdale (COS) to date. COS Comment No.'s 21 through 25 of your (1st Review) letter to Michael P. Leary, dated July 12, 2019 and five unnumbered comments CivTech received directly from COS Traffic Engineer Doug Ostler via e-mail, on July 29, 2019. Presented below are first the City's July 12th comments and then the July 29th comments, each comment followed by our written response. A full copy of each set of 1st review comments as they were received by CivTech has also been attached for reference.

JULY 12, 2019 TRAFFIC STUDY-SPECIFIC REVIEW COMMENTS & RESPONSES

COS Comment No. 21: Transportation staff is not fully supportive of the installation of a traffic signal at 84th Street/Hayden Road due to signal spacing. The proposed change from a church to offices and restaurants result in ~ 4x the daily and AM peak hour trips generated and ~10X the PM peak hour trips generated. This has profound impacts on traffic, particularly at the 84th Street/Hayden Road intersection. Signalization was not intended/planned for this location. DSPM 5-3.123 G3 indicates that "At Minor Arterial/Minor Arterial (or smaller designated streets) intersections the designer should evaluate using a roundabout as an alternative to a traffic signal for all new or significantly rebuilt intersections." The TIMA appears to include no indication that a roundabout option was evaluated. Please address these issues with the next submittal. (DSPM, Sec. 5-3.123)

CivTech Response:

The first submittal version of the traffic study was prepared in accordance with a scope established through discussion with City of Scottsdale Traffic Engineering staff in advance of

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initiating the analysis. Presenting a weekday daily and peak hour trip generation comparison and intersection level of service analysis was part of the agreed upon scope as was identifying roadway capacity and/or traffic control mitigation warranted by the proposed development. Both were provided with the initial submittal. The initial submittal did not however, recognize the opportunity or challenges with converting the intersection of 84th Street and Hayden Road to a roundabout as an alternative to signalizing the intersection in its current conventional configuration. That option has since been considered fairly extensively, the results of which are summarized below.

We have evaluated the appropriateness of a roundabout from an operational perspective using the roundabout warranting benchmarks specified in Section 5-3.124 of the City's Design Standards and Policies Manual (DSPM) which reads, "**Roundabouts are most appropriate...**

1. at locations with high turning movements,

Assuming the traffic count data we were required to collect for this analysis was representative of typical weekday conditions prior to the occupancy of the northwest corner property (4.0-acre +/- APN 215-48-065F) by CARMAX, turning movement volume accounted for approximately 15% of total daily volume entering this intersection. With the addition of CARMAX traffic (estimated to add another 310 turning movements per day, with 24 being made during the am peak hour and 27 during the pm peak hour), we expect this percentage to increase to 16%. Once CORE CENTER traffic and another year of background traffic growth is taken into account, the turning movement percentage is likely to increase to approximately 26%. This begs the question, "What does the City consider "high" in this context?" While 26% is certainly significant and would suggest that further consideration of roundabout appropriateness is warranted, it bears recognizing that 26% is nowhere near the 38-40% turning movement-to-total volume percentage that characterizes the Hayden/Northsight roundabout, a quarter-mile to the northeast.

2. where intersecting street traffic volume on the major street is less than ten times the volume on the minor street,

Assuming again, that the traffic count data we collected for this analysis is representative of typical weekday conditions prior to the occupancy of the northwest corner property by CARMAX, the number of vehicles entering the 84th Street and Hayden Road intersection from a major street (Hayden Road) approach is about 13 times that of vehicles entering from either of the two minor street approaches, well outside the range the City considers indicative on its own, of an intersection for which conversion to a roundabout should be considered further. However, with the addition of CORE CENTER traffic to the intersection, we expect the major-to-minor multiplier will drop to about 8%, within the City's indicated range of appropriateness for a roundabout.



3. and where safety is a primary concern."

Roundabouts are frequently recognized for their safety benefits particularly in the context of reducing the potential for head-on, right angle, and/or left turn collisions. Review of crash data provided by the City of Scottsdale indicates a total of nine (9) reported traffic accidents have occurred in the immediate vicinity of the 84th Street and Hayden Road intersection over the three-year period ending December 31, 2018, none of which resulted in a fatality or serious injury. Of the nine, one (1) was interpreted as a rear-end crash; three (3) were interpreted as side swipe crashes, two (2) were interpreted as left turn/angle accidents involving a northeast-bound driver attempting to turn left/north onto 84th Street being hit by an oncoming through vehicle traveling in the southwest-bound direction, two (2) were interpreted as right angle crashes involving a northbound driver exiting the CORE SCOTTSDALE development attempting to turn left or right onto Hayden Road and getting hit by a driver traveling northeast or southwest on Hayden Road; and one was interpreted as involving two vehicles traveling in the same direction but this was the extent to which the cause or effect could be determined.

Based on the accident history just described, several of the accidents may have been avoided if the intersection were configured as a roundabout but those same accidents might have been avoided if there were a traffic signal in place to periodically grant right of way to turning traffic as well. This accident history on its own is not significant enough to characterize the intersection as unsafe and in need of alternate traffic control purely for safety reasons.

The above-described application of the City's roundabout warranting quidelines yielded results that suggest that the appropriateness of a roundabout in lieu of a traffic signal or any other traffic control alternative cannot be fully determined without more input from the various stakeholders in the outcome of this decision and without consideration of more than just operational factors. For this reason, and at the request of the applicant, we have also prepared a couple of preliminary geometric design concept exhibits which illustrate some of the physical impacts the conversion of this intersection to a roundabout would likely have. The exhibits are included with responses to first review comments, in Appendix A. Both exhibits describe a two-lane by one-lane roundabout similar in configuration to that which exists at Hayden Road and Northsight Boulevard. Both concepts avoid the need for right of way from the north/non-CORE CENTER side of the intersection. The primary difference between the two concepts is that the concept presented in Exhibit A1 has a 169-foot inscribed circle diameter (ICD), identical to that of the Hayden/Northsight Roundabout and the concept presented in Exhibit A2 has a 150-foot diameter ICD. The larger ICD concept allows the circulating path radius (R2) to remain within the City's' specified 15-20 mph design speed range but positioned to avoid any need for north side right of way, would cut fairly deep into the CORE CENTER site and likely cause need for significant adjustments to vertical elements of the site plan, including the building



19-ZN-2013#2 - Core Center 1st Review Comments – Traffic Study Specific August 5, 2109, Page 4 of 7

proposed for location on the southeast quadrant of this intersection. The smaller ICD concept reduces the extent to which the intersection would need to be pushed south (and off of its current alignment) yet allows 22 mph travel along the R2 segment of the fastest path through the roundabout, higher than the City's standards support but still well within the range supported by nationally recognized (NCHRP Report 672) standards.

As to the comment regarding concern over the (quarter-mile) spacing that would result from installing a signal at 84th Street and Hayden Road, based on the understanding that the City is planning to convert the Hayden/Raintree intersection to a roundabout in the not too distant future, there will be an approximately one-mile stretch of Hayden Road with continuous flow endpoint intersections and either one or two signalized intersections in between. It seems therefore that the significance of the quarter-mile spacing of this signal from the 83rd Place and Hayden Road signal should not be as significant as it would be along a longer stretch of arterial with regularly spaced signals.

COS Comment No. 22: Please revise the traffic study to add a queue analysis for site driveways due to the substantial increase in projected trip generation as well as queue analysis for the intersection of 84th street and Hayden Road due to the proposed control change.

CivTech Response:

A queue analysis has been added to the Traffic Impact and Improvement Analysis section of the traffic study.

COS Comment No. 23: Please revise the traffic study to provide project site & total ADT on major street(s) within the study area. (DSPM, Sec. 5-1.701)

CivTech Response:

Site and Total ADT's for those segments of 84th Street and Hayden Road where traffic count date was collected for this analysis have been added to applicable traffic volume figures in the 2nd submittal version of the traffic study. As discussed with City traffic engineering staff on 8/1/2019, current ADT information about other roadway segments further away from the Project site is not available and therefore has not been added to the report.

COS Comment No. 24: Page 31, 1st bullet (84th Street & Hayden Road), 3rd sentence - the site plan depicts a redesign of the existing site driveway. The developer is responsible for correct alignment of their proposed new driveway to prevent negative offset of left turning vehicles. Should the intersection be signalized, the developer will be responsible for improvements associated with the traffic signal, including and not limited to providing a left turn lane on all approaches. Please revise the project plans to address this comment. (Zoning Ordinance, Sec. 1.204.)



CivTech Response:

The project plans have been revised to show curb line geometry and lane striping for the 84th Street driveway to achieve lane alignment north-south across Hayden Road. Two exhibits included with these review comment responses, Exhibit D1 and Exhibit D2, provide a little more detail of what was recommended for that area of the driveway near Hayden Road. Recognizing the site plan is still somewhat conceptual, a detailed assessment of internal circulation has not been performed as part this analysis.

COS Comment No. 25: Please revise the traffic study to add a queue analysis for site driveways due to the substantial increase in projected trip generation as well as queue analysis for the intersection of 84th street and Hayden Road due to the proposed control change

CivTech Response:

A queue analysis has been added to the Traffic Impact and Improvement Analysis section of the traffic study.

JULY 29, 2019 TRAFFIC STUDY-SPECIFIC REVIEW COMMENTS & RESPONSES

July 29th COS General Comment: In addition to the comments already provided, please address the following items related to evaluation of appropriate traffic control at the 84th Street and Hayden Road intersection:

CivTech Response:

All of the requested items have been addressed as requested.

July 29th COS Specific Comment No. 1: Please use the 24-hour counts that were collected at the 84th Street and Hayden Road intersection for evaluating the signal warrants in existing conditions.

CivTech Response:

The 24-hour counts collected for this analysis were used for the traffic signal warrant analysis. If detailed documentation beyond that which is provided in the Appendix of the traffic study is desired, it can be provided upon request.

July 29th COS Specific Comment No. 2: A reduction for right turning traffic is expected to be applied to the minor street approach volumes (see MUTCD Section 4C.01 Paragraph 8).

CivTech Response:

Reductions were taken for a portion of the right turn traffic on the minor street approaches. This reduction varied by approach.



July 29th COS Specific Comment No. 3: Staff recommends consideration of restricting left turns out of the driveway as an alternative to signalization, even if signal warrants are met (see MUTCD Section 4B.04 Paragraph 2J). This restriction would be for the driveway by means of a pork-chop median or channelization, etc.; 84th Street would remain full access. Note: this does not retract comment 21 in the comment letter. You may state the circumstances and/or reference discussion(s) indicating compliance with DSPM 5-30123 G3.

CivTech Response: The turn restriction alternative has been considered, discussion of which appears below and in the Traffic Impact and Improvement Analysis section of the 2nd Submittal version of the traffic study.

The turn restriction alternative would effectively reassign the task of accommodating CORE SCOTTSDALE and CORE CENTER traffic wanting to head southwest on Hayden Road upon exiting the site, to another intersection. In other words, this option which involves construction of a raised channelizing island in the CORE SCOTTSDALE/CORE CENTER driveway such that the only allowable exit movement from the CORE SCOTTSDALE/CORE CENTER development becomes a right turn onto northeast-bound Hayden Road towards Frank Lloyd Wright Boulevard. Exiting CORE SCOTTSDALE/CORE CENTER traffic wanting to head southwest on Hayden Road would therefore first have to make a right turn onto northeast-bound Hayden Road, and then find an alternate route back to southwest-bound Hayden Road. It is anticipated most of the exiting traffic in this situation would attempt a northeast-to-southwest-bound U-turn at the next closest median break to the northeast (adjacent to the Burger King/Home Depot and Go AZ Motorcycles dealership driveways). Due to the limited curb to curb clearance on the southbound side of the Hayden Road median, U-turns cannot be made without either jumping curb on the opposite side of Hayden Road (evidence of which can be see all along this segment) or, traveling to the middle of the median break and using some of the intersecting driveway pavement. Attached Exhibit E1 illustrates path of a passenger vehicle executing the right turn followed by U-turn movement.

July 29th COS Specific Comment No. 4: Correct reference to Sarival Avenue (instead of Hayden Road) on page 17 of the study.

CivTech Response: The requested correction has been made.

July 29th COS Specific Comment No. 5: Using the 24-hour counts that were collected at the 84th Street and Hayden Road intersection, state the 24-hour volume on Hayden Road in existing conditions as well as the projected ADT added by the site.

CivTech Response:

The requested ADT information has been added to the applicable traffic study figures.



We appreciate the City's consideration of these comments. Please call me if you have any questions about this statement and/or if we can be of further assistance.

Sincerely,

CivTech Inc.

10V)

Tove C. White, P.E., PTOE Project Manager/ Senior Traffic Engineer

Attachments:

EXHIBIT A1: CORE CENTER ROUNDABOUT DESIGN CONCEPT (169' ICD) EXHIBIT A2: CORE CENTER ROUNDABOUT DESIGN CONCEPT (150' ICD) EXHIBIT D1: 84TH STREET LANE ALIGNMENT ACROSS HAYDEN ROAD, SHEET 1 OF 2 EXHIBIT D2: 84TH STREET LANE ALIGNMENT ACROSS HAYDEN ROAD, SHEET 1 OF 2 EXHIBIT E1: EXITING RIGHT TURN FOLLOWED BY DOWNSTREAM U-TURN Copy of 1st Review Comments letter, dated 7/12/2019 Copy of 1st Review Comments follow-up e-mail message, dated 7/29/2019















7/12/2019

Michael P. Leary, LTD 10278 E Hillery Dr Scottsdale, AZ 85255

RE: 19-ZN-2013#2 Core Center H4145 (Key Code)

Dear Mr. Leary:

The Planning & Development Services Division has completed the review of the above referenced development application submitted on 6/5/2019. The following **1**st **Review Comments** represent the review performed by our team, and is intended to provide you with guidance for compliance with city codes, policies, and guidelines related to this application.

Zoning Ordinance and Scottsdale Revise Code Significant Issues

The following code and ordinance related issues have been identified in the first review of this application, and shall be addressed in the resubmittal of the revised application material. Addressing these items is critical to scheduling the application for public hearing, and may affect the City Staff's recommendation. Please address the following:

Zoning:

- 1. Please revise the Project Narrative to include a discussion of the use of the PCP district bonus provisions. Discussion should include the proposed bonus to be requested, the justification for the proposed bonus, calculations for the estimated value of the bonus, as well as a plan for community benefit related to the estimated value of the bonus. (Zoning Ordinance, Sec. 5.4008. and 7.1200.)
- 2. Please revise the project plans to demonstrate compliance with the setback and stepback requirements of the PCP zoning district. The setback requirement is a minimum of 25 feet from the curb line along N. Hayden Road. The stepback requirements starts at the minimum setback line. (Zoning Ordinance, Sec. 5.4007.D. & 5.4007.E.)
- 3. Please revise the project plans to include the calculations for floor area ratio (FAR) in compliance with the Zoning Ordinance, Sec. 5.4007.A.
- 4. The site and Core Apartments as part of case 19-ZN-2013 appears to not have complied with stipulation 7 "PEDESTRIAN CONNECTIONS. The site shall provide a minimum of three (3) pedestrian connections to existing properties surrounding the site. A minimum of one (1) connection having a minimum with of six (6) feet shall be provided to each of the west, south and east sides of the site. Pedestrian connections shall be reviewed and approved by

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city transportation staff." Please revise the project plans to identify compliance with these requirements.

- 5. Please submit a revised copy of the Citizen Review Report summary to include details of the most recent public outreach efforts, including any additional public comments that may have been received. (Zoning Ordinance, Sec. 1.305.C.2.b.)
- 6. Please provide conceptual elevations in conformance with the district requirements with the next submittal. (Zoning Ordinance, Sec. 1.303.)

2001 General Plan & Greater Airpark Character Area Plan (GAPCAP) Analysis:

7. The first submittal narrative/ development master plan- a document that is intended to provide overall coordination of urban design character, buffering to adjacent uses, transportation systems, and infrastructure necessary for the proposed development – includes unnecessary/oppositional statements that are not material in any manner to the application request; please see applicant responses to General Plan Growth Area Element Goal #2, Bullet #1, and Community Mobility Element Goal #5, Bullet#3 regarding light-rail transit and equestrians. Please revise the Project Narrative to include only necessary statements are in direction relation to the proposed development be included in the development master plan upon resubmittal.

To this end, please ensure that responses that are completed with "refer to prior responses" (found throughout the document) indicate by numerical identification, and page number, reference to the response the applicant is directing the reader to. Additionally, please remove responses that indicate "not applicable".

8. The General Plan Character and Design Element (Goal 4, bullets 10, 14, and 15) encourage "streetscapes for major roadways that promote the city's visual quality and character; and blend into the character of the surrounding area. The Greater Airpark Character Area Plan Character and Design Element (Goal CD2, Policy CD 2.1.6, CD 2.2, and CD2.7), and Economic Vitality Element (Goal 5, bullet 6) promotes vibrant Signature Corridors in the Greater Airpark to provide a distinct identify and design theme in the area. Although the first submittal discusses Hayden Road being designated as a Signature Corridor, there appears to be no indication as to what that means as a result of this development proposal – details of such are expected of a formal Development Plan. Please note Hayden Road at the subject site's frontage is a designated Signature Corridor and Buffered Roadway – an area in which 50' foot minimum setback, measured from back of curb line, is expected to be maintained as per CD2.7 of the GACAP.

Please respond both graphically and narratively as to how the proposed development will provide this dimension and enhance the Streetscape in response to the cited considerations. Please consider additions of areas of pedestrian lighting, public art, bus shelters, and other public amenities to enhance the pedestrian environment and streetscape.

- Please respond to Goal 10, along with any applicable bullets, of the of the General Plan Preservation and Environmental Planning Element, and Goal EP5 of the Greater Airpark Character Area Plan addressing how the proposed development may, if at all, utilize green building alternatives that support sustainable desert living.
 - a. Please note, Scottsdale is progressively attempting to install in capital projects, and request from private development applications, Low Impact Development (LID) and Green Infrastructure (GI) as a method of stormwater control, water harvesting, and

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cleansing for the first flush requirements of the City's Floodplain Ordnance. Accordingly, please consider utilization of this resource. More information on this initiative can be found at:

https://sustainability.asu.edu/sustainable-cities/resources/lid-handbook/

10. As a respond to Goal 1 of the Community Involvement Element, with a resubmittal, please provide an updated Citizen Involvement Report that describes the key issues that have been identified through the public involvement process.

Fire:

- 11. Please revise the project plans to demonstrate hydrant spacing, existing and proposed (Fire Ord. 4283, 507.5.1.2)
- 12. Please revise the project plans to demonstrate the location of Fire Department Connection(s). (Fire Or. 4283, 912)

Drainage:

13. Please submit a copy of the revised Drainage Report with the remainder of the resubmittal material identified in Attachment A. Please see comments within the red-lined 1st submittal of the Drainage Report and Preliminary G&D and address accordingly.

Water and Wastewater:

- 14. Please submit a revised Water and Wastewater Design Report with the remainder of the resubmittal material identified in Attachment A. Please see comments within the red-lined 1st submittal of the Report. The Preliminary Basis of Design Report must be accepted by the Water Resources Department prior to scheduling of first hearing of project.
- 15. Please submit flow monitoring results of northern 8-inch sewer in Hayden Road with next submittal.

Airport:

16. The subject site is within Airport noise compatibility study AC-2 area. Please note that a signed Avigation Easement along with the required legal descriptions and graphic, and a copy of the Noise Disclosure statement will be required with the final plans submittal.

Engineering:

- 17. All waste shall be placed in suitable containers to facilitate waste removal in a sanitary condition. Please revise the project plans accordingly. (SRC, Sec. 24-13)
- 18. Off-site transportation, stormwater and water resources improvements along property frontages to existing supporting infrastructure, with associated dedications, is required. Please update the project plans accordingly. (SRC, Sec. 48-7, 47-10 & 49-219)

Significant Policy Related Issues

The following policy related issues have been identified in the first review of this application. While these issues may not be critical to scheduling the application for public hearing, they may affect the City Staff's recommendation pertaining to the application and should be addressed with the resubmittal of the revised application material. Please address the following:

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Transportation:

- 19. The entry drive should be redesigned to be in conformance with COS Standard Detail #2257, CH-2. The proposed raised median creates offset lanes alignments with the existing driveway to the northwest. An entry drive of 48 feet of pavement width transitioning to 55 feet is unnecessary. Please revise the project plans accordingly. (DSPM, Sec. 5-3.200 & 5-3.205)
- 20. The north end of the site is designed poorly. The driveway leading from Hayden Road directs vehicles into the pedestrian courtyard. The short turning radius on the site drive leading to this driveway will create issues with vehicle queuing and blocking inbound traffic. Please revise the project plans to correct these issues. (Zoning Ordinance, Sec. 1.204.)

Traffic Study:

- 21. Transportation staff is not fully supportive of the installation of a traffic signal at 84th Street/Hayden Road due to signal spacing. The proposed change from a church to offices and restaurants result in ~ 4x the daily and AM peak hour trips generated and ~10X the PM peak hour trips generated. This has profound impacts on traffic, particularly at the 84th Street/Hayden Road intersection. Signalization was not intended/planned for this location. DSPM 5-3.123 G3 indicates that "At Minor Arterial/Minor Arterial (or smaller designated streets) intersections the designer should evaluate using a roundabout as an alternative to a traffic signal for all new or significantly rebuilt intersections." The TIMA appears to include no indication that a roundabout option was evaluated. Please address these issues with the next submittal. (DSPM, Sec. 5-3.123)
- 22. Please revise the traffic study to add a queue analysis for site driveways due to the substantial increase in projected trip generation as well as queue analysis for the intersection of 84th Street and Hayden Road due to the proposed control change (signalization). (Zoning Ordinance, Sec. 1.303.)
- 23. Please revise the traffic study to provide project site & total ADT on major street(s) within the study area. (DSPM, Sec. 5-1.701)
- 24. Page 31, 1st bullet (84th Street & Hayden Road), 3rd sentence the site plan depicts a redesign of the existing site driveway. The developer is responsible for correct alignment of their proposed new driveway to prevent negative offset of left turning vehicles. Should the intersection be signalized, the developer will be responsible for improvements associated with the traffic signal, including and not limited to providing a left turn lane on all approaches. Please revise the project plans to address this comment. (Zoning Ordinance, Sec. 1.204.)

Engineering:

- 25. Please review the Context Aerial with corrections provided by Engineering for existing easement conflicts that will need to be modified or released prior to permit issuance, including:
 - Any GLO easements in conflict with proposed development and not required by city LAIPS or TMP will need to be abandoned by property owner prior to any permit issuance. Specifically for this project, the supplied ALTA survey identified GLOs per the following recording information: docket 1443 page 63 and docket 3025 page 473. Please call out required abandonments on site plan. (DSPM, Sec. 1-2.400)

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- b. Water lines located outside of a public right-of-way or street tract must be placed in a minimum 20' wide easement:
 - i. Horizontally, a minimum of 6' is required between the water line and the edge of easement.
 - ii. The easement will be free of obstructions, shall not be in a fenced area, and shall be accessible always to city service equipment such as trucks and backhoes.
 - iii. Easements outside of paved areas shall have a 10' wide hardened patch with a cross-slope not greater than 10% and a longitudinal slope not greater than 20%. Hardened paths shall consist of native soil compacted to 95% to a depth of 1'.
 - iv. Revegetation within the easement shall consist of low growing shrubs. Update site plan accordingly.
- c. Existing cross access and emergency services access easement through project parcel to abutting parcel in conflict with proposed development will need to be relocated to provide cross access to southern and eastern abutting parcels. Please update the project plans accordingly. (DSPM, Sec. 5-3.201)
- 26. Please revise the project plans to comply with the following location and design requirements for non-residential, mixed-use, and multi-family residential refuse and recycling enclosures. Please locate and position the enclosure(s): (DSPM, Sec. 2-1.309)
 - a. A minimum of one (1) enclosure shall be provided for every 20,000 square feet of office/retail space.
 - b. So that the approach pad for the enclosure(s) is located that the refuse truck route to and from the public street has a minimum unobstructed vertical clearance of 13 feet 6 inches (14 feet is recommended), and unobstructed minimum vertical clearance above the approach pad and refuse enclosure of 25 feet. (The vertical clearances are subject to modification based on enclosure container size, location, and positioning as determined by the Sanitation Director, or designee.);
 - c. In a location that is easily accessible for collection, and does not require the refuse truck to "backtrack";
 - d. A maximum 100 feet distance from building service exit to refuse enclosure;
 - e. So that collection vehicles do not back up more than 35 feet;
 - f. So that the path of travel for the refuse truck accommodates a minimum vehicle turning radius of 45 feet, and a minimum length of 40 feet;
 - g. So that the approach pad is level, with a maximum of 2 percent slope;
 - So that the enclosure(s) are not placed between the on-site buildings and adjacent lower density residential unless there is no reasonable alternative. In these situations, orient the enclosure(s) towards the interior of the property;
 - i. So that the enclosure(s) are not placed next to drainage ways or basins, unless there is no reasonable alternative;
 - j. So that the enclosure(s) are not placed between the street and the front of the building, unless there is no reasonable alternative; and

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- k. So that the enclosure(s) are not placed at the end of a dead-end parking aisle.
- 27. Compactors may be used as an alternative to refuse or recycling containers. To determine adequacy and site location of compactors, if proposed, please provide the following on a refuse plan:
 - a. Compactor type,
 - b. Compactor capacity state on site plan compactor capacity conversion equating to the city's required 1 enclosure for every 20,000 square feet with no recycling,
 - c. Compactor location, addressing the following:
 - i. Place the refuse compactor container and approach pad so that the refuse truck route to and from the public street has a minimum unobstructed vertical clearance of thirteen (13) feet six (6) inches (fourteen (14) feet is recommended), and unobstructed minimum vertical clearance above the concrete approach slab and refuse compactor container storage area concrete slab of twenty-five (25) feet,
 - ii. Place the refuse compactor container in a location that does not require the bin to be maneuvered or relocated from the bin's storage location to be loaded on to the refuse truck,
 - iii. Provide a refuse compactor container approach area that has a minimum width of fourteen (14) feet and length of sixty (60) feet in front of the container, and
 - iv. Demonstrate path of travel for refuse truck accommodates a minimum vehicle turning radius of 45', and vehicle length of 40'.
- 28. Although not a requirement, recycling is an amenity found to be desired by Scottsdale residents. Please note if recycling containers will be provided for the development project.
- 29. Please revise the project plans with a 6' width accessible pedestrian route from the main entry of the development to each Hayden. (DSPM, Sec. 2-1.310)
- 30. Please revise the project plans to provide an eight (8) foot wide minimum, curb-separated sidewalk along the project boundary. (DSPM, Sec. 5-3.102 and 5-3.110)

Technical Corrections

The following technical ordinance or policy related corrections have been identified in the first review of the project. While these items are not as critical to scheduling the case for public hearing, they will likely affect a decision on the final plans submittal (construction and improvement documents) and should be addressed as soon as possible. Correcting these items before the hearing may also help clarify questions regarding these plans. Please address the following:

<u>Site</u>:

31. Please revise the project plans to identify pedestrian connections to the surrounding commercial businesses. (Zoning Ordinance, Sec. 1.303.)

Transportation:

32. Please revise the project plans to identify what measures will be provided to ensure a safe pedestrian crossing of the main entry drive. (Zoning Ordinance, Sec. 1.303.)

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33. The proposed entry drive is showing a raised median. Please note that this will require the reconstruction of the existing curb returns on Hayden Road. Please revise the project plans to identify this. (Zoning Ordinance, Sec. 1.204.)

Traffic Study:

- 34. Potential errors were noticed in the study which may not necessarily affect the final recommendations of the study nor necessitate a revised study. Please verify the following items prior to a future resubmittal:
 - a. Page 7, 3rd paragraph (Hayden Road), 1st Sentence Hayden Road is a minor arterial within the vicinity of the site, not a major arterial.
 - b. Page 7, 4th paragraph (83rd Place), 2nd & 3rd sentences these two sentences likely belong in the next paragraph (83rd Way/Costco Driveway) Please verify.
 - c. Page 7, 5th paragraph (83rd Way/Costco Driveway), 2nd & 3rd sentences these two sentences likely belong in the prior paragraph (83rd Place). Please verify.
 - d. Page 8, 4th paragraph (Costco/Hayden), last sentence missing "lane" after "deceleration".
 - e. Page 13-14, 83rd Place & Hayden Road, last sentence intersection is operating acceptably per DSPM 5-1.801 B.1, please verify recommendation to monitor the intersection.
 - f. Page 14, 2nd full paragraph (84th Street & Hayden Road), 2nd sentence. See DSPM 5-1.801 B for correct threshold requirements (Generally LOS D or better overall, individual/approach should be LOS D or better, must be LOS E or better). This comment may be applicable to other locations that are not marked. Please revise the Traffic Study and project plans to address this.

Other:

35. Please revise the Zoning Boundary Exhibit to include half of the right-of-way for N. Hayden Road as it fronts the site. All zoning boundaries include adjacent right-of-way. (Zoning Ordinance, Sec. 1.303.)

Please resubmit the revised application requirements and additional/supplemental information identified in Attachment A, Resubmittal Checklist, and a written summary response addressing the comments/corrections identified above as soon as possible for further review. The City will then review the revisions to determine if the application is to be scheduled for a hearing date, or if additional modifications, corrections, or additional/supplemental information is necessary.

PLEASE CALL 480-312-7767 TO SCHEDULE A RESUBMITTAL MEETING WITH ME PRIOR TO YOUR PLANNED RESUBMITTAL DATE. DO NOT DROP OFF ANY RESUBMITTAL MATERIAL WITHOUT A SCHEDULED MEETING. THIS WILL HELP MAKE SURE I'M AVAILABLE TO REVIEW YOUR RESUBMITTAL AND PREVENT ANY UNNECESSARY DELAYS. RESUBMITTAL MATERIAL THAT IS DROPPED OFF MAY NOT BE ACCEPTED AND RETURNED TO THE APPLICANT.

The Planning & Development Services Division has had this application in review for 28 Staff Review Days since the application was determined to have the minimal information to be reviewed.

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These **1**st **Review Comments** are valid for a period of 180 days from the date on this letter. The Zoning Administrator may consider an application withdrawn if a revised submittal has not been received within 180 days of the date of this letter (Section 1.305. of the Zoning Ordinance).

If you have any questions, or need further assistance please contact me at 480-312-7713 or at bcarr@ScottsdaleAZ.gov.

Sincerely,

Bral Com

Brad Carr, AICP Principal Planner

ATTACHMENT A Resubmittal Checklist

Case Number: 19-ZN-2013#2

Please provide the following documents, in the quantities indicated, with the resubmittal (all plans larger than 8 $\frac{1}{2}$ x11 shall be folded):

Digital submittals shall include one copy of each item identified below.

One copy:	COVER LETTER – Respond to all the issues identified in the first review comment
	letter.
One copy:	Revised Narrative for Project

One copy: Revised Traffic Impact Mitigation Analysis (TIMA)

Context Aerial with the proposed Site Plan superimposed

	Color	1	24" x 36"	11" x 17"	8 ½" x 11"
\boxtimes	Site Plan:				
	1	_ 24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Open Space Pl	an:			
	1	_ 24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Elevations:				
	Color	1	24" x 36"	11″ x 17″	8 ½″ x 11″
	B/W	1	24" x 36"	11" x 17"	8 ½" x 11"
\boxtimes	Elevation Wor	<u>ksheet(s):</u>			
	1	_ 24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Perspectives:				
	Color	1	24" x 36"	11" x 17"	8 ½" x 11"
\boxtimes	Color Site Plan	<u>:</u>			
	Color	1	24" x 36"	11" x 17"	8 ½″ x 11″

Landscape Plan:

	B/W	1	_ 24" x 36"	11"	x 17"	8 ½" x 11"
\boxtimes	Site Cross Sec	tions:				
	1	24" x 36"		11" x 17"		8 ½" x 11"
\square	Preliminary G	rading & Dra	ainage Plan:			
	1	24" x 36"		11" x 17"		8 ½" x 11"
\boxtimes	Pedestrian & Y	Vehicular Ci	rculation Plan			
	1	24" x 36"		11" x 17"		8 ½" x 11"
\boxtimes	Dimensioned	Zoning Bour	ndary Exhibit			
	1	24" x 36"		11" x 17"		8 ½" x 11"
\boxtimes	Slope Analysis	(superimpo	osed on a topogi	<u>aphy map)</u>		
\boxtimes	Development The Developm			lipped together	separately, an	d not be bounded.
	Color		_ 11" x 17"	1 8 1/2	" x 11"	
			or copy on archi sion hearing.)	val (acid free par	per) (To be sul	bmitted after the

Technical Reports: Please include one (1) digital copy of each report

□ _ _ _ copy of Revised Drainage Report

 \square <u>1</u> copy of Revised Water and Wastewater Design Report

<u>Resubmit the revised Drainage Report and Water and Wastewater Design Report to your Project</u> <u>Coordinator.</u>

Tove White

From:	Ostler, Douglas <dostler@scottsdaleaz.gov></dostler@scottsdaleaz.gov>
Sent:	Monday, July 29, 2019 11:58 AM
То:	Tove White
Cc:	Kercher, Phillip; Guntupalli, Kiran; Carr, Brad
Subject:	Core Center Traffic Study Comments, 19-ZN-2013 #2

Tove,

Transportation staff had additional discussions and review of the proposed CORE Center project and associated TIMA. In addition to the comments already provided, please address the following items related to evaluation of appropriate traffic control at the 84th Street and Hayden Road intersection:

- Please use the 24-hour counts that were collected at the 84th Street and Hayden Road intersection for evaluating the signal warrants in existing conditions.
- A reduction for right turning traffic is expected to be applied to the minor street approach volumes (see MUTCD Section 4C.01 Paragraph 8).
- Staff recommends consideration of restricting left turns out of the driveway as an alternative to signalization, even if signal warrants are met (see MUTCD Section 4B.04 Paragraph 2J). This restriction would be for the driveway by means of a pork-chop median or channelization, etc.; 84th Street would remain full access.
 - Note: this does not retract comment 21 in the comment letter. You may state the circumstances and/or reference discussion(s) indicating compliance with DSPM 5-30123 G3.
- Correct reference to Sarival Avenue (instead of Hayden Road) on page 17 of the study.
- Using the 24-hour counts that were collected at the 84th Street and Hayden Road intersection, state the 24-hour volume on Hayden Road in existing conditions as well as the projected ADT added by the site.

Thanks!

Doug Ostler -- Traffic Engineer Office: 480-312-7250 Direct: 480-312-7724

APPENDIX B

EXISTING TRAFFIC COUNTS







					5	20.31	6.674	5			traf		
N-S STREET:	Northe	ast Acce	ess		DATE:	04/02/1	.9		LOCA	FION:	Scottsd	ale	
E-W STREET:	Hayder	n Rd.			DAY:	TUESD	AY		PROJE	ECT#	19-1179	9-001	
	NC	ORTHBO	UND	SC	OUTHBO	UND	E	ASTBOUI	ND	W	ESTBOU	IND	
LANES:	NL 0	NT 0	NR 1	SL 0	ST 0	SR 0	EL 0	ET 2	ER 0	WL 0	WT 2	WR 0	TOTAL
6:00 AM 6:15 AM 6:30 AM 7:00 AM 7:15 AM 7:30 AM 7:45 AM 8:00 AM 8:15 AM 9:00 AM 9:15 AM 9:15 AM 9:30 AM 9:45 AM 10:15 AM 10:30 AM 10:45 AM 11:15 AM		0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0 0	0 0 0 0 0 0		0 0 0 0 0 0 0	100 115 128 165 167 164 184 172		0 0 0 0 0 0 0	105 144 167 168 166 167 183 149		205 259 333 333 331 367 321
TOTAL Volumes Approach % App/Depart	NL 0 #### 0	NT 0 #### /	NR 0 #### 0	SL 0 #### 0	ST 0 #### /	SR 0 #### 0	EL 0 0.00 1195	ET 1195 100.00 /	ER 0 0.00 1195	WL 0 0.00 1249	WT 1249 100.00 /	WR 0 0.00 1249	TOTAL 2444
	eak Hr Be	gins at:	745	AM									
AM Pe PEAK					0	0	0	680	0	0	684	0	1364





	DAT	SE	RVIC	ES OF		ZONA 20.31			vera	city	traf	ficg	oup
N-S STREET:	84th St.				DATE:	04/02/1	.9		LOCAT	FION:	Scottsda	ale	
E-W STREET:	Hayden	Rd.			DAY:	TUESD	ΑY		PROJE	CT#	19-1179	9-002	
	NO	RTHBO	UND	SO	UTHBOU	JND	E/	ASTBOU	ND	W	ESTBOU	IND	
LANES:	NL 0	NT 1	NR 0	SL 0	ST 1	SR 0	EL 1	ET 2	ER 1	WL 1	WT 2	WR 0	TOTAL
6:00 AM 6:15 AM 6:30 AM 6:45 AM 7:00 AM 7:15 AM 7:45 AM 8:00 AM 8:15 AM 8:00 AM 8:15 AM 9:00 AM 9:15 AM 9:00 AM 9:15 AM 10:00 AM 10:15 AM 10:30 AM 10:30 AM 10:45 AM 11:30 AM 11:30 AM	4 5 6 3 5 0	1 0 1 0 1 0 0	11 9 13 16 8 16 14 10	1 5 8 5 8 3 11 11	0 0 0 0 0 0	3 2 2 2 2 7 5	7 6 11 5 2 6 5 5	88 100 107 142 151 145 159 151	1 0 1 1 6 2 1 1	1 0 2 1 4 5 6 9	90 128 143 147 144 141 162 130	14 16 22 20 18 21 15 10	221 271 314 342 349 345 385 332
TOTAL Volumes	NL 31	NT 3	NR 97	SL 52	ST 0	SR 24	EL 47	ET 1043	ER 13	WL 28	WT 1085	WR 136	TOTAL 2559
Approach % App/Depart	23.66 131	2.29	74.05 186	68.42 76	0.00	31.58 41	4.26	94.56	1.18 1192	2.24	86.87	10.89 1140	2000
	ak Hr Beg	ins at:	745			14	1105		1172	1215		1110	
PEAK Volumes Approach %	16 22.22	2 2.78	54 75.00	27 67.50	0 0.00	13 32.50	18 2.88	597 95.52	10 1.60	16 2.34	594 86.84	74 10.82	1421
PEAK HR. FACTOR:		0.900	I		0.556	-		0.947	1		0.934		0.923

F IEL	d D at	a Se	RVIC	ES O		IZON 520.31			vera	city	traf	ficgr	oup
N-S STREET:	84th St.				DATE:	04/02/1	9		LOCA	TION:	Scottsda	ale	
E-W STREET:	Hayden	(Rd.	J		DAY:	TUESDA	Y		PROJI	ECT#	19-1179	9-002	
	NO	RTHBO	UND	SO	UTHBO	UND	E/	ASTBOU	ND	W	ESTBOU	ND	
LANES:	NL 0	NT 1	NR 0	SL 0	ST 1	SR 0	EL 1	ET 2	ER 1	WL 1	WT 2	WR 0	TOTAL
1:00 PM 1:15 PM 1:30 PM 1:45 PM 2:00 PM 2:15 PM 2:30 PM 2:45 PM 3:00 PM 3:45 PM 3:30 PM 3:45 PM 4:00 PM 4:15 PM 5:30 PM 5:15 PM 5:30 PM 5:45 PM 6:00 PM 6:45 PM	3 1 5 1 3 3 2 1	0 0 0 0 0 0 0 1	3 4 23 7 8 12 6 13	15 22 8 29 10 14 9 4	0 0 0 1 0 1 0 0	15 16 8 18 9 7 8 1	6 3 5 0 5 3 2 2	272 276 265 300 284 247 217 187	2 5 3 6 13 10 7 4	10 10 13 10 13 7 11 11	162 176 193 150 167 163 128 108	3 7 3 3 8 2 2	491 520 516 525 515 475 392 334
TOTAL Volumes	NL 19	NT 1	NR 76	SL 111	ST 2	SR 82	EL 26	ET 2048	ER 50	WL 75	WT 1247	WR 31	TOTAL 3768
Approach % App/Depart	19.79 96	1.04	79.17 58	56.92 195	1.03	42.05 127	1.22 2124	96.42	2.35 2235	5.54 1353	92.17	2.29 1348	
	ak Hr Beg	, jins at:	415		/			/			/	_0.0	
PEAK Volumes Approach %	10 19.23	0 0.00	42 80.77	69 57.02	1 0.83	51 42.15	13 1.12	1125 96.57	27 2.32	36 4.88	686 92.95	16 2.17	2076
PEAK HR. FACTOR:	I	0.464	ļ		0.630	I		0.952	I		0.927	Í	0.989



				leisel		ared		ement					
Ē IELD	D ат/	A SE	RVICI	S OF			a, Ind 6.674		vera	acity	traf	ficgı	oup
S STREET:	Northsig	ght Blvd	l.		DATE:	04/02/:	19		LOCA	TION:	Scottsd	ale	
W STREET:	Hayden	Rd.			DAY:	TUESD	AY		PROJ	ECT#	19-1179	9-003	
	NO	RTHBO	UND	SO	UTHBOL	JND	E	ASTBOU	ND	W	'ESTBOU	IND	
LANES:	NL 0.5	NT 0.5	NR 1	SL 0	ST 0	SR 1	EL 0.5	ET 1	ER 0.5	WL 0.5	WT 1	WR 0.5	TOTAL
6:00 AM 6:15 AM 6:30 AM 6:45 AM 7:00 AM 7:15 AM 7:30 AM 8:00 AM 8:15 AM 8:30 AM 8:45 AM 9:15 AM 9:15 AM 10:30 AM 10:31 AM 10:32 AM 11:30 AM 11:15 AM	11 10 14 15 13 19 17 15	24 25 30 33 24 20 22	29 20 24 41 42 29 33 35	1 1 2 3 1 1 2 1	17 18 16 22 20 24 41 42	21 28 24 32 30 33 39	19 22 20 28 24 41 43 39	55 69 87 89 88 80 74 78	14 19 22 20 21 17 18 16	16 14 17 21 28 21 20	78 80 111 125 122 131 125 114	2 5 2 3 6 2 5 2	287 311 371 421 423 426 432 423
DTAL lumes proach % p/Depart	NL 114 19.76 577	NT 210 36.40 /	NR 253 43.85 473	SL 12 2.68 447	ST 200 44.74 /	SR 235 52.57 501	EL 236 23.53 1003	ET 620 61.81 /	ER 147 14.66 885	WL 154 14.43 1067	WT 886 83.04 /	WR 27 2.53 1235	TOTAL 3094
AM Pe	ak Hr Beg	gins at:	800	AM									
olumes proach %	64 21.19	99 32.78	139 46.03	5 1.88	127 47.74	134 50.38	147 27.27	320 59.37	72 13.36	90 15.08	492 82.41	15 2.51	1704
ak hr. Ctor:	I	0.858	I		0.811		I	0.976	ļ		0.927	I	0.986



FIELD	DAT	A SEI	RVICI	ES OF		ZONA 20.316			vera	city	traf	ficg	roup
N-S STREET:	Hayden	Rd.			DATE:	04/02/1	9		LOCA	TION:	Scottsda	ale	
E-W STREET:	Frank L	loyd Wr	ight Blv	d.	DAY:	TUESDA	Y		PROJ	ECT#	19-1179	9-004	
	NO	RTHBO	JND	SC	OUTHBOU	JND	E	ASTBOU	IND	W	ESTBOU	ND	
LANES:	NL 1.5	NT 0.5	NR 1	SL 1	ST 1	SR 0	EL 1	ET 3	ER 1	WL 2	WT 3	WR 1	TOTAL
6:00 AM 6:15 AM 6:30 AM 6:45 AM 7:00 AM 7:15 AM 7:30 AM 7:45 AM 8:00 AM 8:15 AM 8:30 AM 8:45 AM 9:15 AM 9:15 AM 9:30 AM 9:45 AM 10:00 AM 10:15 AM 10:30 AM 10:45 AM 11:30 AM 11:35 AM	29 33 30 54 41 45 69 60	2 2 5 1 4 2 5 2	74 75 50 74 76 66 50 49	3 2 5 1 4 2 5 2	1 0 1 2 1 4 1 3	1 0 1 1 2	1 1 1 0 1 2 1	214 252 305 333 236 263 246 228	28 24 41 42 29 60 65 54	69 78 80 89 1111 88 80 82	258 285 286 333 352 285 279	6 9 9 5 8 2	686 763 813 937 863 863 862 817 764
TOTAL Volumes Approach % App/Depart	NL 361 40.20 898	NT 23 2.56	NR 514 57.24 86	SL 24 54.55 44	ST 13 29.55 /	SR 7 15.91 1033	EL 9 0.37 2429	ET 2077 85.51 /	ER 343 14.12 2615	WL 677 21.60 3134	WT 2403 76.68 /	WR 54 1.72 2771	TOTAL 6505
	ak Hr Beg	gins at:	745	AM									
PEAK Volumes Approach %	209 42.92	12 2.46	266 54.62	12 52.17	8 34.78	3 13.04	4 0.31	1078 84.35	196 15.34	368 21.76	1295 76.58	28 1.66	3479
PEAK HR. FACTOR:		0.944	i	I	0.821	I		0.850	I		0.896		0.928

							16.67						
N-S STREET:	Hayden	Rd. ()		DATE:	04/02/1	.9		LOCA	TION:	Scottsda	ale	
E-W STREET:	Frank L	loyd Wr	ight Blv	d.	DAY:	TUESD	ΑY		PROJ	ECT#	19-1179	9-004	
	NO	RTHBO	UND	SO	UTHBOU	JND	E	ASTBOU	ND	W	ESTBOU	ND	
LANES:	NL 1.5	NT 0.5	NR 1	SL 1	ST 1	SR 0	EL 1	ET 3	ER 1	WL 2	WT 3	WR 1	TOTAL
1:00 PM 1:15 PM 1:30 PM 1:45 PM 2:00 PM 2:15 PM 2:30 PM 2:45 PM 3:00 PM 3:45 PM 4:00 PM 4:15 PM 4:30 PM 5:15 PM 5:30 PM 5:45 PM 6:00 PM 6:45 PM	136 122 121 104 108 85 106 103	3 2 1 4 1 2 5 2	133 154 174 158 181 174 169 131	5 2 3 6 9 5 8 5	7 4 8 5 9 6 3 2	2 5 2 3 6 2 5 1	1 2 1 1 2 1 1 2 1 1 0	325 310 501 411 333 285	54 41 45 58 54 74 75 50	69 80 74 78 66 41 32 22	258 296 333 322 341 328 285 276	8 5 2 3 6 2 5 2 5 2	1001 1023 1265 1153 1205 1061 1027 879
OTAL	NL	NT	NR	SL 42	ST	SR	EL	ET	ER	WL	WT	WR	TOTAL
/olumes Approach % App/Depart	885 40.61 2179	20 0.92	1274 58.47 62	43 38.05 113	44 38.94 /	26 23.01 957	9 0.27 3388	2928 86.42 /	451 13.31 4245	462 15.75 2934	2439 83.13	33 1.12 3350	8614
	eak Hr Beg	, gins at:	430		,			,			,		
PEAK /olumes	418 37.56	8	687	23	28 43 75	13 20.31	5 0.26	1675 87.65	231 12.09	259 16.23	1324 82.96	13 0.81	4684


FIELD	ο D ΑΤ/	A SE	RVIC	ES OF	ARI		, Inc		e vera	city	traf	ficgi	oup
•						20.31		5				0	
N-S STREET:						04/02/1					Scottsda		
E-W STREET:	Hayden	Ka.			DAT:	TUESD	AY		PROJ	ECT#	19-1179	9-005	
	NO	RTHBO	JND	SO	UTHBOI	JND	E	ASTBOU	ND	W	ESTBOU	ND	
LANES:	NL 1	NT 1	NR 1	SL 1	ST 1	SR 0	EL 1	ET 2	ER 0	WL 1	WT 2	WR 0	TOTAL
6:00 AM 6:15 AM 6:30 AM 7:00 AM 7:15 AM 7:30 AM 7:45 AM 8:00 AM 8:15 AM 9:00 AM 9:15 AM 9:30 AM 9:30 AM 9:45 AM 10:15 AM 10:30 AM 10:45 AM 11:30 AM 11:45 AM	5 7 8 7 17 2 6	6 6 4 6 4 7 9	11 8 7 16 11 17 21 27	3 4 7 2 6 3 7 2	1 1 2 3 8 4	1 1 2 0 0 0 1 5	2 6 5 1 6 3 5 5 5	85 83 110 123 137 119 133 149	4 8 4 5 2 4 9	9 14 5 8 15 15 4 10	61 79 99 101 80 111 112 126	5 6 13 11 18 7 12 9	193 223 264 278 303 286 316 361
OTAL /olumes	NL 54	NT 46	NR 118	SL 34	ST 20	SR 10	EL 33	ET 939	ER 40	WL 80	WT 769	WR 81	TOTAL 2224
Approach % App/Depart	24.77 218	21.10	54.13 160	53.13 64	31.25	15.63 140	3.26 1012	92.79	3.95 1091	8.60 930	82.69	8.71 833	
	ak Hr Beg	jins at:	800		/	2.0	1012	/	1071		/		
PEAK /olumes Approach %	27 20.93	26 20.16	76 58.91	18 43.90	17 41.46	6 14.63	19 3.29	538 93.24	20 3.47	44 8.48	429 82.66	46 8.86	1266
Peak Hr. Factor:	I	0.768			0.641			0.885	I		0.895	I	0.877



APPROACH LANES

					5	20.31	6.674	5		_			
N-S STREET:	Burger H	King Dri	iveway		DATE:	04/02/1	.9		LOCA	TION:	Scottsda	ale	
E-W STREET:	Hayden	Rd.			DAY:	TUESD	ΑY		PROJE	ECT#	19-1179	9-006	
	NO	RTHBO	UND	SO	UTHBOI	JND	EA	ASTBOU	ND	W	ESTBOU	ND	
LANES:	NL 0	NT 1	NR 0	SL 0	ST 1	SR 0	EL 1	ET 2	ER 1	WL 1	WT 2	WR 1	TOTAL
6:00 AM 6:15 AM 6:45 AM 7:00 AM 7:15 AM 7:45 AM 8:00 AM 8:15 AM 8:00 AM 9:00 AM 9:15 AM 9:00 AM 9:15 AM 10:00 AM 10:15 AM 10:30 AM 10:30 AM 10:30 AM	2 5 10 7 1 4 4 4	0 0 0 0 0 0	4 7 2 8 4 4 2 5	0 0 0 2 0 1	0 0 0 0 0 0 0	0 0 0 1 0 1 0	2 0 1 3 0 0 1	80 79 149 144 154 154 174 161	6 15 5 4 12 12 9 11	10 14 9 16 7 11 10 15	100 114 154 156 170 157 158 166	0 1 2 1 4 2 4 2	204 235 301 337 346 346 362 366
11:13 AM 11:30 AM 11:45 AM FOTAL /olumes Approach % App/Depart	NL 37 50.68 73	NT 0 0.00	NR 36 49.32 23	SL 3 60.00	ST 0 0.00	SR 2 40.00 166	EL 7 0.62 1136	ET 1055 92.87	ER 74 6.51 1094	WL 92 7.17 1283	WT 1175 91.58	WR 16 1.25 1214	TOTAL 2497
	ak Hr Beg	ins at:	800	Ű	/	100	1150	/	1051	1205	/	1211	
PEAK Volumes Approach %	13 46.43	0	15 53.57	3 60.00	0 0.00	2 40.00	4 0.59	633 92.95	44 6.46	43 6.09	651 92.21	12 1.70	1420

F IELI	D DAT	a Se	RVIC	ES O		IZON/ 520.31			e vera	city	traf	ficgr	oup
N-S STREET:	Burger I	<u> </u>	· · · · ·		DATE:	04/02/1	9		LOCA	TION:	Scottsda	ale	
E-W STREET:	Hayden	Rd.)		DAY:	TUESDA	Y		PROJ	ECT#	19-1179	9-006	
	NO	RTHBOU	JND	SO	UTHBOI	JND	E	ASTBOUI	ND	W	ESTBOU	ND	
LANES:	NL 0	NT 1	NR 0	SL 0	ST 1	SR 0	EL 1	ET 2	ER 1	WL 1	WT 2	WR 1	TOTAL
1:00 PM 1:15 PM 1:30 PM 1:45 PM 2:00 PM 2:45 PM 2:30 PM 2:45 PM 3:00 PM 3:15 PM 3:30 PM 3:45 PM 4:30 PM 4:15 PM 5:30 PM 5:15 PM 5:30 PM 6:45 PM 6:45 PM	2 2 4 3 2 1 0 1	0 0 0 0 0 0 1 0	2 8 3 4 6 1 2	2 2 6 1 3 1 0 1	0 0 0 0 0 0 0 0	4 3 2 9 4 4 2	0 3 2 1 1 4 2 1	295 294 301 280 341 265 269 215	8 13 15 3 11 7 4 4	4 5 6 8 3 4 2 2	182 186 185 176 174 168 172 121	1 1 8 5 5 2 0 0	500 517 532 490 548 462 455 349
TOTAL Volumes	NL 15	NT 1	NR 30	SL 16	ST 0	SR 32	EL 14	ET 2260	ER 65	WL 34	WT 1364	WR 22	TOTAL 3853
Approach % App/Depart	32.61 46	2.17		33.33 48	0.00	66.67 99	0.60		2.78	2.39	96.06	1.55	
	ak Hr Beg	/	415		1	77	2339	/	2300	1420	/	1411	
PEAK Volumes Approach %	11 36.67	0 0.00	19 63.33	12 40.00	0 0.00	18 60.00	7 0.55	1216 96.13	42 3.32	22 2.89	721 94.62	19 2.49	2087
PEAK HR. FACTOR:	I	0.750	ļ		0.750	I		0.896	I		0.957	I	0.952



-S STREET:	Costco		ay (83rd	Way)	DATE:	04/02/1	9		LOCA	TION:	Scottsda	ale	
-W STREET:	Hayden		0		DAY:	TUESDA	Y		PROJ	ECT#	19-1179	9-007	
	NO	RTHBO	UND	SC	UTHBOU	JND	E	ASTBOU	ND	W	ESTBOU	ND	
LANES:	NL 0	NT 1	NR 0	SL 0	ST 1	SR 0	EL 1	ET 2	ER 1	WL 1	WT 2	WR 0	TOTAL
1:15 PM 1:30 PM 1:45 PM 2:00 PM 2:15 PM 2:45 PM 3:00 PM 3:15 PM 3:30 PM 4:30 PM 4:30 PM 4:30 PM 4:30 PM 5:15 PM 5:30 PM 5:45 PM 6:30 PM 6:45 PM	0 1 1 1 1 1 0 2	0 0 0 0 0 0 0 0 0	47 58 65 54 56 51 49 50	1 1 2 1 0 2 2 2 2	0 0 1 0 1 0 0 0	14 20 23 10 34 18 20 10	4 6 4 7 3 3 0 1	229 253 209 237 259 229 208 167	22 15 7 16 19 13 7 8	63 64 70 62 67 50 64 55	126 134 124 138 112 127 110 72	2 2 0 2 1 0 1 1	508 554 506 528 553 494 461 368
DTAL Diumes	NL 7 1.60	NT 0 0.00	NR 430 98.40	SL 11 6.79	ST 2 1.23	SR 149 91.98	EL 28 1.45	ET 1791 92.99	ER 107 5.56	WL 495 34.21	WT 943 65.17	WR 9 0.62	<u>TOTAL</u> 3972
proach %	437	1	37	162	/	604	1926	/	2232	1447	/	1099	
p/Depart	eak Hr Beg	ains at:	415	PM									

Volumes					5, 201	19			City:	Scottsdale					Pro	ject #:	19-1	226-00	1
Location: AM Period	84th NB	St. & I	Hayde SB	n Rd.	EB		WB			PM Period	NB		SB		EB		WB		
00:00	0		1		9		9			12:00	10		9		128		134		
00:00	0		0		6		9 19			12:00	7		11		120		134		
00:30	3		0		9		13			12:30	5		10		139		158		
00:45	1	4	0	1	8	32	9	50	87	12:45	8	30	14	44	145	545	163	596	1215
01:00	2		3		4		7			13:00	13		16		141		166		
01:15	1		1		7		7			13:15	16		13		147		161		
01:30	0		0		10		6			13:30	13		20		154		154		
01:45	2	5	1	5	11	32	9	29	71	13:45	13	55	21	70	161	603	147	628	1356
02:00	1		2		7		5			14:00	11		28		166		141		
02:15	0		1		5		8			14:15	7		24		196		145		
02:30	0		0		8		4			14:30	5		26		179		158		
02:45	1	2	1	4	4	24	7	24	54	14:45	8	31	33	111	185	726	154	598	1466
03:00	0		0		7		10			15:00	14		30		201		185		
03:15	0		0		5		11			15:15	10		32		222		196		
03:30	0	~	0		8		13		<u>.</u>	15:30	11		28		243		199		
03:45	2	2	0	0	6	26	19	53	81	15:45	9	44	24	114	252	918	164	744	1820
04:00	1		0		9		13			16:00	7		28		279		176		
04:15	0		1		13		16			16:15	9		24		285		199		
04:30	3 1	5	0	2	16 14	52	21 41	91	150	16:30	11 20	47	41 42	135	276 296	1136	181	743	2061
04:45	2	5		2		52	54	91	150	16:45		4/	42 29	135		1130	187 174	743	2061
05:00 05:15	4		1 1		21 28		54 60			17:00 17:15	21 14		29 11		333 325		1/4		
05:15	7		2		20 42		76			17:15	8		20		222		155		
05:45	5	18	3	7	41	132	74	264	421	17:45	9	52	10	70	201	1081	141	621	1824
06:00	8	10	1		54	102	85	201	122	18:00	11	52	14	10	185	1001	107	ULI	1021
06:15	10		2		50		104			18:15	10		8		174		92		
06:30	11		4		66		117			18:30	7		5		146		86		
06:45	12	41	7	14	74	244	120	426	725	18:45	4	32	9	36	133	638	80	365	1071
07:00	17		9		89		115			19:00	5		6		120		79		
07:15	17		8		99		133			19:15	2		3		104		70		
07:30	18		11		111		161			19:30	1		2		105		76		
07:45	16	68	10	38	125	424	154	563	1093	19:45	3	11	5	16	87	416	60	285	728
08:00	20		14		155		174			20:00	2		2		85		65		
08:15	21		15		151		175			20:15	1		1		86		52		
08:30	19		13	-	154		158			20:30	0		0		60		53		
08:45	16	76	9	51	174	634	166	673	1434	20:45	0	3	1	4	54	285	39	209	501
09:00	11		17		146		151			21:00	1		2		43		30		
09:15	10		12		166		154			21:15	0		1		33		32		
09:30	8	24	8	49	161	627	147 141	502	1202	21:30	0 0	1	0	4	30 21	127	25	100	241
09:45	5	34	11	48	154	627	141	593	1302	21:45		1	1	4	21	127	22	109	241
10:00 10:15	9 11		10 14		152 155		122 131			22:00 22:15	2 0		2 1		19 16		20 19		
10:15	11		14 16		155 151		131			22:15	0		1		16 13		19 16		
10:30	16	49	13	53	151	616	125	529	1247	22:30	2	5	1	4	11	59	13	68	136
11:00	13		13	55	154	010	147	525		23:00	1	5	2		10		9		100
11:15	9		9		154		147			23:00	0		1		10		9 11		
11:30	6		6		143		139			23:30	1		1		12		10		
11:45	8	36	8	36	139	577	133	560	1209	23:45	0	2	0	4	8	44	7	37	87
Total Vol.		340		259		3420		3855	7874			313		612		6578		5003	12506
PS Coordi	noton			2.55 825607,	111 00			2022	/0/4			515		012	Dai	ly Total	-	5005	12500
	at 0 5		33.		-111.09							NB		SB	Jai	EB	-	WB	Combine
												653		871		9998		8858	20380
						АМ								-		PM			
Split %		4.3%		3.3%		43.4%		49.0%	38.6%			2.5%		4.9%		52.6%		40.0%	61.4%
Peak Hour		07:45		10:15		08:45		08:00	08:00			16:30		16:15		16:30		15:00	16:15
Volume		76		56		647		673	1434			66		136		1230		744	2128
P.H.F.		0.90		0.88		0.93		0.96	0.98			0.79		0.81		0.92		0.93	0.96

APPENDIX C

EXISTING PEAK HOUR ANALYSIS AND SIGNAL TIMING





	٦	-	4	+	1	Ť	1	1	ŧ	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	
Lane Configurations	5	≜ 1}	5	≜ †}	1	1	1	5	ĥ	
Traffic Volume (vph)	19	538	44	429	27	26	76	18	17	
Future Volume (vph)	19	538	44	429	27	26	76	18	17	
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	
Protected Phases		6		2	7	4			8	
Permitted Phases	6		2		4		4	8		
Detector Phase	6	6	2	2	7	4	4	8	8	
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	26.9	26.9	26.9	26.9	9.6	32.4	32.4	32.4	32.4	
Total Split (s)	76.0	76.0	76.0	76.0	24.0	44.0	44.0	20.0	20.0	
Total Split (%)	63.3%	63.3%	63.3%	63.3%	20.0%	36.7%	36.7%	16.7%	16.7%	
Yellow Time (s)	4.7	4.7	4.7	4.7	3.0	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.2	1.2	1.2	1.2	1.6	1.8	1.8	1.8	1.8	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.9	5.9	5.9	5.9	4.6	5.4	5.4	5.4	5.4	
Lead/Lag					Lead			Lag	Lag	
Lead-Lag Optimize?					Yes			Yes	Yes	
Recall Mode	None	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	93.1	93.1	93.1	93.1	16.4	15.6	15.6	8.0	8.0	
Actuated g/C Ratio	0.78	0.78	0.78	0.78	0.14	0.13	0.13	0.07	0.07	
v/c Ratio	0.03	0.22	0.09	0.19	0.22	0.13	0.35	0.33	0.27	
Control Delay	4.8	4.5	5.1	4.3	45.1	43.4	11.5	63.3	47.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.8	4.5	5.1	4.3	45.1	43.4	11.5	63.3	47.5	
LOS	A	A	A	A	D	D	B	E	D	
Approach Delay		4.5		4.3	5	25.0	5	-	54.4	
Approach LOS		A		A		C			D	
									-	
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 12										
Offset: 72 (60%), Reference	ced to phase	2:WBTL	, Start of	Green						
Natural Cycle: 70										
Control Type: Actuated-Co	ordinated									
Maximum v/c Ratio: 0.35										
Intersection Signal Delay:						n LOS: A				
Intersection Capacity Utiliz	ation 45.6%	1		10	CU Level	of Service	эA			
Analysis Period (min) 15										
Colite and Dhases 4.93	ord Diago 9		lood							
Splits and Phases: 1:83	Brd Place &	пауцеп н	USO							
Ø2 (R)							- I 🖘	Ø4		
76 s							44 s			
A							1			L K
								Ø7		¥ Ø8

Lane Configurations 1		۶	-	\mathbf{F}	1	+	•	1	Ť	1	1	ŧ	-
Traffic Volume (velvh) 19 538 20 44 429 46 27 26 76 18 17 Initial Q (Qb), veh 0	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SE
Traffic Volume (velvh) 19 538 20 44 429 46 27 26 76 18 17 Initial Q (Qb), veh 0	Lane Configurations		^ î>			≜ 17⊧		۲			۲	4Î	
Initial Q(b), veh 0 0 0 0 0 0 0 0 0 0 0 Parking Bis, Adj 1.00	Traffic Volume (veh/h)	19	538	20	44	429	46	27	26	76	18	17	
Pad-Bike Adj(A, pbT) 1.00 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 1.01 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>													
Parking Bus, Agi 1.00 1.0			0			0			0			0	
Work Zone On Ápproach No No </td <td></td> <td>1.</td>													1.
Adj Sat Flow, vehninin 1772 1969 1772 1772 1969 1772 1772 1969 1 Adj Flow Rate, veh/n 21 604 10 49 477 34 35 34 67 28 27 Percent Heavy Veh, % 2		1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.0
Adj Flow Rate, veh/h 21 604 10 49 477 34 35 34 67 28 27 Peak Hour Factor 0.89 0.89 0.89 0.90 0.90 0.77 0.77 0.77 0.64 <td></td>													
Peak Hour Factor 0.89 0.89 0.89 0.90 0.90 0.77 0.72 0.77													17
Percent Heavy Veh, % 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2													
Cap, veh/h 697 2971 49 633 2794 199 154 230 176 121 87 Arrive On Green 0.79 0.79 0.79 0.79 0.79 0.79 0.03 0.12 0.12 0.12 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.07 0.07 0.07 0.07 0.07 0.07 0.02 1.20 1.12 0.05 0.05 0.05 0.05 0.05 0.05 0.07 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00													0.0
Arrive On Green 0.79 0.79 0.79 0.79 0.79 0.79 0.03 0.12 0.12 0.05 0.05 0.5 Sat Flow, veh/h 842 3766 62 766 3542 252 1688 1969 1502 1226 1741 Grp Volume(v), veh/h 21 300 314 49 251 260 35 34 67 28 0 Grp Sat Flow(s), veh/h 842 1766 1870 1923 1688 1969 1502 1226 0 1 Q Serve(g.s), s 0.7 4.8 4.8 6.9 3.9 4.0 2.3 1.9 4.9 2.7 0.0 Cycle Q Clear(g.c), s 4.7 4.8 4.8 6.9 3.9 4.0 2.3 1.9 4.9 2.7 0.0 Lane Grp Cap(c), veh/h 697 1476 1544 633 1476 1517 154 230 176 121 0 V/C Ratio(X), veh/h 697 1476 1544 633 1476 1517 178													
Sat Flow, veh/h 842 3766 62 766 3542 252 1688 1969 1502 1226 1741 Grp Volume(v), veh/h 21 300 314 49 251 260 35 34 67 28 0 Grp Sat Flow(s), veh/h/ln 842 1870 1958 766 1870 1923 1688 1969 1502 1226 0 1 Q Serve(g.s), s 0.7 4.8 4.8 2.1 3.9 4.0 2.3 1.9 4.9 2.7 0.0 Cycle Q Clear(g.c), s 4.7 4.8 4.8 6.9 3.9 4.0 2.3 1.9 4.9 2.7 0.0 Cycle Q Clear(g.c), veh/h 697 1476 1544 633 1476 1517 154 230 176 0.38 0.23 0.00 0 VIC Ratio(X) 0.03 0.20 0.20 0.8 0.17 0.17 0.23 0.15 0.38 0.23 0.00 0 0 0 0 0 0 0													
Grp Volume(v), veh/h 21 300 314 49 251 260 35 34 67 28 0 Grp Sat Flow(s), veh/h/h 842 1870 1958 766 1870 1923 1688 1969 1502 1226 0 1 Q Serve(g, s), s 0.7 4.8 4.8 2.1 3.9 4.0 2.3 1.9 4.9 2.7 0.0 Cycle Q Clear(g, c), s 0.7 4.8 4.8 6.9 3.9 4.0 2.3 1.9 4.9 2.7 0.0 V/cke Q Clear(g, c), s 0.7 4.8 4.8 6.9 3.9 4.0 2.3 1.9 4.9 2.7 0.0 Lane Grp Cap(c), veh/h 697 1476 1544 633 1476 1517 378 633 483 209 0 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 1.00 1.00 1.00 1.00 1.00 1.00 1.00													0.0
Grp Sat Flow(s), veh/h/in 842 1870 1958 766 1870 1923 1688 1969 1502 1226 0 1 Q Serve(g_c), s 0.7 4.8 4.8 2.1 3.9 4.0 2.3 1.9 4.9 2.7 0.0 Cycle Q Clear(g_c), s 4.7 4.8 4.8 6.9 3.9 4.0 2.3 1.9 4.9 2.7 0.0 Cycle Q Clear(g_c), s 4.7 4.8 4.8 6.9 3.9 4.0 2.3 1.9 4.9 2.7 0.0 Cycle Q Clear(g_c), s 4.7 4.8 4.8 6.9 3.9 4.0 2.3 1.9 4.9 2.7 0.0 Lane Grp Cap(c), veh/h 697 1476 1544 633 1476 1517 158 633 433 29 0 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 1.00 1.00 1.00 1.00 1.00 1.00 1.00													1
Q Šerve(g_s), s 0.7 4.8 4.8 2.1 3.9 4.0 2.3 1.9 4.9 2.7 0.0 Cycle Q Clear(g_c), s 4.7 4.8 4.8 6.9 3.9 4.0 2.3 1.9 4.9 2.7 0.0 Prop In Lane 1.00 0.03 1.00 0.13 1.00 1.0													
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Prop In Lane 1.00 0.03 1.00 0.13 1.00													1
Lane Grp Cap(c), veh/h 697 1476 1544 633 1476 1517 154 230 176 121 0 V/C Ratio(X) 0.03 0.20 0.20 0.08 0.17 0.17 0.23 0.15 0.38 0.23 0.00 (Avail Cap(c_a), veh/h 697 1476 1544 633 1476 1517 378 633 483 209 0 HOM Platoon Ratio 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0			4.8			3.9			1.9			0.0	1
V/C Ratio(X) 0.03 0.20 0.20 0.08 0.17 0.17 0.23 0.15 0.38 0.23 0.00 0 Avail Cap(c. a), veh/h 697 1476 1544 633 1476 1517 378 633 463 209 0 ICM Platoon Ratio 1.00			4.470			4.470			000			0	0.
Avail Cap(c.a), veh/h 697 1476 1544 633 1476 1517 378 633 483 209 0 HCM Platoon Ratio 1.00													1
HCM Platoon Ratio 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0													0.3
Upstream Filter(I) 1.00 0.00 0.0 0													2
Uniform Delay (d), s/veh 3.7 3.2 3.2 4.1 3.1 3.1 50.2 47.6 49.0 55.4 0.0 49.0 55.6 0.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 11.4 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0 </td <td></td> <td>1.</td>													1.
Incr Delay (d2), siveh 0.0 0.0 0.2 0.3 0.2 0.3 0.1 0.5 0.4 0.0 Initial Q Delay(d3), siveh 0.0 <													1.0
Initial Q Delay(d3),s/veh 0.0 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>55 0</td></t<>													55 0
%ile BackOfQ(50%),veh/ln 0.1 1.5 1.6 0.3 1.3 1.4 1.0 0.9 1.9 0.8 0.0 Unsig. Movement Delay, siveh 3.7 3.2 3.2 4.3 3.3 3.3 50.5 47.7 49.5 55.8 0.0 1.0 LnGrp Delay(d),siveh 3.7 3.2 3.2 4.3 3.3 3.3 50.5 47.7 49.5 55.8 0.0 1.0 LnGrp LOS A A A A A D D E A Approach Vol, veh/h 635 560 136 58 57.7 Approach LOS A A A O E Timer - Assigned Phs 2 4 6 7 8 Phs Duration (G+Y+Rc), s 100.6 19.4 100.6 8.0 11.4 Change Period (Y+Rc), s *5.9 *5.4 *5.9 *4.6 *5.4 Max Green Setting (Gmax), s *70 *39 *70 *19 *15 Max Q Clear Time (p, c), s 1.2 0.2 1.4 0.0													0
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LnGrp LOS A D D D E A Approach Delay, slveh 3.2 3.4 49.3 55.7 Approach Delay, slveh 3.2 3.4 49.3 55.7 Approach LOS A A D E			3.0	3.0	13	33	33	50.5	177	10.5	55.8	0.0	55
Approach Vol, veh/h 635 560 136 58 Approach Delay, siveh 3.2 3.4 49.3 55.7 Approach LOS A A D E Timer - Assigned Phs 2 4 6 7 8 Phs Duration (G+Y+Rc), s 100.6 19.4 100.6 8.0 11.4 Change Period (Y+Rc), s *5.9 *5.4 *5.9 *4.6 *5.4 Max Green Setting (Gmax), s *70 *39 *70 *19 *15 Max Qclear Time (p_c), s 1.2 0.2 1.4 0.0 0.1 Intersection Summary HCM 6th Ctrl Delay 10.0 HCM 6th LOS B Notes User approved pedestrian interval to be less than phase max green. E User approved pedestrian interval to be less than phase max green. E													Ju
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Approach LOS A A D E Timer - Assigned Phs 2 4 6 7 8 Phs Duration (G+Y+Rc), s 100.6 19.4 100.6 8.0 11.4 Change Period (Y+Rc), s *5.9 *5.4 *5.9 *4.6 *5.4 Max Green Setting (Gmax), s *70 *39 *70 *19 *15 Max Q Clear Time (g_c+11), s 8.9 6.9 6.8 4.3 4.7 Green Ext Time (g_c, s), s 1.2 0.2 1.4 0.0 0.1 Intersection Summary HCM 6th Ctrl Delay 10.0 HCM 6th Ctrl Delay 10.0 HCM 6th Ctrl Delay 10.0 HCM 6th Ctrl Delay 10.0 HCM 6th LOS B Notes User approved pedestrian interval to be less than phase max green. User approxed pedestrian interval to be less than phase max green. E													
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HCM 6th Ctrl Delay 10.0 HCM 6th LOS B Notes User approved pedestrian interval to be less than phase max green.	Green Ext Time (p_c), s		1.2		0.2		1.4	0.0	0.1				
HCM 6th Ctrl Delay 10.0 HCM 6th LOS B Notes User approved pedestrian interval to be less than phase max green.	Intersection Summary												
HCM 6th LOS B Notes User approved pedestrian interval to be less than phase max green.				10.0									
Notes User approved pedestrian interval to be less than phase max green.													
User approved pedestrian interval to be less than phase max green.				5									_
* HCM bth computational engine requires equal clearance times for the phases crossing the barrier													
	* HCM 6th computational engir	ne requir	es equal	clearance	e times fo	r the pha	ses crossi	ing the ba	rrier.				

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Movement EBL EBT EBR WBL WBT WBT NBT NBT NBT SBL SBT SBR Lane Configurations 37 554 26 96 500 12 0 0 92 8 0 11 Configurations 37 554 26 96 500 12 0 0 92 8 0 11 Confilicing Peds,#/m 0<	Hayden One Existing AM										2:	Cost	co Dr	Wy & Hayden Road HCM 6th TWSC
Int Delay, s/veh 2.3 Movement EBL EBT EBR WBL WBT WBR NBL NBT NBT SBL SBT SBR Lane Configurations 1 1 1 1 1 1 1 1 1 Traffic Vol, veh/h 37 554 26 96 500 12 0 0 92 8 0 11 Future Vol, veh/h 37 554 26 96 500 12 0 0 92 8 0 11 Conflicting Peds,#hr 0	Intersection													
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Lane Configurations Y	Movement	FRI	FRT	FRR	WRI	WBT	WRR	NRI	NBT	NRR	SBI	SBT	SBR	
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Conflicting Peds, #/hr 0 <td></td>														
Sign Control Free Free Free Free Free Stop Stop <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td></td> <td></td> <td></td>									0					
RT Channelized None None<				Free	Free	Free	Free		Stop	Stop	Stop	Stop	Stop	
Storage Length 135 - 135 175 - - 0 0 26 2 -						-								
Veh in Median Storage, # 0 - 0 - 0 - 1 - Grade, % - 0 0		135		135	175		-		-	0	-		-	
Grade, % - 0 - - 0 - - 0 - Peak Hour Factor 91 91 96 96 72 72 72 43 43 43 Heavy Vehicles, % 2 3 3 3 3 2			0			0	-	-	0	-	-	1	-	
Peak Hour Factor 91 91 91 96 96 72 72 72 43 43 43 Heavy Vehicles, % 2 335 1115 1448 267 Stage 1 - - - - - - - 6.94 7.54 6.54 6.94 - - - 6.94 7.51 6.54 6.94 - - -	Grade, %				-	0			0		-	0	-	
Mmit Flow 41 609 29 100 521 13 0 128 19 0 26 Major/Image Minor Minor Minor Minor Minor Conflicting Flow All 534 0 0 638 0 0 - 20 - 332 352 4.02 3.32 352 4.02 3.32 352 4.02 3.32 352	Peak Hour Factor	91	91	91	96	96	96	72	72	72	43	43	43	
Mvmt Flow 41 609 29 100 521 13 0 128 19 0 26 Major/Minor Major1 Major2 Minor1 Minor2 Conflicting Flow All 534 0 0 638 0 0 - - 305 1115 1448 267 Stage 1 - - - - - - - 728 728 - Critical Hdwy 4.14 - - 4.14 - - 6.94 7.54 6.54 5.94 Critical Hdwy Stg 2 - - - - - - 6.54 5.54 - Collow-up Hdwy 2.22 - 2.22 - - 3.32 3.52 4.02 3.32 Pollow-up Hdwy 2.22 - 2.22 - - 0 0 6.91 118 120 3.32 Stage 1 - - - <td>Heavy Vehicles, %</td> <td>2</td> <td></td>	Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Conflicting Flow All 534 0 0 638 0 - - 305 1115 1448 267 Stage 1 - - - - - 728 - Stage 2 - - - - - 387 720 - Critical Hdwy 4.14 - - 4.14 - - - 6.94 7.54 6.54 6.94 Critical Hdwy Stg 1 - - - - 6.94 7.54 6.54 - Critical Hdwy Stg 2 - - - - 6.94 7.54 6.54 - Contincal Hdwy Stg 2 - - - - 323 3.52 4.02 3.32 Pot Cap-1 Maneuver 1030 - 942 - - 0 0 691 163 130 731 Stage 1 - - - 0 0 691 118 112 731 Mov Cap-1 Maneuver 1030 - 942 - <t< td=""><td>Mvmt Flow</td><td>41</td><td>609</td><td>29</td><td>100</td><td>521</td><td>13</td><td>0</td><td>0</td><td>128</td><td>19</td><td>0</td><td>26</td><td></td></t<>	Mvmt Flow	41	609	29	100	521	13	0	0	128	19	0	26	
Conflicting Flow All 534 0 0 638 0 - - 305 1115 1448 267 Stage 1 - - - - - 728 - Stage 2 - - - - - 387 720 - Critical Hdwy 4.14 - - 4.14 - - - 6.94 7.54 6.54 6.94 Critical Hdwy Stg 1 - - - - 6.94 7.54 6.54 - Critical Hdwy Stg 2 - - - - 6.94 7.54 6.54 - Contincal Hdwy Stg 2 - - - - 323 3.52 4.02 3.32 Pot Cap-1 Maneuver 1030 - 942 - - 0 0 691 163 130 731 Stage 1 - - - 0 0 691 118 112 731 Mov Cap-1 Maneuver 1030 - 942 - <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>														
Conflicting Flow All 534 0 0 638 0 - - 305 1115 1448 267 Stage 1 - - - - - 728 - Stage 2 - - - - - 387 720 - Critical Hdwy 4.14 - - 4.14 - - - 6.94 7.54 6.54 6.94 Critical Hdwy Stg 1 - - - - 6.94 7.54 6.54 - Critical Hdwy Stg 2 - - - - 6.94 7.54 6.54 - Contincal Hdwy Stg 2 - - - - 323 3.52 4.02 3.32 Pot Cap-1 Maneuver 1030 - 942 - - 0 0 691 163 130 731 Stage 1 - - - 0 0 691 118 112 731 Mov Cap-1 Maneuver 1030 - 942 - <t< td=""><td>Major/Minor</td><td>Major1</td><td></td><td>1</td><td>Major2</td><td></td><td>1</td><td>Minor1</td><td></td><td>I</td><td>/linor2</td><td></td><td></td><td></td></t<>	Major/Minor	Major1		1	Major2		1	Minor1		I	/linor2			
Stage 2 - - - - - - 387 720 - Critical Hdwy 4.14 - 4.14 - - - 6.94 7.54 6.54 6.94 Critical Hdwy Stg 1 - - - - 6.54 5.54 - Critical Hdwy Stg 2 - - - - 6.54 5.54 - Follow-up Hdwy 2.22 - 2.22 - - 0 0 691 163 130 731 Stage 1 - - - 0 0 - 381 427 - Stage 2 - - - 0 0 - 381 127 - Stage 1 - - - - - 691 118 112 731 Mov Cap-2 Maneuver - - - - 232 207 - Stage 1 - - - - - - 232 207 -	Conflicting Flow All		0	0	638	0	0	-	-	305	1115	1448	267	
Stage 2 - - - - - 387 720 - Critical Hdwy 4.14 - 4.14 - - 6.94 7.54 6.54 6.94 Critical Hdwy Stg 1 - - - 6.54 6.54 6.54 - Critical Hdwy Stg 2 - - - - 6.54 5.54 - Follow-up Hdwy 2.22 - 2.22 - 0 0 691 163 130 731 Stage 1 - - - 0 0 - 383 427 - Stage 2 - - - 0 0 - 381 427 - Stage 2 - - - 0 0 - 88 - Mov Cap-1 Maneuver 1030 - 942 - - - 691 118 112 731 Mov Cap-2 Maneuver - - - - 691 118 112 731 Stage 2 <td>Stage 1</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>728</td> <td>728</td> <td>-</td> <td></td>	Stage 1	-	-	-	-	-	-	-	-	-	728	728	-	
Critical Hdwy Stg 1 - - - - - 6.54 5.54 - Critical Hdwy Stg 2 - - - - - 6.54 5.54 - Critical Hdwy Stg 2 - - 2.22 - - 3.32 3.52 4.02 3.32 Polt Cap-1 Maneuver 1030 - 942 - 0 0 691 163 130 731 Stage 1 - - - - 0 0 691 163 130 731 Stage 2 - - - 0 0 691 163 130 - Platon blocked, % - - - 0 0 691 118 112 731 Mov Cap-1 Maneuver 1030 - 942 - - 691 118 112 731 Mov Cap-2 Maneuver - - - - 223 207 - Stage 1 - - - 242 - 368 2 - Stage		-	-	-	-	-	-	-	-	-	387	720	-	
Critical Hdwy Stg 2 - - - - - - 6.54 5.54 - Follow-up Hdwy 2.22 - 2.22 - - - 3.32 3.52 4.02 3.32 Pot Cap 1 Maneuver 1030 - 942 - 0 0 691 163 130 731 Stage 1 - - - 0 0 691 163 130 731 Stage 1 - - - 0 0 - 608 430 - Platoon blocked, % - - - - 691 118 112 731 Mov Cap-2 Maneuver - - - 691 118 112 731 Mov Cap-2 Maneuver - - - - 691 118 112 731 Mov Cap-2 Maneuver - - - - - 691 118 112 731 Stage 2 - - - - - - 476	Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	7.54	6.54	6.94	
Follow-up Hdwy 2.22 - 2.22 - - - 3.32 3.52 4.02 3.32 Pot Cap-1 Maneuver 1030 - 942 - 0 0 691 163 130 731 Stage 1 - - - 0 0 - 342 - - 0 0 691 163 130 731 Stage 2 - - - 0 0 - 344 27 - Platoon blocked, % - - - - 0 0 - 814 127 - Mov Cap-2 Maneuver 1030 - 942 - - - - 223 207 - Stage 1 - - - - - - - 233 235 - - 233 235 - - 233 207 - - 233 207 - 346 382 - - 346 382 - - 346 38	Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	5.54	-	
Pot Cap-1 Maneuver 1030 - 942 - 0 0 691 163 130 731 Stage 1 - - - 0 0 - 381 427 - Stage 2 - - - 0 0 - 801 427 - Platoon blocked, % - - - 0 0 - 601 118 112 731 Mov Cap-1 Maneuver 1030 - 942 - - - 691 118 112 731 Mov Cap-2 Maneuver - - - - - - 2 207 - Stage 1 - - - - - - - 366 382 - Stage 2 - - - - - - - 4113 - Approach EB WB NB SB B C - - - 373 HCM Control Delay, s 0.5 1.5 <td< td=""><td>Critical Hdwy Stg 2</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td>6.54</td><td>5.54</td><td>-</td><td></td></td<>	Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	5.54	-	
Stage 1 - - - - - - - - - - - - - - - - 0 0 - 381 427 - - - - - - 0 0 - 381 427 - - - - - - 0 0 - 381 427 - 3 3 - -	Follow-up Hdwy	2.22	-	-	2.22	-	-	-	-	3.32	3.52	4.02	3.32	
Stage 2 - - - - 0 0 - 608 430 - Platoon blocked, % - - - - - - - - Mov Cap-1 Maneuver 1030 - 942 - - 691 118 112 731 Mov Cap-2 Maneuver - - - - 691 118 112 731 Mov Cap-2 Maneuver - - - - - 223 207 - Stage 1 - - - - - - 366 382 - Stage 2 - - - - - - 476 413 - Approach EB WB NB SB - - - 476 413 - HCM LOS 0.5 1.5 11.4 15.9 - - - 373 HCM Lane V/C Ratio 0.185 0.039 - 0.106 - 0.1118 - - 15.9<	Pot Cap-1 Maneuver	1030	-	-	942	-	-	0	0	691	163	130	731	
Platon blocked, %	Stage 1	-	-	-	-	-	-	0	0	-			-	
Mov Cap-1 Maneuver 1030 - 942 - - 691 118 112 731 Mov Cap-2 Maneuver - - - - - - 691 118 112 731 Stage 1 - - - - - - 207 - Stage 1 - - - - - - 368 382 - Approach EB WB NB SB - - 4/76 4/13 - Approach EB WB NB SB - - - - - - - - - - - - - - - - 4/76 4/13 - Approach EB WB NB SB - - - - - - - - - - - - - - - - <td>Stage 2</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> <td>0</td> <td>0</td> <td>-</td> <td>608</td> <td>430</td> <td>-</td> <td></td>	Stage 2	-	-	-	-	-	-	0	0	-	608	430	-	
Mov Cap-2 Maneuver - - - - - - 223 207 - Stage 1 - - - - - - - 203 207 - Stage 1 - - - - - - - 366 382 - Stage 2 - - - - - - - 476 413 - Approach EB WB NB SB - - - 476 413 - Minor Lane/Major Mvmt NBLn1 EBL EBT EBR WBL WBT NBL - - - 373 HCM Lane V/C Ratio 0.185 0.039 - - 0.106 - 0.118 HCM Lane LOS B A - A - C -	Platoon blocked, %		-	-		-	-							
Stage 1 - - - - - - - 366 382 - Stage 2 - - - - - - - - - - - 366 382 - Approach EB WB NB SB - - - - - - - - - - - - - - - - - - 476 413 - Approach EB WB NB SB - - 11.4 15.9 - - - 373 - - - 0.106 - 0.118 - - 0.106 - 0.118 - - 0.106 - 0.118 - - 0.29 - 7.9 - 15.9 - - 15.9 - - 0.0 - 0.0 - 0.0 -	Mov Cap-1 Maneuver	1030		-	942				-	691			731	
Stage 2 - - - - - - 476 413 - Approach EB WB NB SB HCM Control Delay, s 0.5 1.5 11.4 15.9 HCM LOS B C Minor Lane/Major Mvmt NBLn1 EBL EBT EBR WBL WBT WBR SBLn1 Capacity (veh/h) 691 1030 - 942 - 373 HCM Lane V/C Ratio 0.185 0.039 - 0.106 - 0.118 HCM Lane LOS B A - A - C	Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-			-	
Approach EB WB NB SB HCM Control Delay, s 0.5 1.5 11.4 15.9 HCM LOS B C Minor Lane/Major Mvmt NBLn1 EBL EBT EBR WBL WBR SBLn1 Capacity (veh/h) 691 1030 - - 942 - 373 HCM Lane V/C Ratio 0.185 0.039 - 0.106 - 0.118 HCM Control Delay (s) 11.4 8.6 - 9.3 - 15.9 HCM Lane LOS B A - A - C		-	-	-	-	-	-	-	-	-			-	
HCM Control Delay, s 0.5 1.5 11.4 15.9 HCM LOS B C Minor Lane/Major Mvmt NBLn1 EBL EBT EBR WBL WBR SBLn1 Capacity (veh/h) 691 1030 - - 942 - 373 HCM Lane V/C Ratio 0.185 0.039 - - 0.106 - 0.118 HCM Control Delay (s) 11.4 8.6 - 9.3 - 15.9 HCM Lane LOS B A - A - C	Stage 2	-	-	-	-	-	-	-	-	-	476	413	-	
HCM Control Delay, s 0.5 1.5 11.4 15.9 HCM LOS B C Minor Lane/Major Mvmt NBLn1 EBL EBT EBR WBL WBR SBLn1 Capacity (veh/h) 691 1030 - - 942 - 373 HCM Lane V/C Ratio 0.185 0.039 - - 0.106 - 0.118 HCM Control Delay (s) 11.4 8.6 - 9.3 - 15.9 HCM Lane LOS B A - A - C														
HCM LOS B C Minor Lane/Major Mvmt NBLn1 EBL EBT EBR WBL WBT WBR SBLn1 Capacity (veh/h) 691 1030 - - 942 - - 373 HCM Lane V/C Ratio 0.185 0.039 - - 0.106 - 0.118 HCM Control Delay (s) 11.4 8.6 - 9.3 - 15.9 HCM Lane LOS B A - A - C	Approach	EB			WB			NB			SB			
HCM LOS B C Minor Lane/Major Mvmt NBLn1 EBL EBR WBL WBT WBR SBLn1 Capacity (veh/h) 691 1030 - - 942 - 373 HCM Lane V/C Ratio 0.185 0.039 - - 0.106 - 0.118 HCM Control Delay (s) 11.4 8.6 - 9.3 - 15.9 HCM Lane LOS B A - A - C	HCM Control Delay, s	0.5			1.5			11.4			15.9			
Capacity (veh/h) 691 1030 - - 942 - - 373 HCM Lane V/C Ratio 0.185 0.039 - 0.106 - - 0.118 HCM Control Delay (s) 11.4 8.6 - 9.3 - 15.9 HCM Lane LOS B A - A - C	HCM LOS							В			С			
Capacity (veh/h) 691 1030 - - 942 - - 373 HCM Lane V/C Ratio 0.185 0.039 - 0.106 - - 0.118 HCM Control Delay (s) 11.4 8.6 - 9.3 - 15.9 HCM Lane LOS B A - A - C														
HCM Lane V/C Ratio 0.185 0.039 0.106 0.118 HCM Control Delay (s) 11.4 8.6 9.3 15.9 HCM Lane LOS B A A C	Minor Lane/Major Mvm	it I	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
HCM Control Delay (s) 11.4 8.6 9.3 15.9 HCM Lane LOS B A A C	Capacity (veh/h)		691	1030	-	-	942	-	-	373				
HCM Lane LOS B A A C	HCM Lane V/C Ratio		0.185	0.039	-	-	0.106	-	-	0.118				
	HCM Control Delay (s)		11.4	8.6	-	-	9.3	-	-	15.9				
HCM 95th %tile O(veh) 0.7 0.1 0.4 0.4	HCM Lane LOS		В	А	-	-	А	-	-	С				
	HCM 95th %tile Q(veh))	0.7	0.1	-	-	0.4	-	-	0.4				

05/30/2019 CivTech BR Synchro 10 Report Page 3 Hayden One Existing AM 3: 84th Street & Hayden Road HCM 6th TWSC

Int Delay, s/veh Movement	1.7 EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ľ	<u></u>	1	5	≜ ↑₽	TIDIT	5	1	HDI	ODL	4	ODIX
Traffic Vol. veh/h	18	597	10	16	594	74	16	2	54	27	0	13
Future Vol. veh/h	18	597	10	16	594	74	16	2	54	27	0	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	135		100	145		-	45		-	-	-	NUNC
Veh in Median Storage,		0	- 100	-	0	-	-	1	-	-	1	
Grade. %		0			0		-	0			0	
Peak Hour Factor	95	95	95	93	93	93	90	90	90	56	56	56
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	19	628	11	17	639	80	18	2	60	48	0	23
	19	020		17	039	00	10	2	00	40	0	20
Major/Minor Ma	ajor1			Major2		N	/linor1		Ν	Minor2		
Conflicting Flow All	719	0	0	639	0	0	1020	1419	314	1066	1390	360
Stage 1		-	-	- 005	-	-	666	666	- 514		713	- 300
Stage 2			-	-		-	354	753	-	353	677	
	4.14		-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	4.14			4.14	-		6.54	5.54	0.94	6.54	5.54	0.94
Critical Hdwy Stg 2	-		-		-		6.54	5.54	-	6.54	5.54	-
	- 2.22			2.22	-		6.54 3.52				5.54 4.02	3.32
		-	-		-	-		4.02	3.32	3.52		
Pot Cap-1 Maneuver	878			941		-	191 415	136 456	682	177 389	141 434	637
Stage 1	-	-	-	-	-	-			-			-
Stage 2	-	-	-	-		-	636	416	-	637	450	-
Platoon blocked, %	070	-	-	0.44	-	-	470	404	000	450	405	007
Mov Cap-1 Maneuver	878		-	941	-	-	179	131	682	156	135	637
Mov Cap-2 Maneuver	-		-	-		-	296	249	-	273	255	-
Stage 1	-			-	-		406	446	-	380	426	
Stage 2	-	-			-		602	409	-	566	440	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.3			0.2			12.7			18.6		
							В			С		
HCM LOS												
								WBT	WBR S	SBI n1		
Minor Lane/Major Mvmt		NBLn1 I		EBL	EBT	EBR	WBL			-		_
Minor Lane/Major Mvmt Capacity (veh/h)		296	642	878	-	-	941	-	-	335		
Minor Lane/Major Mvmt Capacity (veh/h) HCM Lane V/C Ratio		296 0.06	642 0.097	878 0.022	-	-	941 0.018	-	-	335 0.213		
Minor Lane/Major Mvmt Capacity (veh/h) HCM Lane V/C Ratio HCM Control Delay (s)		296 0.06 17.9	642 0.097 11.2	878 0.022 9.2	-	-	941 0.018 8.9	-	-	335 0.213 18.6		
Minor Lane/Major Mvmt Capacity (veh/h) HCM Lane V/C Ratio		296 0.06	642 0.097	878 0.022	-	-	941 0.018	-	-	335 0.213		

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Hayden One Existing AM

4: Northeast Access & Hayden Road HCM 6th TWSC

Intersection	_					
Int Delay, s/veh	0					
	-		MID	MOT	NIDI	NDD
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	^	1		- 11		1
Traffic Vol, veh/h	680	0	0	684	0	0
Future Vol, veh/h	680	0	0	684	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	-	135	-	-	-	0
Veh in Median Storage,	# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	93	93	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mymt Flow	739	0	0	735	0	0
	155	0	0	155	0	0
Major/Minor N	lajor1	1	Major2	N	Ainor1	
Conflicting Flow All	0	0	-	-	-	370
Stage 1	-	-	-	-	-	-
Stage 2		-		-		-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-		-			- 0.04
Critical Hdwy Stg 2					-	_
Follow-up Hdwy	-		-		-	3.32
	-	-	0	-	0	627
Pot Cap-1 Maneuver						
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	627
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		0	
HCM LOS					A	
Mineral and Made 14			EDT	EDD	MDT	
Minor Lane/Major Mvmt	ſ	VBLn1	EBT	EBR	WBT	
Capacity (veh/h)			-	-		
HCM Lane V/C Ratio		-	-	-	-	
HCM Control Delay (s)		0	-	-	-	
HCM Lane LOS		Α	-	-	-	
HCM 95th %tile Q(veh)		-	-	-	-	

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Hayden One Existing AM

5: Burger King Drwy & Hayden Road HCM 6th TWSC

Intersection Int Delay, s/veh	0.8												
					14/57					0.51			
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
ane Configurations	۴.	^	1	<u></u>	*	1	40		45	•		0	
Traffic Vol, veh/h	4	633	44	43	651	12	13	0	15	3	0	2	
uture Vol, veh/h	4	633	44	43	651	12	13	0	15	3	0	2	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-		None			None	-		None	
Storage Length	100	-	75	90		100	-	-	-	-	-	-	
Veh in Median Storage,	# -	0	-	-	0	-	-	1	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	93	93	93	96	96	96	78	78	78	63	63	63	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	4	681	47	45	678	13	17	0	19	5	0	3	
Major/Minor M	ajor1	_	1	Major2	_	1	/linor1	_	Ν	/linor2	_		
Conflicting Flow All	691	0	0	728	0	0	1118	1470	341	1117	1504	339	
Stage 1	-	-	-	-	-	-	689	689	-	768	768	-	
Stage 2	-		-				429	781	-	349	736	-	
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94	
Critical Hdwy Stg 1	-			-			6.54	5.54	-	6.54	5.54	-	
Critical Hdwy Stg 2	-		-	-			6.54	5.54		6.54	5.54	-	
Follow-up Hdwy	2.22			2.22			3.52	4.02	3.32	3.52	4.02	3.32	
Pot Cap-1 Maneuver	900		_	871	-		162	126	655	162	120	657	
Stage 1				-			402	445	-	360	409		
Stage 2							574	403		640	403		
Platoon blocked, %	-			-			514	400	-	040	720	-	
Mov Cap-1 Maneuver	900			871			154	119	655	150	113	657	
Mov Cap-1 Maneuver Mov Cap-2 Maneuver	- 300			-			278	240	- 000	150	113	- 001	
Stage 1	-	-	-	-		-	400	443	-	359	388	-	
	-		-	-			400 542	382	-	618	421		
Stage 2	-	-	-	-		-	54Z	302	-	010	421	-	
Approach	EB			WB			NB			SB			
Approach													_
HCM Control Delay, s	0.1			0.6			14.8			22.2			
HCM LOS							В			С			
Minor Long/Major Mumt			EDI	EBT	EBR				ODI #1				
Minor Lane/Major Mvmt Capacity (veh/h)	r	VBLn1 402	EBL 900	EB1	EBR	WBL 871	WBT	WBR	217				
HCM Lane V/C Ratio		0.089				0.051	-		0.037				
HCM Control Delay (s)		14.8	0.005	-	-	9.4	-	-	22.2				
HCM Lane LOS		14.0 B	A	-		9.4 A	-		22.2 C				
HCM 25th %tile Q(veh)		0.3	A 0		-	0.2		-	0.1				
		0.5	U	-		0.2		-	0.1				

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Hayden One Existing AM

6: Northsight Boulevard & Hayden Road HCM 6th Roundabout

Intersection Delay, s/veh	7.0							
Intersection LOS	7.0 A							
	~							
Approach		EB		WB		NB		SB
Entry Lanes		2		2		2		1
Conflicting Circle Lanes		2		2		2		2
Adj Approach Flow, veh/h		550		642		351		328
Demand Flow Rate, veh/h		561		655		357	;	334
Vehicles Circulating, veh/h		265		345		493		714
Vehicles Exiting, veh/h		783		505		333		286
Ped Vol Crossing Leg, #/h		0		0		0		0
Ped Cap Adj		1.000		1.000		1.000	1.	000
Approach Delay, s/veh		5.8		6.9		6.2	1	0.4
Approach LOS		A		А		А		В
Lane	Left	Right	Left	Right	Left	Right	Left	
Designated Moves	LT	TR	LT	TR	LT	R	LTR	
Assumed Moves	LT	TR	LT	TR	LT	R	LTR	
RT Channelized								
Lane Util	0.471	0.529	0.470	0.530	0.538	0.462	1.000	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328	
Entry Flow, veh/h	264	297	308	347	192	165	334	
Cap Entry Lane, veh/h	1058	1134	983	1059	858	934	774	
Entry HV Adj Factor	0.980	0.982	0.980	0.981	0.983	0.982	0.982	
Flow Entry, veh/h	259	292	302	340	189	162	328	
Cap Entry, veh/h	1037	1114	963	1039	843	917	760	
V/C Ratio	0.250	0.262	0.313	0.328	0.224	0.177	0.432	
Control Delay, s/veh	5.9	5.7	7.0	6.8	6.6	5.7	10.4	
LOS	А	А	A	А	А	А	В	
95th %tile Queue, veh	1	1	1	1	1	1	2	

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Hayden One 7: Hayden Road & Frank Lloyd Wright Boulevard Existing AM Timings ⊁ . * Lane Group EBL EBT EBR WBL WBT SBT WBR NBL NBT SBL **†††** 1078 **†††** 1295 Lane Configurations × ኘኘ 4 1. Traffic Volume (vph) 209 368 4 196 28 Future Volume (vph) 4 1078 196 368 1295 28 209 12 266 12 8 NA pm+ov Turn Type Prot NA pm+ov Prot NA Perm Split Split NA Protected Phases 5 2 8 6 8 8 4 4 1 1 Permitted Phases 2 8 Detector Phase 5 2 8 8 4 4 8 1 6 6 1 Switch Phase Minimum Initial (s) 5.0 10.0 5.0 5.0 10.0 10.0 5.0 5.0 5.0 6.0 6.0 Minimum Split (s) 11.0 38.7 47.0 11.0 25.7 25.7 47.0 47.0 11.0 44.3 44.3 12.0 Total Split (s) 11.0 35.0 33.0 40.0 64.0 64.0 33.0 33.0 40.0 12.0 53.3% Total Split (%) 9.2% 29.2% 27.5% 33.3% 53.3% 27.5% 27.5% 33.3% 10.0% 10.0% 3.3 Yellow Time (s) 4.0 4.7 4.0 4.0 4.7 4.7 4.0 4.0 4.0 3.3 All-Red Time (s) 2.0 1.0 2.0 2.0 1.0 1.0 2.0 2.0 2.0 2.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Lost Time Adjust (s) 0.0 0.0 0.0 0.0 Total Lost Time (s) 6.0 6.0 5.7 5.7 6.0 6.0 6.0 5.3 5.3 5.7 6.0 Lead/Lag Lag Lead Lag Lead Lead Lag Lead-Lag Optimize? Yes Yes Yes Yes Yes Yes Recall Mode None C-Max None None C-Max C-Max None None None None None Act Effct Green (s) 5.0 57.9 75.9 86.9 86.9 12.4 12.4 40.0 6.1 6.1 25.2 Actuated g/C Ratio 0.04 0.48 0.63 0.21 0.72 0.72 0.10 0.10 0.33 0.05 0.05 0.14 v/c Ratio 0.07 0.49 0.22 0.60 0.37 0.03 0.72 0.64 0.47 0.18 57.5 59.5 47.7 Control Delay 24.2 2.3 46.4 8.3 0.0 75.2 66.5 12.7 Queue Delay 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 47.7 Total Delay 57.5 24.2 46.4 66.5 12.7 59.5 2.3 8.3 0.0 75.2 LOS E С D А Е В E D Α А E 20.9 53.8 Approach Delay 16.4 39.1 Approach LOS В D D С Intersection Summary Cycle Length: 120 Actuated Cycle Length: 120 Offset: 72 (60%), Referenced to phase 2:EBT and 6:WBT, Start of Green Natural Cycle: 145 Control Type: Actuated-Coordinate Maximum v/c Ratio: 0.72 Intersection Signal Delay: 21.4 Intersection LOS: C Intersection Capacity Utilization 58.4% ICU Level of Service B Analysis Period (min) 15 Splits and Phases: 7: Hayden Road & Frank Lloyd Wright Boulevard 108 101 Ø4 ₩¹Ø2 (R) Ø6 (R) .≯ ø₅ 11 s 05/30/2019 Synchro 10 Report CivTech BR Page 8

R WBL 7 75 76 368 06 368 0 0 00 1.00 00 1.00 72 1772 13 409 35 0.90 2 2 86 1468 24 0.45 23 3274 13 409 12 3274 13 409 10 1.637 5 9.4 10 1.00 10 1.00 10 0.028 10 1.00	WBT ↑↑↑ 1295 1295 1295 0 1.00 No 1969 1439 0.90 2 2611 0.49 5375 1439 1792 22.6 22.6 22.6 22.6 2611 0.55	WBR 28 28 0 1.00 1.00 1.00 1.00 1.00 2.0 1.00 2.0 1.502 0.8 0.8 0.8 0.8 0.0	NBL 209 209 0 1.00 1772 231 0.94 2 290 0.09 3375 231 1688 8.1	NBT 12 12 12 0 1.00 No 1969 0 0.94 2 0 0.00 0 0 0 0 0 0 0 0 0 0 0 0	NBR 266 266 0 1.00 1.00 1.00 1.772 177 0.94 2 803 0.09 1502 177	SBL 12 12 12 12 12 12 12 12 12 12 12 12 100 1.00 1772 15 0.82 2 50 0.03 1688	SBT	SBR 3 3 0 1.00 1.00 1.00 1772 2 0.82 2 9
366 368 0 0 00 1.00 300 1.00 301 1.00 302 1.72 313 409 32 2.2 366 1468 32 3.274 33 409 32 1637 5 9.4 30 1.00 36 1468 29 0.28	1295 0 1.00 No 1969 1439 0.90 2 2611 0.49 5375 1439 1792 22.6 22.6 22.6 22.6	28 28 0 1.00 1.00 1772 20 0.90 2 730 0.49 1502 20 1502 0.8 0.8	209 209 0 1.00 1.00 1772 231 0.94 2 290 0.09 3375 231 1688	12 12 0 1.00 No 1969 0 0.94 2 0 0.00 0 0 0 0	266 266 0 1.00 1.00 1772 177 0.94 2 803 0.09 1502	12 12 0 1.00 1.00 1.00 1.00 1.00 1.00 2.082 2 50 0.03	8 8 0 1.00 No 1969 10 0.82 2 47	3 0 1.00 1.00 1772 2 0.82 2
366 368 0 0 00 1.00 300 1.00 301 1.00 302 1.72 313 409 32 2.2 366 1468 32 3.274 33 409 32 1637 5 9.4 30 1.00 36 1468 29 0.28	1295 0 1.00 No 1969 1439 0.90 2 2611 0.49 5375 1439 1792 22.6 22.6 22.6 22.6	28 0 1.00 1.00 1772 20 0.90 2 730 0.49 1502 20 1502 0.8 0.8	209 0 1.00 1.00 1772 231 0.94 2 290 0.09 3375 231 1688	12 0 1.00 No 1969 0 0.94 2 0 0.94 2 0 0.00 0 0 0	266 0 1.00 1.00 1772 177 0.94 2 803 0.09 1502	12 0 1.00 1.00 1772 15 0.82 2 50 0.03	8 0 1.00 No 1969 10 0.82 2 47	3 0 1.00 1.00 1772 2 0.82 2
0 0 00 1.00 00 1.00 72 1772 13 409 35 0.90 2 2 44 0.45 12 3274 13 409 12 3274 13 409 12 1637 .5 9.4 04 1.00 04 1.00 05 1.468 29 0.28	0 1.00 No 1969 1439 0.90 2 2611 0.49 5375 1439 1792 22.6 22.6 22.6 22.61	0 1.00 1.00 1772 20 0.90 2 730 0.90 1502 20 1502 0.8 0.8	0 1.00 1.00 1772 231 0.94 2 290 0.09 3375 231 1688	0 1.00 No 1969 0 0.94 2 0 0.94 2 0 0.00 0 0 0	0 1.00 1.00 1772 177 0.94 2 803 0.09 1502	0 1.00 1.00 1772 15 0.82 2 50 0.03	0 1.00 No 1969 10 0.82 2 47	0 1.00 1.00 1772 2 0.82 2
00 1.00 00 1.00 172 1772 13 409 15 0.90 2 2 2 2 12 2274 13 409 12 3274 13 409 12 1637 1.5 9.4 0.0 1.00 04 1468 2 1637 5.5 9.4 9.0 1.48	1.00 No 1969 1439 0.90 2 2611 0.49 5375 1439 1792 22.6 22.6 22.6 22.6	1.00 1.00 1772 20 0.90 2 730 0.49 1502 20 1502 0.8 0.8	1.00 1.00 1772 231 0.94 2 290 0.09 3375 231 1688	1.00 No 1969 0 0.94 2 0 0.00 0.00 0 0	1.00 1.00 1772 177 0.94 2 803 0.09 1502	1.00 1.00 1772 15 0.82 2 50 0.03	1.00 No 1969 10 0.82 2 47	1.00 1.00 1772 2 0.82 2
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1772 13 409 35 0.90 2 2 36 1468 24 0.45 32 3274 13 409 32 1637 .5 9.4 .5 9.4 .00 1.00 06 1468 29 0.28	No 1969 1439 0.90 2 2611 0.49 5375 1439 1792 22.6 22.6 22.6	1772 20 0.90 2 730 0.49 1502 20 1502 0.8 0.8	1772 231 0.94 2 290 0.09 3375 231 1688	No 1969 0 0.94 2 0 0.00 0 0	1772 177 0.94 2 803 0.09 1502	1772 15 0.82 2 50 0.03	No 1969 10 0.82 2 47	1772 2 0.82 2
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.5 9.4 00 1.00 06 1468 29 0.28	22.6 2611	0.8		0.0	0.0	1.0	0.0	0.7
00 1.00 96 1468 29 0.28	2611		8.1	0.0	0.0	1.0	0.0	0.7
96 1468 29 0.28		1 00	1.00	0.0	1.00	1.00	0.0	0.17
29 0.28		730	290	0	803	50	0	57
	0.00	0.03	0.80	0.00	0.22	0.30	0.00	0.21
1400	2611	730	759	0	1011	94	0	107
00 1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
00 1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
.8 20.9	21.7	16.1	53.8	0.0	14.7	57.0	0.0	56.8
.5 0.0	0.8	0.1	1.9	0.0	0.1	1.2	0.0	0.7
.0 0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
.7 3.6	9.5	0.3	3.5	0.0	2.5	0.5	0.0	0.4
.2 20.9	22.5	16.1	55.7	0.0	14.8	58.2	0.0	57.5
C C	С	В	E	Α	В	E	Α	E
	1868			408			27	
	22.1			38.0			57.9	
	С			D			E	
4	5	6		8				
0.0	0.0	5.0		0.3				
4								
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[4 D se max gree	* 5.3 6.0 * 6.7 5.0 3.0 2.3 0.0 0.0	*5.3 6.0 5.7 *6.7 5.0 58.3 3.0 2.3 24.6 0.0 0.0 5.0 4 5 ee max green.	*5.3 6.0 5.7 *6.7 5.0 58.3 3.0 2.3 24.6 0.0 0.0 5.0 4 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	*5.3 6.0 5.7 6.0 *6.7 5.0 58.3 27.0 3.0 2.3 24.6 10.1 0.0 0.0 5.0 0.3 *6 max green.	*5.3 6.0 5.7 6.0 *6.7 5.0 58.3 27.0 3.0 2.3 24.6 10.1 0.0 0.0 5.0 0.3	*5.3 6.0 5.7 6.0 *6.7 5.0 58.3 27.0 3.0 2.3 24.6 10.1 0.0 0.0 5.0 0.3	*5.3 6.0 5.7 6.0 *6.7 5.0 58.3 27.0 3.0 2.3 24.6 10.1 0.0 0.0 5.0 0.3

Lane Group EBL EBI WBL WBL NBL NBT NBR SBL SBT Lane Configurations 1		≯	-	1	-	1	1	1	×	Ļ	
Traffic Volume (vph) 19 538 44 429 27 26 76 18 17 Turn Type Perm NA Perm NA prinept NA Perm Perm NA Protected Phases 6 2 2 7 4 8 Protected Phases 6 2 2 7 4 8 Permited Phases 6 2 2 7 4 8 Detector Phase 6 6 2 2 7 4 4 8 Detector Phase 6 6 2 2 7 4 4 8 Detector Phase 6 6 2 2 7 4 4 8 Detector Phase 6 6 2 2 7 4 4 8 Detector Phase 6 6 2 2 7 7 4 4 8 Detector Phase 6 6 2 2 7 7 4 4 8 Detector Phase 6 6 2 2 7 7 4 4 8 Detector Phase 6 6 2 2 7 7 4 4 8 Detector Phase 6 6 2 2 7 7 4 4 8 Detector Phase 6 6 2 2 7 7 4 4 8 Detector Phase 6 6 2 2 7 7 4 4 8 Detector Phase 6 6 2 2 7 7 4 4 8 Detector Phase 6 6 2 2 7 7 4 4 8 Detector Phase 6 6 2 2 7 7 4 4 8 Detector Phase 6 6 3 2 2 7 7 4 4 8 Detector Phase 6 6 3 2 2 7 7 4 4 8 Detector Phase 6 6 6 2 2 8 9 26 9 26 9 26 9 26 9 26 9	Lane Group	EBL	EBT		WBT	NBL	NBT	NBR	SBL	SBT	
Future Volume (vph) 19 538 44 429 27 26 76 18 17 Turm Type Perm NA Perm NA Perm NA Perm NA Permited Phases 6 2 4 4 8 8 Detector Phase 6 2 7 4 4 8 Switch Phase 6 6 2 7 4 4 8 Minimum Initia (s) 10.0 10.0 10.0 50.70 7.0 7.0 7.0 Minimum Spit (s) 76.0 76.0 76.0 76.0 22.0 20.0 10.0			≜ †Ъ		≜ †}		1			ţ,	
Turn Type Perm NA Perm NA Perm NA Perm Perm NA Protected Phases 6 2 7 4 8 8 Permitted Phases 6 2 7 4 8 8 Permitted Phases 6 2 2 7 4 4 8 Detector Phase 6 6 2 2 7 4 4 8 8 Minimum Initial (s) 10.0 10.0 10.0 5.0 7.0 7.0 7.0 7.0 Total Split (s) 63.3% 63.3% 63.3% 20.0% 36.7% 36.7% 16.7% 16.7% Yellow Time (s) 1.2 1.2 1.2 1.6 18 18 18 18 18 18 18 18 18 18 14 14 14 14 14 14 14 14 15 16.3 16.4 15.6 8.0 8.0 14 14 13 0.13 0.31 0.31 0.31 0.31											
Protected Phases 6 2 7 4 8 Permitted Phases 6 2 4 4 4 8 Permitted Phases 6 2 7 4 4 8 Permitted Phases 6 2 7 7 4 4 8 Permitted Phases 6 2 7 7 4 4 8 Switch Phase Minimum Initial (s) 10.0 10.0 10.0 5.0 7.0 7.0 7.0 7.0 Minimum Split (s) 26.9 26.9 26.9 9.6 32.4 32.4 32.4 32.4 32.4 32.4 32.4 32.4											
Permited Phases 6 2 4 4 4 8 Detector Phase 6 6 2 2 7 4 4 4 8 Detector Phase 6 6 2 2 7 4 4 8 Switch Phase Minimum Initial (s) 10.0 10.0 10.0 5.0 7.0 7.0 7.0 7.0 Minimum Split (s) 76.0 76.0 76.0 76.0 24.0 44.0 44.0 20.0 20.0 Total Split (s) 63.3% 63.3% 63.3% 63.3% 63.3% 63.6 3.6 3.6 Jaila Split (s) 61.2 1.2 1.2 1.2 1.2 1.6 1.8 1.8 1.8 1.8 1.8 Lead Lag 0.1 1.2 1.2 1.2 1.2 1.6 1.8 1.8 1.8 1.8 1.8 Lead Lag 0.1 1.2 1.2 1.2 1.2 1.6 1.8 1.8 1.8 1.8 1.8 Lead Lag 0.1 1.2 1.2 1.2 1.2 1.6 1.5 1.8 1.8 1.8 1.8 1.8 Lead Lag 0.1 1.2 1.2 1.2 1.2 1.6 1.5 1.8 1.8 1.8 1.8 1.8 Lead Lag 0.1 1.2 1.2 1.2 1.2 1.6 1.5 1.8 1.8 1.8 1.8 1.8 Lead Lag 0.2 Lead Lag		Perm		Perm				Perm	Perm		
Detector Phase 6 6 6 2 2 7 7 4 4 8 8 8 Switch Phase 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7		6	0	2	2		4	А	8	0	
Switch Phase Minimum Initial (s) 10.0 10.0 10.0 5.0 7.0 7.0 7.0 Minimum Initial (s) 76.0 76			6		2		4			8	
Minimum Split (a) 26.9 26.9 26.9 26.9 26.0 24.0 24.0 24.0 22.0 22.0 Total Split (s) 65.3% 63.3% 63.3% 20.0% 36.7%		Ű	Ŭ	-	-				Ű	Ű	
Total Split (s) 76.0 76.0 76.0 76.0 76.0 76.0 76.0 24.0 44.0 44.0 20.0 20.0 Total Split (%) 63.3% 63.3% 63.3% 63.3% 20.0% 36.7% 36.7% 16.7% 16.7% Yellow Time (s) 1.2 1.2 1.2 1.2 1.6 1.8 1.8 1.8 1.8 Lest Time Adjust (s) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	7.0	7.0	7.0	7.0	
Total Spit (%) 63.3% 63.3% 63.3% 63.3% 20.0% 36.7% 36.7% 16.7% 16.7% Yellow Time (s) 4.7 4.7 4.7 4.7 3.0 3.6 3.6 3.6 3.6 3.6 Lead 1.8 1.8 1.8 1.8 1.8 Lead 1.8 1.8 1.8 1.8 1.8 1.8 Lead 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8 1.8											
Yellow Time (s) 4.7 4.7 4.7 4.7 3.0 3.6 3.6 3.6 3.6 3.6 All-Red Time (s) 1.2 1.2 1.2 1.2 1.6 1.8 1.8 1.8 1.8 Lead-Lag Optimize(s) 5.9 5.9 5.9 5.9 4.6 5.4 5.4 5.4 Lead-Lag Optimize(s) Vestor Vest											
All-Red Time (g) 1.2 1.2 1.2 1.2 1.2 1.6 1.8 1.8 1.8 1.8 1.8 1.8 Lost Time Adjust (s) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.											
Lost Time Adjust (s) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.											
Total Lost Time (s) 5.9 5.9 5.9 5.9 5.4 5.6 7.8 0.14 0.13 0.07 0.07 wice bait 0.0											
Lead Lag Optimize? Ves											
Recall Mode None None C-Max C-Max None None None None None Act Effet Green (s) 93.1 93.1 93.1 64.4 15.6 15.6 15.6 8.0 8.0 Actuated g/C Ratio 0.78 0.14 0.13 0.07 0.07 0.07 Vic Ratio 0.03 0.0											
Act Effct Green (s) 93.1 93.1 93.1 93.1 16.4 15.6 8.0 8.0 Actuated g/C Ratio 0.78 0.78 0.78 0.78 0.14 0.13 0.13 0.07 0.07 v/c Ratio 0.03 0.22 0.09 0.19 0.22 0.13 0.35 0.33 0.27 Control Delay 4.8 4.5 5.1 4.3 45.1 43.4 11.5 63.3 47.5 Queue Delay 0.0											
Actuated g/C Ratio 0.78 0.78 0.78 0.78 0.14 0.13 0.13 0.07 0.07 v/c Ratio 0.03 0.22 0.09 0.19 0.22 0.13 0.33 0.27 Control Delay 4.8 4.5 5.1 4.3 45.1 43.4 11.5 63.3 47.5 Queue Delay 0.0											
vic Ratio 0.03 0.22 0.09 0.19 0.22 0.13 0.35 0.33 0.27 Control Delay 4.8 4.5 5.1 4.3 45.1 43.4 11.5 63.3 47.5 Queue Delay 0.0 0											
Control Delay 4.8 4.5 5.1 4.3 45.1 43.4 11.5 63.3 47.5 Queue Delay 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.											
Queue Delay 0.0											
Total Delay 4.8 4.5 5.1 4.3 45.1 43.4 11.5 63.3 47.5 LOS A A A A A A D D B E D Approach Delay 4.5 4.3 25.0 54.4 Approach Delay 4.5 4.3 25.0 54.4 Approach LOS A A C D Intersection Summary Cycle Length: 120 Actuated Cycle Length: 120 Offset: 72 (60%), Referenced to phase 2:WBTL, Start of Green Natural Cycle: 70 Control Type: Actuated-Coordinated Maximum v/c Ratio: 0.35 Intersection Signal Delay: 9.0 Intersection LOS: A Intersection Signal Delay: 9.0 Intersection LOS: A Intersection Signal Delay: 9.0 Intersection LOS: A Intersection Capacity Utilization 45.6% ICU Level of Service A Analysis Period (min) 15 Splits and Phases: 1: 83rd Place & Hayden Road \overrightarrow{r}_{02} (R) 76 s 76 s 77 s 78 s 78 s 78 s 79 s 79 s 70											
LOS A A A A A A D D B E D Approach Delay 4.5 4.3 25.0 54.4 Approach LOS A A C D Intersection Summary Cycle Length: 120 Actuated Cycle Length: 120 Offset: 72 (60%), Referenced to phase 2:WBTL, Start of Green Natural Cycle: 70 Control Type: Actuated-Coordinated Maximum v/c Ratio: 0.35 Intersection Control Type: Actuated-Coordinated Maximum v/c Ratio: 0.35 Intersection COS: A Intersection COS: A											
Approach LOS A A C D Intersection Summary Cycle Length: 120 Offset: 72 (60%), Referenced to phase 2:WBTL, Start of Green Natural Cycle: 70 Control Type: Actuated-Coordinated Maximum vfc Ratio: 0.35 Intersection Capacity Utilization 45.6% ICU Level of Service A Analysis Period (min) 15 Splits and Phases: 1: 83rd Place & Hayden Road Splits and Phases: 1: 83rd Place & Hayden Road											
Diffset: 70 Cortlor Type: Actuated Coordinated Maximum v/c Ratio: 0.35 Intersection Signal Delay: 9.0 Intersection LOS: A Intersection Apacity Utilization 45.6% ICU Level of Service A Analysis Period (min) 15 Splits and Phases: 1: 83rd Place & Hayden Road Image: Control Type and the service of	Approach Delay		4.5		4.3		25.0			54.4	
Cycle Length: 120 Actuated Cycle Length: 120 Offset: 72 (60%), Referenced to phase 2:WBTL, Start of Green Natural Cycle: 70 Control Type: Actuated-Coordinated Maximum v/c Ratio: 0.35 Intersection Cogacity Utilization 45.6% ICU Level of Service A Analysis Period (min) 15 Splits and Phases: 1: 83rd Place & Hayden Road Cog (R) 76 s 06/03/2019 Synchro 10 Report	Approach LOS		А		A		С			D	
Actuated Cycle Length: 120 Offset: 72 (60%), Referenced to phase 2:WBTL, Start of Green Natural Cycle: 70 Control Type: Actuated-Coordinated Maximum v/c Ratio: 0.35 Intersection Signal Delay: 9.0 Intersection LOS: A Intersection Capacity Utilization 45.6% ICU Level of Service A Analysis Period (min) 15 Splits and Phases: 1: 83rd Place & Hayden Road Cog (R) Cog	Intersection Summary										
Offset: 72 (60%), Referenced to phase 2:WBTL, Start of Green Natural Cycle: 70 Control Type: Actuated-Coordinated Maximum vic Ratio: 0.35 Intersection Signal Delay: 9.0 Intersection LOS: A Intersection Copacity Utilization 45.6% ICU Level of Service A Analysis Period (min) 15 Splits and Phases: 1: 83rd Place & Hayden Road											
Natural Cycle: 70 Control Type: Actuated-Coordinated Maximum v/c Ratio: 0.35 Intersection Signal Delay: 9.0 Intersection LOS: A Intersection Capacity Utilization 45.6% ICU Level of Service A Analysis Period (min) 15 Splits and Phases: 1: 83rd Place & Hayden Road			0.14/0.71		_						
Control Type: Actuated-Coordinated Maximum v/c Ratic: 0.35 Intersection Signal Delay: 9.0 Intersection LOS: A Intersection Capacity Utilization 45.6% ICU Level of Service A Analysis Period (min) 15 Splits and Phases: 1: 83rd Place & Hayden Road Correct Control Type: Actuated Control Type: Ac		ed to phase	e 2:WBTL	., Start of	Green						
Maximum v/c Ratio: 0.35 Intersection Signal Delay: 9.0 Intersection LOS: A Intersection Capacity Utilization 45.6% ICU Level of Service A Analysis Period (min) 15 Splits and Phases: 1: 83rd Place & Hayden Road		ordinated									
Intersection Signal Delay: 9.0 Intersection LOS: A Intersection Capacity Utilization 45.6% ICU Level of Service A Analysis Period (min) 15 Splits and Phases: 1: 83rd Place & Hayden Road		orumatou									
Analysis Period (min) 15 Splits and Phases: 1: 83rd Place & Hayden Road Color (R) Color (R) Col		9.0			Ir	ntersectio	n LOS: A				
Splits and Phases: 1: 83rd Place & Hayden Road		ation 45.6%			10	CU Level	of Service	θA			
✓ Ø2 (R) ✓ Ø4 ✓ Ø2 (R) ✓ Ø4 ✓ Ø5 ✓ Ø7 ✓ Ø6 ✓ Ø7 ✓ Ø6 ✓ 24s Ø6/03/2019 Synchro 10 Report	Analysis Period (min) 15										
✓ Ø2 (R) ✓ Ø4 ✓ Ø2 (R) ✓ Ø4 ✓ Ø5 ✓ Ø7 ✓ Ø6 ✓ Ø7 ✓ Ø6 ✓ 24s Ø6/03/2019 Synchro 10 Report	Calita and Dhasaay 1, 92	rd Diago 9	l lavdan F) o o d							
76 s 44 s 44 s 70 6 70 70 8 70 s 70 5 70 5 70 5 70 5 70 5 70 5 70 5	Splits and Priases. 1. 05	TO Place &	nayuen r	(080							
06/03/2019 Synchro 10 Report	Ø2 (R)							1	Ø4		
76 s 24 s 20 s 66/03/2019 Synchro 10 Report	76 s							44 s			
76 s 24 s 20 s 66/03/2019 Synchro 10 Report	406								Ø7		08
	76 s							24 s			20 s
	06/03/2019										Synchro 10 Report
UNIECH BK Page 1											Page 1
	CivTech BR										

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lovement	EBL	EBT	EBR		WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
ane Configurations	5	≜ †}		5	≜ ⊅		3	*	1	5	1.	
raffic Volume (veh/h)	19	538	20	44	429	46	27	26	76	18	17	6
uture Volume (veh/h)	19	538	20	44	429	46	27	26	76	18	17	6
itial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
ed-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
arking 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
/ork Zone On Approach		No			No			No			No	
dj Sat Flow, veh/h/ln	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
dj Flow Rate, veh/h	21	604	10	49	477	34	35	34	67	28	27	3
ak Hour Factor	0.89	0.89	0.89	0.90	0.90	0.90	0.77	0.77	0.77	0.64	0.64	0.64
ercent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
ap, veh/h	697	2971	49	633	2794	199	154	230	176	121	87	10
rrive On Green	0.79	0.79	0.79	0.79	0.79	0.79	0.03	0.12	0.12	0.05	0.05	0.05
at Flow, veh/h	842	3766	62	766	3542	252	1688	1969	1502	1226	1741	193
rp Volume(v), veh/h	21	300	314	49	251	260	35	34	67	28	0	30
rp Sat Flow(s),veh/h/ln	842	1870	1958	766	1870	1923	1688	1969	1502	1226	0	1934
Serve(g_s), s	0.7	4.8	4.8	2.1	3.9	4.0	2.3	1.9	4.9	2.7	0.0	1.8
ycle Q Clear(g_c), s	4.7	4.8	4.8	6.9	3.9	4.0	2.3	1.9	4.9	2.7	0.0	1.8
rop In Lane	1.00		0.03	1.00		0.13	1.00		1.00	1.00		0.10
ane Grp Cap(c), veh/h	697	1476	1544	633	1476	1517	154	230	176	121	0	96
/C Ratio(X)	0.03	0.20	0.20	0.08	0.17	0.17	0.23	0.15	0.38	0.23	0.00	0.31
vail Cap(c_a), veh/h	697	1476	1544	633	1476	1517	378	633	483	209	0	235
CM 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
pstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
niform Delay (d), s/veh	3.7	3.2	3.2	4.1	3.1	3.1	50.2	47.6	49.0	55.4	0.0	55.0
cr Delay (d2), s/veh	0.0	0.0	0.0	0.2	0.3	0.2	0.3	0.1	0.5	0.4	0.0	0.7
itial 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/In	0.1	1.5	1.6	0.3	1.3	1.4	1.0	0.9	1.9	0.8	0.0	0.9
nsig. Movement Delay, s/veh		2.0	2.0	4.0	2.2	2.2	50 F	47 7	10 5	55.0	0.0	FF 7
nGrp Delay(d),s/veh	3.7	3.2	3.2	4.3	3.3	3.3	50.5	47.7	49.5	55.8	0.0	55.7
nGrp LOS	A	A	A	A	A	A	D	D	D	E	A	E
pproach Vol, veh/h		635			560			136			58	
pproach Delay, s/veh		3.2			3.4			49.3			55.7	
pproach LOS		A			A			D			E	
imer - Assigned Phs		2		4		6	7	8				
hs Duration (G+Y+Rc), s		100.6		19.4		100.6	8.0	11.4				
hange Period (Y+Rc), s		* 5.9		* 5.4		* 5.9	* 4.6	* 5.4				
lax Green Setting (Gmax), s		* 70		* 39		* 70	* 19	* 15				
lax Q Clear Time (g_c+l1), s		8.9		6.9		6.8	4.3	4.7				
ireen Ext Time (p_c), s		1.2		0.2		1.4	0.0	0.1				
Itersection Summary												
CM 6th Ctrl Delay			10.0									
CM 6th LOS			B									
			5									
otes												
ser approved pedestrian inter												_
HCM 6th computational engir	ne requi	res equal	clearance	e times fo	r the phas	ses cross	ing the ba	arrier.				
						ses cross	ing the ba	arrier.				

	<u> </u>												
ntersection													
Int Delay, s/veh	1.7												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	۳.	- 11	1	٦.	_ ≜ β		<u>۳</u>	1		<u>٦</u>	Þ		
Traffic Vol, veh/h	18	597	10	16	594	74	16	2	54	27	0	13	
Future Vol, veh/h	18	597	10	16	594	74	16	2	54	27	0	13	
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	135	-	100	145	-	-	45	-	-	0	-	-	
Veh in Median Storage	,# -	0	-	-	0	-	-	1	-	-	1	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	95	95	95	93	93	93	90	90	90	56	56	56	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	19	628	11	17	639	80	18	2	60	48	0	23	
Major/Minor M	/lajor1		1	Major2		1	Minor1		Ν	/linor2			
Conflicting Flow All	719	0	0	639	0	0	1020	1419	314	1066	1390	360	
Stage 1	-	-	-	-	-	-	666	666	-	713	713	-	
Stage 2	-		-	-	-	-	354	753	-	353	677	-	
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-	
Follow-up Hdwy	2.22		-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32	
Pot Cap-1 Maneuver	878	-	-	941	-	-	191	136	682	177	141	637	
Stage 1	-	-	-	-		-	415	456	-	389	434	-	
Stage 2	-	-	-	-	-	-	636	416	-	637	450	-	
Platoon blocked, %		-	-										
Mov Cap-1 Maneuver	878		-	941		-	179	131	682	156	135	637	
Mov Cap-2 Maneuver	-		-	-		-	296	249		273	255	-	
Stage 1		-	-	-	-	-	406	446	-	380	426	-	
Stage 2							602	409		566	440		
oldgo 2							002	100		000	110		
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.3			0.2			12.7			17.7			
HCM LOS							В			С			
Minor Lane/Major Mvm	t N	IBLn1 I	VBLn2	EBL	EBT	EBR	WBL	WBT	WBR S	SBLn1	SBLn2		
Capacity (veh/h)		296	642	878	-	-	941	-	-	273	637		
HCM Lane V/C Ratio		0.06	0.097	0.022	-	-	0.018	-	-	0.177	0.036		
HCM Control Delay (s)		17.9	11.2	9.2	-	-	8.9	-	-	21	10.9		
HCM Lane LOS		С	В	А	-	-	А	-	-	С	В		
HCM 95th %tile Q(veh)		0.2	0.3	0.1			0.1			0.6	0.1		

06/03/2019 CivTech BR Synchro 10 Report Page 4 Hayden One Existing AM mitigated 4: Northeast Access & Hayden Road HCM 6th TWSC

0 EBT 11 680 680	EBR	WBL			
↑↑ 680		WBL	11/57		
↑↑ 680		TUL	WBT	NBL	NBR
680			^	NDL	
	0	0	684	0	r
	0	0	684	0	0
000	0	0	004	0	0
Free	Free	Free		Stop	Stop
Fiee		- Fiee	Free None		None
	135		None -		None 0
- # 0		-			-
					-
•			•	•	-
					90
			-		2
739	0	0	735	0	0
Maior1	1	Maior2	1	Minor1	
0	0	-	-	-	370
-	-	-	-	-	-
	-		-	-	-
-	-	-	-	-	6.94
		-			-
					3.32
					627
				-	027
					-
		0		0	-
					007
					627
-		-	-	-	-
	-		-		-
-	-	-	-	-	-
EB		WB		NB	
; 0		0		0	
				A	
		EDT	500	MOT	
nt I					
				-	
	-	-	-	-	
i)		-	-	-	
	A	-	-	-	
h)	-				
	e,e, # 0 0 92 2 739 Major1 0 - - - - - - - - - - - - -	iei, # 0 92 92 2 739 0 Major1 N 0 0 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -	iei, # 0 - - 92 92 92 93 92 92 92 93 739 0 0 Major1 Major2 0 0 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - </td <td>μ_e, # 0 - - 0 0 - - 0 92 93 93 92 92 92 92 92 92 92 93 93 92 92 92 92 92 93 93 92<td>mt NBLn1 EB WB NB mt NBLn1 EB WB NB mt NBLn1 EB WB NB mt NBLn1 EB WB NB mt mt mt mt mt</td></td>	μ_e , # 0 - - 0 0 - - 0 92 93 93 92 92 92 92 92 92 92 93 93 92 92 92 92 92 93 93 92 <td>mt NBLn1 EB WB NB mt NBLn1 EB WB NB mt NBLn1 EB WB NB mt NBLn1 EB WB NB mt mt mt mt mt</td>	mt NBLn1 EB WB NB mt mt mt mt mt

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Hayden One	a a ta	ما							5:	Burg	er Kir	ng Dr	wy & Hayden Roa HCM 6th TWS
Existing AM miti	gate	d											
Intersection													
Int Delay, s/veh	0.8												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	<u>LDL</u>	^	1	NDL 1		7	NDL	4	NDIX	JDL	4	ODIN	
Traffic Vol, veh/h	4	633	44	43	651	12	13	• •• •	15	3	•	2	
Future Vol, veh/h	4	633	44	43	651	12	13	0	15	3	0	2	
Conflicting Peds, #/hr	0	000	0	43	0.01	0	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	TICC	TICC	None	TICC	TICC	None	- Stop	- Stop	None	Stop	Stop	None	
Storage Length	100		75	90		100			-			-	
Veh in Median Storage.		0	- 15	90	0	- 100	-	- 1	-	-	0	-	
Grade, %	,# -	0	-	-	0	-		0	-	-	0	-	
Peak Hour Factor	93	93	93	96	96	96	78	78	78	63	63	63	
Heavy Vehicles, %	93	93	93 2	30	2	2	2	2	2	2	2	2	
Mymt Flow	4	681	47	45	678	13	17	0	19	5	0	2	
WWITH FIOW	4	001	41	40	070	13	17	0	19	5	0	5	
	/lajor1			Major2			Vinor1			/linor2			
Conflicting Flow All	691	0	0	728	0	0	1118	1470	341	1117	1504	339	
Stage 1	-	-	-	-	-	-	689	689	-	768	768	-	
Stage 2	-	-	-	-	-	-	429	781	-	349	736	-	
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-	
Critical Hdwy Stg 2	-		-				6.54	5.54	-	6.54	5.54	-	
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32	
Pot Cap-1 Maneuver	900	-	-	871	-	-	162	126	655	162	120	657	
Stage 1	-	-	-	-	-	-	402	445	-	360	409	-	
Stage 2	-	-	-	-	-	-	574	403	-	640	423	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	900	-	-	871	-	-	154	119	655	150	113	657	
Mov Cap-2 Maneuver	-	-	-	-	-	-	278	240	-	150	113	-	
Stage 1	-	-	-	-	-	-	400	443	-	359	388	-	
Stage 2	-		-	-	-	-	542	382	-	618	421	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.1			0.6			14.8			22.2			
HCM LOS							В			С			
Minor Lane/Major Mvm	t	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)		402	900		-	871	-	-	217				
HCM Lane V/C Ratio			0.005			0.051			0.037				
HCM Control Delay (s)		14.8	9	-	-	9.4	-	-	22.2				
HCM Lane LOS		B	Ā			э. 4 А			C				
HCM 95th %tile Q(veh)		0.3	0	-	-	0.2	-	-	0.1				
		0.5	0	-	-	0.2		-	0.1				

06/03/2019 CivTech BR Synchro 10 Report Page 6 Hayden One Existing AM mitigated 6: Northsight Boulevard & Hayden Road HCM 6th Roundabout

Intersection Delay, s/veh	7.0								
Intersection LOS	А								
Approach		EB		WB		NB		SB	
Entry Lanes		2		2		2		1	
Conflicting Circle Lanes		2		2		2		2	
Adj Approach Flow, veh/h		550		642		351		328	
Demand Flow Rate, veh/h		561		655		357		334	
Vehicles Circulating, veh/h		265		345		493		714	
Vehicles Exiting, veh/h		783		505		333		286	
Ped Vol Crossing Leg, #/h		0		0		0		0	
Ped Cap Adj		1.000		1.000		1.000		1.000	
Approach Delay, s/veh		5.8		6.9		6.2		10.4	
Approach LOS		A		А		А		В	
Lane	Left	Right	Left	Right	Left	Right	Left		
Designated Moves	LT	TR	LT	TR	LT	R	LTR		
Assumed Moves	LT	TR	LT	TR	LT	R	LTR		
RT Channelized									
Lane Util	0.471	0.529	0.470	0.530	0.538	0.462	1.000		
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535		
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328		
Entry Flow, veh/h	264	297	308	347	192	165	334		
Cap Entry Lane, veh/h	1058	1134	983	1059	858	934	774		
Entry HV Adj Factor	0.980	0.982	0.980	0.981	0.983	0.982	0.982		
Flow Entry, veh/h	259	292	302	340	189	162	328		
Cap Entry, veh/h	1037	1114	963	1039	843	917	760		
V/C Ratio	0.250	0.262	0.313	0.328	0.224	0.177	0.432		
Control Delay, s/veh	5.9	5.7	7.0	6.8	6.6	5.7	10.4		
LOS	А	А	А	А	А	А	В		
95th %tile Queue, veh	1	1	1	1	1	1	2		

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Lane Group EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL SBT Lane Configurations 1		≯	-	\mathbf{r}	4	+	•	1	1	1	×	Ļ
Traffic Volume (vph) 4 1078 196 368 1295 28 209 12 266 12 8 Future Volume (vph) 4 1078 196 368 1295 28 209 12 266 12 8 Turn Type Prot NA pm+ov Prot NA Perm Split NA pm+ov Split NA Protected Phases 5 2 8 1 6 8 8 1 4 4 Permitted Phases 2 6 1 6 8 8 1 4 4 Switch Phase 5 2 8 1 6 6 8 8 1 4 4 Switch Phase 5 2 8 1 6 6 8 8 1 4 4 Switch Phase 5 2 8 1 6 6 8 8 1 4 4 Switch Phase 5 2 8 1 6 6 8 8 1 4 4 Switch Phase 5 2 8 1 6 6 8 8 1 4 4 Switch Phase 5 2 8 1 6 6 8 8 1 4 4 Switch Phase 5 2 8 1 6 6 8 8 1 4 4 Switch Phase 5 7 2 8 1 6 6 8 8 1 4 4 Switch Phase 5 7 2 8 1 6 6 8 8 1 4 4 Switch Phase 5 7 2 8 1 6 6 8 8 1 4 4 Switch Phase 7 7 10 0 0 5.0 5.0 10.0 10.0 5.0 5.0 5.0 6.0 6.0 6.0 Minimum Initial (s) 11.0 38.7 47.0 11.0 25.7 25.7 47.0 47.0 11.0 44.3 44.3 Total Split (s) 11.0 38.7 47.0 11.0 25.7 25.7 47.0 47.0 11.0 44.3 44.3 Total Split (s) 11.0 35.0 33.0 40.0 64.0 64.0 33.0 33.0 40.0 12.0 12.0 12.0 Itotal Split (s) 10.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Lane Group	EBL		EBR		WBT	WBR	NBL	NBT	NBR	SBL	SBT
Future Volume (vph) 4 1078 196 368 1295 28 209 12 266 12 8 Tum Type Prot NA pmrov Prot NA permov Split NA pmrov Split NA permov Split NA 4 4 Permited Phases 5 2 8 1 6 8 8 1 4 4 Detector Phase 5 2 8 1 6 8 8 1 4 4 Detector Phase 5 2 8 1 6 6 8 8 1 4 4 Minimum Split (s) 11.0 35.0 47.0 11.0 25.7 47.0 47.0 40.3 4.3 3.3 10.0 3.3	Lane Configurations	ሻ	<u></u>	1	ሻሻ	<u> </u>	7		ર્ન	1		î»
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Lead/Lag Lag Lead Lag											••	•••
Lead-Lag Optimize? Yes Yes Yes Yes Yes Yes Recall Mode None C-Max None None C-Max None None <t< td=""><td></td><td></td><td></td><td>6.0</td><td></td><td></td><td></td><td>6.0</td><td>0.0</td><td></td><td>5.3</td><td>5.3</td></t<>				6.0				6.0	0.0		5.3	5.3
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Analysis Period (min) 15 Splits and Phases: 7: Hayden Road & Frank Lloyd Wright Boulevard → D2 (R)								B				
Splits and Phases: 7: Hayden Road & Frank Lloyd Wright Boulevard		001100.47	'			00 20101	01 001 110	, 0				
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₩02 (R) A Ø1 ₩04 \$ Ø8	Solits and Phases: 7: Hay	/den Road	& Frank	Llovd Wri	iaht Boule	evard						
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	35 s		40 s					12 s	33	3 s		
Ø6 (R)	(A)						<u>م</u> ر					
	64 s						115					

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
ane Configurations	1	<u></u>	1	ኘኘ	^	1	۲	4	1	٦	4Î	
Fraffic Volume (veh/h)	4	1078	196	368	1295	28	209	12	266	12	8	
Future Volume (veh/h)	4	1078	196	368	1295	28	209	12	266	12	8	;
nitial Q (Qb), veh	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		1.0
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	1.0
Nork Zone On Approach	4770	No	4770	4770	No	4770	4770	No	4770	4770	No	477
Adj Sat Flow, veh/h/ln	1772 5	1969 1268	1772 143	1772	1969 1439	1772 20	1772 231	1969 0	1772 177	1772	1969 10	177
Adj Flow Rate, veh/h Peak Hour Factor	5 0.85	0.85	0.85	409 0.90	0.90	0.90	0.94	0.94	0.94	15 0.82	0.82	0.8
Percent Heavy Veh, %	0.05	0.05	0.05	0.90	0.90	0.90	0.94	0.94	0.94	0.02	0.02	0.0
Cap, veh/h	349	1312	496	1468	2611	730	290	0	803	50	47	9
Arrive On Green	0.21	0.24	0.24	0.45	0.49	0.49	0.09	0.00	0.09	0.03	0.03	0.0
Sat Flow, veh/h	1688	5375	1502	3274	5375	1502	3375	0.00	1502	1688	1593	31
Grp Volume(v), veh/h	5	1268	143	409	1439	20	231	0	177	15	0	1
Grp Sat Flow(s), veh/h/ln	1688	1792	1502	1637	1792	1502	1688	0	1502	1688	0	191
Q Serve(g_s), s	0.3	28.0	8.5	9.4	22.6	0.8	8.1	0.0	0.0	1.0	0.0	0.
Cycle Q Clear(g_c), s	0.3	28.0	8.5	9.4	22.6	0.8	8.1	0.0	0.0	1.0	0.0	0.
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.1
ane Grp Cap(c), veh/h	349	1312	496	1468	2611	730	290	0	803	50	0	5
//C Ratio(X)	0.01	0.97	0.29	0.28	0.55	0.03	0.80	0.00	0.22	0.30	0.00	0.2
Avail Cap(c_a), veh/h	349	1312	496	1468	2611	730	759	0	1011	94	0	10
ICM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.0
Jpstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.0
Jniform Delay (d), s/veh	37.9	44.9	29.8	20.9	21.7	16.1	53.8	0.0	14.7	57.0	0.0	56.
ncr Delay (d2), s/veh	0.0	18.0	1.5	0.0	0.8	0.1	1.9	0.0	0.1	1.2	0.0	0.1
nitial 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 Jnsig. Movement Delay, s/veh	0.1	14.5	3.7	3.6	9.5	0.3	3.5	0.0	2.5	0.5	0.0	0.4
In Grp Delay(d),s/veh	37.9	62.8	31.2	20.9	22.5	16.1	55.7	0.0	14.8	58.2	0.0	57.
InGrp LOS	57.9 D	02.0 E	51.2 C	20.9 C	22.5 C	B	55.7 E	A U.U	14.0 B	56.2 E	0.0 A	57.3
Approach Vol, veh/h	0	1416	0	0	1868			408			27	
Approach Delay, s/veh		59.6			22.1			38.0			57.9	
Approach LOS		55.0 E			C			D			57.5 E	
											-	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	59.8	35.0		8.9	30.8	64.0		16.3				
Change Period (Y+Rc), s	6.0	5.7		* 5.3	6.0	5.7		6.0				
Max Green Setting (Gmax), s	34.0	29.3		* 6.7	5.0	58.3		27.0				
Max Q Clear Time (g_c+I1), s	11.4 0.3	30.0 0.0		3.0 0.0	2.3 0.0	24.6 5.0		10.1 0.3				
Green Ext Time (p_c), s	0.5	0.0		0.0	0.0	5.0		0.5				
ntersection Summary												
ICM 6th Ctrl Delay			38.4									
ICM 6th LOS			D									
lotes												
Jser approved pedestrian inter Jser approved volume balanci	ng amor	ng the lan	es for turi	ning move	ement.							
HCM 6th computational engin	ne requir	es equal	clearance	e times fo	r the phas	ses crossi	ng the ba	rrier.				
06/03/2019											nchro 10	-

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ane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	
ane Configurations	3	≜1 ≱	5	≜î ≽	٦	↑ 12	1	5	4Î	
raffic Volume (vph)	13	810	62	508	145		130	90	24	
uture Volume (vph)	13	810	62	508	145	12	130	90	24	
urn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	
rotected Phases		6		2	7	4			8	
ermitted Phases	6		2		4		4	8		
etector Phase	6	6	2	2	7	4	4	8	8	
witch Phase	40.0	40.0	40.0	40.0	5.0	7.0	7.0	7.0	7.0	
linimum Initial (s)	10.0	10.0	10.0	10.0	5.0	7.0	7.0	7.0	7.0	
linimum Split (s) otal Split (s)	26.9 74.0	26.9 74.0	26.9 74.0	26.9 74.0	9.6 26.0	32.4 46.0	32.4 46.0	32.4 20.0	32.4 20.0	
otal Split (S)	74.0 61.7%		61.7%	61.7%	26.0	46.0 38.3%	46.0 38.3%	20.0	20.0	
ellow Time (s)	4.7	4.7	4.7	4.7	21.7%	30.3%	30.3%	3.6	3.6	
II-Red Time (s)	4.7	4.7	4.7	4.7	3.0 1.6	3.0 1.8	3.0 1.8	3.0 1.8	3.0 1.8	
ost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
otal Lost Time (s)	5.9	5.9	5.9	5.9	4.6	5.4	5.4	5.4	5.4	
ead/Lag	0.0	0.0	0.0	0.0	Lead	0.4	0.7	Lag	Lag	
ead-Lag Optimize?					Yes			Yes	Yes	
ecall Mode	None	None	C-Max	C-Max	None	None	None	None	None	
ct Effct Green (s)	74.4	74.4	74.4	74.4	35.1	34.3	34.3	12.3	12.3	
ctuated g/C Ratio	0.62	0.62	0.62	0.62	0.29	0.29	0.29	0.10	0.10	
c Ratio	0.03	0.42	0.24	0.24	0.49	0.03	0.32	0.74	0.25	
ontrol Delay	11.3	13.1	15.1	11.3	37.2	27.6	9.1	82.3	32.5	
ueue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
otal Delay	11.3	13.1	15.1	11.3	37.2	27.6	9.1	82.3	32.5	
OS	В	В	В	В	D	С	А	F	С	
pproach Delay		13.1		11.7		24.1			65.5	
pproach LOS		В		В		С			E	
tersection Summary										
ycle Length: 120										
ctuated Cycle Length: 1	20									
ffset: 2 (2%), Reference	d to phase 2	:WBTL, S	Start of G	reen						
atural Cycle: 70										
ontrol Type: Actuated-C	oordinated									
aximum v/c Ratio: 0.74										
tersection Signal Delay						n LOS: B				
tersection Capacity Util	zation 61.1%)		10	U Level	of Service	эB			
nalysis Period (min) 15										
plits and Phases: 1: 8	3rd Place &	Havdor E	beo							
+	i iuuo u	ayaann					▲			
🔮 Ø2 (R)							104	ł		
4s							46 s			
							107	,		
4 s							26 s			20 s
5/30/2019										Synchr
ivTech BR										

Hayden One Existing PM								1: 83r HCM 6t		e & Ha zed Inters		
	≯	-	\mathbf{i}	4	+	×	1	1	1	1	ţ	-
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	≜ 1}		5	≜ †ĵø		7	^	1	5	f,	
Traffic Volume (veh/h)	13	810	68	62	508	17	145	12	130	90	24	22
Future Volume (veh/h)	13	810	68	62	508	17	145	12	130	90	24	22
Initial Q (Qb), veh	0 1.00	0	0	0 1.00	0	0 1.00	0 1.00	0	0 1.00	0 1.00	0	0 1.00
Ped-Bike Adj(A_pbT) 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
ork Zone On Approach	1.00	No	1.00	1.00	No	1.00	1.00	No	1.00	1.00	No	1.00
dj Sat Flow, veh/h/ln	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
dj Flow Rate, veh/h	14	890	48	65	535	7	188	16	59	100	27	7
eak Hour Factor	0.91	0.91	0.91	0.95	0.95	0.95	0.77	0.77	0.77	0.90	0.90	0.90
ercent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
p, veh/h	553	2376	128	369	2488	33	355	488	372	179	143	37
rrive On Green	0.66	0.66	0.66	0.66	0.66	0.66	0.11	0.25	0.25	0.09	0.09	0.09
Sat Flow, veh/h	818	3609	195	566	3781	49	1688	1969	1502	1255	1508	391
rp Volume(v), veh/h	14 818	461	477 1934	65 566	265 1870	277 1960	188 1688	16 1969	59 1502	100 1255	0	34 1898
p Sat Flow(s),veh/h/ln Serve(g_s), s	0.8	1870 13.4	1934	7.1	6.8	6.8	1000	0.7	3.7	9.4	0.0	2.0
cle Q Clear(g_c), s	7.6	13.4	13.4	20.5	6.8	6.8	11.6	0.7	3.7	9.4	0.0	2.0
op In Lane	1.00		0.10	1.00	0.0	0.03	1.00		1.00	1.00	0.0	0.21
ane Grp Cap(c), veh/h	553	1231	1273	369	1231	1290	355	488	372	179	0	180
C Ratio(X)	0.03	0.37	0.37	0.18	0.21	0.22	0.53	0.03	0.16	0.56	0.00	0.19
vail Cap(c_a), veh/h	553	1231	1273	369	1231	1290	463	666	508	213	0	231
CM 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
ostream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
niform Delay (d), s/veh	9.7	9.3	9.3	14.0	8.2	8.2	40.5	34.2	35.3	53.4	0.0	50.1
cr Delay (d2), s/veh	0.0 0.0	0.1	0.1	1.0 0.0	0.4	0.4	0.5 0.0	0.0	0.1	1.0 0.0	0.0	0.2
hitial Q Delay(d3),s/veh 6ile BackOfQ(50%),veh/ln	0.0	0.0 5.2	0.0 5.4	0.0	0.0 2.8	0.0 2.9	0.0 4.9	0.0 0.4	0.0 1.4	0.0 3.0	0.0 0.0	0.0 1.0
Insig. Movement Delay, s/veh		5.2	0.4	1.0	2.0	2.9	4.9	0.4	1.4	3.0	0.0	1.0
nGrp Delay(d),s/veh	9.7	9.4	9.4	15.0	8.6	8.6	41.0	34.2	35.4	54.5	0.0	50.3
nGrp LOS	A	A	A	B	A	A	D	C	D	D	A	D
proach Vol, veh/h		952			607		-	263			134	
pproach Delay, s/veh		9.4			9.2			39.3			53.4	
pproach LOS		А			А			D			D	
mer - Assigned Phs		2		4		6	7	8				
hs Duration (G+Y+Rc), s		84.9		35.1		84.9	18.4	16.7				
Change Period (Y+Rc), s		* 5.9		* 5.4		* 5.9	* 4.6	* 5.4				
lax Green Setting (Gmax), s		* 68		* 41		* 68	* 21	* 15				
lax Q Clear Time (g_c+I1), s		22.5		5.7		15.4	13.6	11.4				
Green Ext Time (p_c), s		1.5		0.1		2.2	0.2	0.1				
ntersection Summary												
HCM 6th Ctrl Delay			16.4									
HCM 6th LOS			B									
otes ser approved pedestrian inter	nual to b	o loss tha	n nhasa i	max area	n							
HCM 6th computational engin						ses crossi	ng the ba	irrier.				
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ntersection														
nt Delay, s/veh	5.7													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
ane Configurations	ň	††	1	7	≜ ‡		٦	4			4			
Fraffic Vol, veh/h	13	1125	27	36	686	16	10	0	42	69	1	51		
uture Vol. veh/h	13	1125	27	36	686	16	10	0	42	69	1	51		
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	135		100	145	-	-	45		-	-		-		
/eh in Median Storage	. # -	0	-	-	0	-	-	1	-	-	1	-		
Grade, %	-	0	-	-	0			0		-	0	-		
Peak Hour Factor	95	95	95	93	93	93	46	46	46	63	63	63		
leavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2		
Nymt Flow	14	1184	28	39	738	17	22	0	91	110	2	81		
			20	00				Ū	0.		-			
Major/Minor	Major1		1	Major2		1	Minor1		ľ	/linor2				
Conflicting Flow All	755	0	0	1212	0	0	1660	2045	592	1445	2065	378		
Stage 1	-	-	-	-	-	-	1212	1212	-	825	825	-		
Stage 2							448	833		620	1240	-		
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94		
Critical Hdwy Stg 1				-			6.54	5.54	- 0.04	6.54	5.54	- 0.04		
Critical Hdwy Stg 2	-	-	-	-			6.54	5.54	-	6.54	5.54			
Follow-up Hdwy	2.22		-	2.22			3.52	4.02	3.32	3.52	4.02	3.32		
Pot Cap-1 Maneuver	851	-	-	571		-	64	55	449	~ 93	54	620		
Stage 1	-			-			193	253		333	385	- 020		
Stage 2		-	-	-			560	382	-	442	245	-		
Platoon blocked, %							000	002			210			
Nov Cap-1 Maneuver	851		-	571		-	52	50	449	~ 69	50	620		
Nov Cap-2 Maneuver	-			-			140	154		176	139	- 020		
Stage 1		-	-	-		-	190	249	-	328	359	-		
Stage 2			-				452	356		346	241	-		
Oldgo 2							102	000		010	241			
Approach	EB			WB			NB			SB				
HCM Control Delay, s	0.1			0.6			19			54.4				
HCM LOS	0.1			0.0			C			F				
10111 200							Ū							
/linor Lane/Major Mvm	t I	NBLn1 I	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)		140	449	851		-	571	-	-	251				
HCM Lane V/C Ratio			0.203				0.068			0.765				
HCM Control Delay (s)		35.4	15.1	9.3	-	-	11.8	-	-	54.4				
HCM Lane LOS		E	C	A			B			F				
HCM 95th %tile Q(veh)		0.5	0.8	0	-	-	0.2	-	-	5.6				
Notes														
-: Volume exceeds cap	pacity	\$: De	elay exc	eeds 3)0s	+: Com	putatio	n Not D	efined	*· All	maior v	olume i	n platoon	

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Hayden One Existing PM

4: Northeast Access & Hayden Road HCM 6th TWSC

Intersection		_	_		_	
Int Delay, s/veh	0					
Movement	EBT	EBR	WDI	WBT	NBL	NBR
		EBR	VVDL		INDL	
Lane Configurations Traffic Vol. veh/h	^		0		0	۳
	1236 1236		0	738 738	0	0
Future Vol, veh/h Conflicting Peds, #/hr		0	0	/38	0	0
Sign Control	Free	•	Free	Free	Stop	Stop
RT Channelized	Free -			None		None
Storage Length	-		-	None -	-	None 0
Veh in Median Storage			-	0	0	-
Grade. %	e,#0 0		-	0	0	-
Peak Hour Factor	92		93	93	90	90
Heavy Vehicles, %	92		93	93	90	90
Mymt Flow	1343		2	794	2	2
NIVITE FIOW	1343	U	U	794	U	U
Major/Minor	Major1	1	Major2	1	Minor1	
Conflicting Flow All	0	0	-	-	-	672
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-		-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-		3.32
Pot Cap-1 Maneuver	-	-	0	-	0	398
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	398
Mov Cap-2 Maneuver		-		-		-
Stage 1	-	-	-	-	-	-
Stage 2		-				
olugo 2						
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		0	
HCM LOS					A	
Minor Lane/Major Mvn	nt	NBLn1	EBT	EBR	WBT	
Capacity (veh/h)		-	-	-	-	
		-		-		
HCM Lane V/C Ratio				-		
HCM Lane V/C Ratio HCM Control Delay (s))	0	-	-		
)	0 A	-		-	
HCM Control Delay (s)					-	

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Hayden	One
Existing	PM

5: Burger King Drwy & Hayden Road HCM 6th TWSC

Intersection													_
Int Delay, s/veh	1												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	5	^	1	1	**	1	NDL	4	NDIX	ODL	4	ODIX	
Traffic Vol, veh/h	7	1216	42	22	721	19	11	0	19	12	0	18	
Future Vol. veh/h	7	1216	42	22	721	19	11	0	19	12	0	18	
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		75	90		100			-			-	
Veh in Median Storage,		0	-	-	0	-	-	1		-	1	-	
Grade. %	-	0			0			0			0		
Peak Hour Factor	90	90	90	96	96	96	75	75	75	75	75	75	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mymt Flow	2	1351	47	23	751	20	15	0	25	16	0	24	
WWWITCT IOW	0	1001	41	20	131	20	10	0	25	10	0	24	
	lajor1			Major2			Minor1			Minor2			
Conflicting Flow All	771	0	0	1398	0	0	1789	2184	676	1489	2211	376	
Stage 1	-	-	-	-	-	-	1367	1367	-	797	797	-	
Stage 2	-	-	-	-	-	-	422	817	-	692	1414	-	
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-	
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32	
Pot Cap-1 Maneuver	840	-	-	485	-	-	51	45	396	86	44	622	
Stage 1	-	-	-	-	-	-	155	213	-	346	397	-	
Stage 2	-	-	-	-	-	-	580	388	-	400	202	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	840	-	-	485	-	-	47	42	396	77	41	622	
Mov Cap-2 Maneuver	-	-	-	-	-	-	122	139	-	193	126	-	
Stage 1	-	-	-	-	-	-	153	211	-	343	378	-	
Stage 2	-	-	-	-	-	-	531	370	-	371	200	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.1			0.4			25.3			17.5			_
HCM LOS	0.1			0.4			25.3 D			17.5 C			
							U			U			
Minor Lane/Major Mvmt		VBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBI n1				
Capacity (veh/h)		217	840	-	LDIX	485	-	ALDIA V	329	_	_	_	_
HCM Lane V/C Ratio			0.009		-				0.122				
HCM Control Delay (s)		25.3	9.3		-	12.8		-	17.5				
HCM Control Delay (s) HCM Lane LOS		25.3 D	9.3 A	-	-	12.8 B	-		17.5 C				
		0.7	A 0		-	0.1	-		0.4				
HCM 95th %tile Q(veh)		0.7	0	-	-	0.1		-	0.4				

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Hayden One Existing PM

6: Northsight Boulevard & Hayden Road HCM 6th Roundabout

Intersection Delay, s/veh	13.9							
Intersection LOS	В							
Approach		EB		WB		NB		SB
Entry Lanes		2		2		2		1
Conflicting Circle Lanes		2		2		2		2
Adj Approach Flow, veh/h		1274		590		641		415
Demand Flow Rate, veh/h		1300		602		655		423
Vehicles Circulating, veh/h		292		556		1174		651
Vehicles Exiting, veh/h		782		1273		418		507
Ped Vol Crossing Leg, #/h		0		0		0		0
Ped Cap Adj		1.000		1.000		1.000		1.000
Approach Delay, s/veh		11.6		8.5		24.8		11.8
Approach LOS		В		А		С		В
Lane	Left	Right	Left	Right	Left	Right	Left	
Designated Moves	LT	TR	LT	TR	LT	R	LTR	
Assumed Moves	LT	TR	LT	TR	LT	R	LTR	
RT Channelized								
Lane Util	0.470	0.530	0.470	0.530	0.482	0.518	1.000	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328	
Entry Flow, veh/h	611	689	283	319	316	339	423	
Cap Entry Lane, veh/h	1032	1108	809	885	458	523	817	
Entry HV Adj Factor	0.980	0.980	0.979	0.980	0.979	0.979	0.982	
Flow Entry, veh/h	599	675	277	312	309	332	415	
Cap Entry, veh/h	1011	1086	793	867	449	513	802	
V/C Ratio	0.592	0.622	0.350	0.360	0.689	0.648	0.518	
Control Delay, s/veh	11.6	11.7	8.7	8.3	27.4	22.3	11.8	
LOS	В	В	А	А	D	С	В	
95th %tile Queue, veh	4	5	2	2	5	5	3	

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ane Group ane Configurations Traffic Volume (vph) Future Volume (vph) Furn Type	EBL			•			<u> </u>		- 7		•	
Fraffic Volume (vph) Future Volume (vph)		EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Future Volume (vph)	<u>۲</u>	111	1	ካካ	<u> </u>	1	3	ર્શ	1	5	4	
	5	1675	231	259	1324	13	418	8	687	23	28	
	5	1675	231	259	1324	13	418	8	687	23	28	
	Prot	NA	pm+ov	Prot	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2	. 8	1	6		. 8	8	. 1	4	4	
Permitted Phases			2			6			8			
Detector Phase	5	2	8	1	6	6	8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	5.0	5.0	6.0	6.0	
Vinimum Split (s)	11.0	38.7	47.0	11.0	25.7	25.7	47.0	47.0	11.0	44.3	44.3	
Fotal Split (s)	11.0	50.0	27.0	29.0	68.0	68.0	27.0	27.0	29.0	14.0	14.0	
Total Split (%)	9.2%	41.7%	22.5%	24.2%	56.7%	56.7%	22.5%	22.5%	24.2%	11.7%	11.7%	
(ellow Time (s)	4.0	4.7	4.0	4.0	4.7	4.7	4.0	4.0	4.0	3.3	3.3	
All-Red Time (s)	2.0	1.0	2.0	2.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	
ost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Fotal Lost Time (s)	6.0	5.7	6.0	6.0	5.7	5.7	6.0	6.0	6.0	5.3	5.3	
_ead/Lag	Lag	Lead	0.0	Lag	Lead	Lead	0.0	0.0	Lag	0.0	0.0	
_ead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	None	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	5.0	50.0	75.0	23.0	76.8	76.8	19.3	19.3	43.5	7.0	7.0	
Actuated g/C Ratio	0.04	0.42	0.62	0.19	0.64	0.64	0.16	0.16	0.36	0.06	0.06	
/c Ratio	0.09	0.86	0.26	0.43	0.40	0.01	0.89	0.80	1.20	0.35	0.50	
Control Delay	58.2	38.3	1.9	45.2	12.3	0.0	82.6	68.5	133.3	64.0	56.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Fotal Delay	58.2	38.3	1.9	45.2	12.3	0.0	82.6	68.5	133.3	64.0	56.7	
_OS	50.2 E	00.0	A	43.2 D	12.3 B	0.0 A	02.0 F	60.5 E	F	64.0 E	50.7 E	
Approach Delay	-	33.9	7	U	17.6	A		111.2			59.3	
Approach LOS		00.0 C			B			F			55.5 E	
Appidacii 200		U			D			1			L	
ntersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 103 (86%), Reference	ced to phase	se 2:EBT	and 6:WE	3T, Start	of Green							
Vatural Cycle: 145												
Control Type: Actuated-Coc	ordinated											
Maximum v/c Ratio: 1.20												
ntersection Signal Delay: 4					ntersectio							
ntersection Capacity Utiliza	ation 94.8%)		ŀ	CU Level	of Service	ə F					
Analysis Period (min) 15												
Splits and Phases: 7: Ha	yden Road	& Frank	Lloyd Wri	ight Boule	evard							
₩ Ø2 (R)				10	1		,	Ø4	- 15	Ø8		
50 s				29 s	-		14	is l	27 s			

Traffic Volume (veh/h) Future Volume (veh/h) Initial Q (Qb), veh Ped-Bike Adj(A_pbT) 1.0 Parking Bus, Adj 1.0 Work Zone On Approach Adj Sat Flow, veh/hln 177 Adj Sat Flow, veh/hln 15 Arrive On Green 0.0 Sat Flow(s),veh/hln 168 Grp Volume(v), veh/h 168 Grp Volume(v), veh/h 168 Grp Volume(v), veh/h 168 Grp Sat Flow(s),veh/hln 168 Q Serve(gs), s 0.0 Cycle Q Clear(g_c), s 0.0 Prop In Lane 1.0 Lane Grp Cap(c), veh/h 15 HCM Platoon Ratio 1.0 Uniform Delay (d), s/veh 19 Incr Delay (d2), s/veh 0.0 Initial Q Delay(d3), s/veh 0.1 Visig, Movement Delay, s/veh 10 Unsigr.memt Delay, s/veh 19	Image: https://www.science.org/line 5 1675 5 1675 5 1675 0 0 0 0 0 1060 2 1969 6 1925 7 0.87 2 2 5 1984 9 0.375 6 1925 8 5375 6 1925 9 0.37 5 1984 4 42.2 0 0 5 1984 4 0.97 5 1984 0 1.00	EBR 231 231 0 1.00 1.00 1.00 1.00 1.00 1.00 1.00	WBL 259 259 0 1.00 1.00 1772 267 0.97 2 791 0.24 3274 267 1637 8.1 8.1 1.00 791	WBT 1324 1324 1324 1324 0 1.00 No 1969 1365 0.97 2 2790 0.52 5375 1365 1792 19.66 19.6	WBR 13 13 13 10 1.00 1.00 1772 5 0.97 2 780 0.52 1502 5 1502	NBL 418 418 0 1.00 1.00 1772 451 0.94 2 510 0.15 3375 451	NBT 4 8 8 0 1.00 No 1969 0 0.94 2 0 0.94 0 0.00 0 0 0 0 0 0 0 0 0 0 0 0	NBR 687 687 0 1.00 1.00 1.00 1.00 1.00 1.00 1.00 2.518 590 0.15 1.502 518	SBL 23 23 0 1.00 1.00 1.00 1.00 1.00 1.00 2 34 0.67 2 79 0.05 1688	SBT 28 28 0 1.00 No 1969 42 0.67 2 82 0.05 1770	SBF 13 13 13 0 1.00 1.00 1.00 1.00 1.00 1.0
Traffic Volume (veh/h) Future Volume (veh/h) Initial Q (Qb), veh Peed-Bike Adj(A_pbT) 1.0 Parking Bus, Adj 1.0 Work Zone On Approach Adj Sat Flow, veh/h/n 177 Adj Sat Flow, veh/h/n 177 Adj Sat Flow, veh/h/n 177 Adj Sat Flow, veh/h 15 Percent Heavy Veh, % Cap, veh/h Cap, veh/h 15 Arrive On Green 0.0 Sat Flow, veh/h 168 Grp Volume(v), veh/h 168 Q Serve(g_s), s 0. Cycle Q Clear(g_c), s 0.0 Lane Grp Cap(c), veh/h 15 V/C Ratio(X) 0.0 Avail Cap(c_a), veh/h 15 HOM Platoon Ratio 1.0 Upstream Filter(I) 1.0 Uniform Delay (d), s/veh 49. Incr Delay(d2), s/veh 0. %ile BackOfQ(50%), veh/n 0. Movement Delay, s/veh 10. LnGrp Delay(d), s/veh 49. LnGrp Delay(s/s/s/eh 49.<	5 1675 5 1675 0 0 0 100 0 1969 6 1925 7 0.87 2 2 2 1984 9 0.375 6 1925 8 5375 6 1925 8 5375 5 1984 4 42.2 0 0 5 1984 4 0.97 5 1984 0 1.00	231 231 0 1.00 1.00 1772 134 0.87 2 781 0.37 1502 134 1502 5.6 5.6 1.00 781 0.17	259 259 0 1.00 1.00 1772 267 0.97 2 791 0.24 3274 267 1637 8.1 8.1 8.1	1324 1324 0 1.00 No 1969 1365 0.97 2 2790 0.52 5375 1365 1792 19.6	13 13 0 1.00 1.00 1772 5 0.97 2 780 0.52 1502 5 1502	418 418 0 1.00 1.00 1772 451 0.94 2 510 0.15 3375	8 8 0 1.00 No 1969 0 0.94 2 0 0.00 0.00 0	687 687 0 1.00 1.00 1.00 1.772 518 0.94 2 590 0.15 1502	23 23 0 1.00 1.00 1.00 1.00 1.00 1.00 2 34 0.67 2 79 0.05 1688	28 28 0 1.00 No 1969 42 0.67 2 82 0.05	100 1.00 1.00 1772 0.67 2 8 0.05
Future Volume (veh/h) Initial Q (Qb), veh Ped-Bike Adj(A_pbT) 1.0 Parking Bus, Adj 1.0 Work Zone On Approach Adj Sat Flow, veh/h/ln 177 Adj Sat Flow, veh/h/ln 177 Adj Flow Rate, veh/h 6 Peak Hour Factor 0.8 Percent Heavy Veh, % 6 Cap, veh/h 168 Grp Sat Flow(s), veh/h/ln 168 Q Serve(g_s), s 0.0 Sat Flow, veh/h 168 Q Serve(g_s), s 0.0 Y/C Ratio(s), veh/h 15 Janne Grp Cap(c), veh/h 15 V/C Ratio(x) 0.0 Avail Cap(c_a), veh/h 15 V/C Ratio(X) 0.0 Upstream Filter(I) 1.0 Uniform Delay (d), s/veh 49. Incr Delay (d2), s/veh 0.0 %ile BackOfQ(50%), veh/in 0. Movement Delay, s/veh 0.0 LnGrp Delay(d), s/veh 49. LnGrp Delay(d), s/veh 49.	5 1675 0 0 1.00 0 1.00 2 1969 6 1925 7 0.87 2 2 5 1984 9 0.37 8 5375 6 1925 6 1925 7 0.87 6 1925 7 0.87 6 1925 5 1984 4 42.2 0 5 1984 4 0.97 5 1984 0 .07 5 1984 0 .07 1 .00 1 .00	231 0 1.00 1772 134 0.87 2 781 0.37 1502 134 1502 5.6 5.6 5.6 1.00 781 0.17	259 0 1.00 1.00 1772 267 0.97 2 791 0.24 3274 267 1637 8.1 8.1 8.1	1324 0 1.00 No 1969 1365 0.97 2 2790 0.52 5375 1365 1792 19.6	13 0 1.00 1.00 1772 5 0.97 2 780 0.52 1502 5 1502	418 0 1.00 1.00 1772 451 0.94 2 510 0.15 3375	8 0 1.00 No 1969 0 0.94 2 0 0.00 0.00 0	687 0 1.00 1.00 1772 518 0.94 2 590 0.15 1502	23 0 1.00 1.00 1772 34 0.67 2 79 0.05 1688	28 0 1.00 No 1969 42 0.67 2 82 0.05	13 (1.00 1.00 1772 2 0.67 2 8 0.05
Initial Q (Qb), veh Ped-Bike Adj(A_pbT) 1.0 Work Zone On Approach Adj Sat Flow, veh/h/in 1.77 Adj Sat Flow, veh/h/in 1777 Adj Flow Rate, veh/h 198 Peak Hour Factor 0.8 Percent Heavy Veh, % 0.0 Cap, veh/h 15 Arrive On Green 0.0 Sat Flow, veh/h 168 Grp Volume(v), veh/h 168 Grp Volume(v), veh/h 168 Grp Volume(v), veh/h 168 Gy Serve(g.s), \$ 0.0 Cycle Q Clear(g_c), \$ 0. Cycle Q Clear(g_c), veh/h 15 V/C Ratio(X) 0.0 Avail Cap(c_a), veh/h 15 HCM Platoon Ratio 1.0 Upstream Filter(I) 1.0 Unsig. Movement Delay, (s/veh 0. %ile BackOfQ(50%), veh/in 0. Mile BackOfQ(50%), veh/in 0. Mile BackOfQ, So (%) 49. LnGrp Delay(d), s/veh 49. LnGrb Dolay (S) 49.	0 0 0 1.00 No 1969 6 1925 7 0.87 2 2 5 1984 9 0.37 8 5375 6 1925 8 1792 4 42.2 0 0 5 1984 4 0.97 5 1984 4 0.97 5 1984 0 1.00	0 1.00 1.00 1772 134 0.87 2 781 0.87 1502 134 1502 5.6 5.6 1.00 781 0.17	0 1.00 1.00 1772 267 0.97 2 791 0.24 3274 267 1637 8.1 8.1 8.1 1.00	0 1.00 No 1969 1365 0.97 2 2790 0.52 5375 1365 1792 19.6	0 1.00 1.00 1772 5 0.97 2 780 0.52 1502 5 1502	0 1.00 1.00 1772 451 0.94 2 510 0.15 3375	0 1.00 No 1969 0 0.94 2 0 0.00 0.00 0	0 1.00 1.00 1772 518 0.94 2 590 0.15 1502	0 1.00 1.00 1772 34 0.67 2 79 0.05 1688	0 1.00 No 1969 42 0.67 2 82 0.05	(1.00 1.00 1772 0.67 2 8 0.05
Ped-Bike Adj(A_pbT) 1.0 Parking Bus, Adj 1.0. Work Zone On Approach Add Adj Sat Flow, veh/h/in 177 Adj Sat Flow, veh/h/in 177 Adj Sat Flow, veh/h 15 Arrive On Green 0.0 Sat Flow, veh/h 168 Grp Sat Flow(s), veh/h/in 168 Q Serv(g, s), s 0.0 Cycle Q Clear(g_c), s 0.0 Lane Grp Cap(c), veh/h 15 V/C Ratio(X) 0.0 Avail Cap(c_a), veh/h 15 HOM Platoon Ratio 1.0 Upstream Filter(I) 1.0 Uniform Delay (d), s/veh 49. Incr Delay (d2), s/veh 0.0 %ile BackOfQ(50%), veh/n 0. More Delay(d), s/veh 49. LnGrp Delay(d), s/veh 49. LnGrp Delay(d), s/veh 49.	0 0 1.00 No 2 1969 5 1925 5 1984 9 0.377 8 5 1984 9 0.375 6 1925 8 1792 4 4 2.2 5 1984 9 0.377 5 1984 9 0.375 5 1925 5 1984 9 0.375 5 1984 9 0.375 5 1984 9 0.375 5 1984 9 0.375 5 1984 9 0.375 5 1984 9 0.375 5 1984 9 0.375 5 1984 9 0.375 5 1984 9 0.375 5 1984 9 0.375 5 1984 9 0.375 5 1984 9 0.375 5 1984 9 0.375 5 1984 9 0.375 5 1984 9 0.375 5 1985 9 0.375 5 1985 9 0.375 5 1925 5 1984 9 0.375 5 1925 5 1984 9 0.375 5 1925 5 1984 9 0.375 5 1925 5 1984 9 0.375 5 1925 5 1984 9 0.375 5 1925 5 1984 9 0.375 5 1925 5 1984 4 4 0.2 2 5 1984 4 4 0.2 1 5 1984 4 0.375 5 1984 4 0.375 5 1984 4 0.375 5 1984 4 0.375 5 1984 4 0.375 5 1984 4 0.375 5 1984 4 0.375 5 1984 4 0.375 5 1984 0 1.007 5 1984 0 1.007 1.00	1.00 1.00 1772 134 0.87 2 781 0.37 1502 134 1502 5.6 5.6 5.6 5.6 5.6 1.00 781 0.17	1.00 1.00 1772 267 0.97 2 791 0.24 3274 267 1637 8.1 8.1 8.1	1.00 No 1969 1365 0.97 2 2790 0.52 5375 1365 1792 19.6	1.00 1.00 1772 5 0.97 2 780 0.52 1502 5 1502	1.00 1.00 1772 451 0.94 2 510 0.15 3375	1.00 No 1969 0 0.94 2 0 0.00 0.00	1.00 1.00 1772 518 0.94 2 590 0.15 1502	1.00 1.00 1772 34 0.67 2 79 0.05 1688	1.00 No 1969 42 0.67 2 82 0.05	1.00 1.00 1772 0.67 2 8 0.05
Parking Bus, Adj 1.0 Work Zone On Approach Adj Sat Flow, veh/h/ln 177 Adj Sat Flow, veh/h/ln 177 Adj Flow Rate, veh/h Peak Hour Factor 0.8 Percent Heavy Veh, %	0 1.00 No 2 1969 6 1925 7 0.87 2 2 5 1984 9 0.37 5 375 6 1925 8 1792 8 1792 4 42.2 0 5 1984 4 0.97 5 1984 4 0.97 5 1984 0 1.00	1.00 1772 134 0.87 2 781 0.37 1502 134 1502 5.6 5.6 5.6 1.00 781 0.17	1.00 1772 267 0.97 2 791 0.24 3274 267 1637 8.1 8.1 1.00	No 1969 1365 0.97 2 2790 0.52 5375 1365 1792 19.6	1.00 1772 5 0.97 2 780 0.52 1502 5 1502	1.00 1772 451 0.94 2 510 0.15 3375	No 1969 0 0.94 2 0 0.00 0.00	1.00 1772 518 0.94 2 590 0.15 1502	1.00 1772 34 0.67 2 79 0.05 1688	No 1969 42 0.67 2 82 0.05	1.00 1772 0.67 2 8 0.05
Work Zone On Ápproach Adj Sat Flow, veh/h/n 1777 Adj Flow Rate, veh/h 1777 Adj Flow Rate, veh/h 178 Percent Heavy Veh, % 15 Cap, veh/h 15 Arrive On Green 0.0 Sat Flow, veh/h 168 Grp Valume(v), veh/h 168 Grp Valume(v), veh/h 168 Grp Valume(v), veh/h 168 Grp Valume(v), veh/h 168 Q Serve(g.s.), s 0.0 Agerve(g.s.), s 0.0 Avail Cap(c.a), veh/h 15 V/C Ratio(X) 0.0 Avail Cap(c.a), veh/h 15 U/C Ratio(X) 0.0 Avail Cap(c.a), veh/h 15 HCM Platoon Ratio 1.0 Upstream Filter(I) 1.0 Uniform Delay (d), s/veh 49. Incr Delay (d2), s/veh 0. %ile BackOfQ(50%), veh/ln 0. Misiga Delay(d), s/veh 49. InGrp Delay(d), s/veh 49.	No 2 1969 6 1925 7 0.87 2 2 2 1984 9 0.37 8 5375 6 1925 8 1792 4 42.2 0 0 5 1984 4 0.97 5 1984 4 0.97 5 1984 0 1.00	1772 134 0.87 2 781 0.37 1502 134 1502 5.6 5.6 1.00 781 0.17	1772 267 0.97 2 791 0.24 3274 267 1637 8.1 8.1 1.00	No 1969 1365 0.97 2 2790 0.52 5375 1365 1792 19.6	1772 5 0.97 2 780 0.52 1502 5 1502	1772 451 0.94 2 510 0.15 3375	No 1969 0 0.94 2 0 0.00 0.00	1772 518 0.94 2 590 0.15 1502	1772 34 0.67 2 79 0.05 1688	No 1969 42 0.67 2 82 0.05	1772 0.67 2 8 0.05
Adj Sat Flow, veh/h/ln 177 Adj Flow Rate, veh/h 177 Adj Flow Rate, veh/h 0.8 Peak Hour Factor 0.8 Peak Hour Factor 0.8 Percent Heavy Veh, % 15 Arrive On Green 0.0 Sat Flow, veh/h 168 Grp Volume(v), veh/h 168 Grp Sat Flow(s), veh/h/in 168 Q Serve(g_s), s 0.0 Cycle Q Clear(g_c), s 0. Cycle Q Clear(g_c), s 0. Prop In Lane 1.0 Lane Grp Cap(c), veh/h 15 V/C Ratio(X) 0.0 Avail Cap(c_a), veh/h 15 HOM Platoon Ratio 1.0 Unform Delay (d), s/veh 49. Initial Q Delay(d3), s/veh 0. Mile BackOfQ(50%), veh/ln 0. Miles BackOfQ(50%), veh/ln 0. LnGrp Delay(d), s/veh 49. LnGrp LOS I	2 1969 6 1925 7 0.87 2 2 2 5 1984 9 0.37 8 5375 6 1925 6 1925 8 1792 4 42.2 4 42.2 0 5 1984 4 0.97 5 1984 0 .100	134 0.87 2 781 0.37 1502 134 1502 5.6 5.6 1.00 781 0.17	267 0.97 2 791 0.24 3274 267 1637 8.1 8.1 8.1 1.00	1969 1365 0.97 2 2790 0.52 5375 1365 1792 19.6	5 0.97 2 780 0.52 1502 5 1502	451 0.94 2 510 0.15 3375	1969 0 0.94 2 0 0.00 0.00	518 0.94 2 590 0.15 1502	34 0.67 2 79 0.05 1688	1969 42 0.67 2 82 0.05	0.6
Adj Flow Rate, veh/h Peak Hour Factor 0.8 Percent Heavy Veh, % 2 Zap, veh/h 15 Arrive On Green 0.0 Sar Flow, veh/h 168 Grp Volume(v), veh/h 168 Sgr Volume(v), veh/h 168 Q Serv(g_s), s 0.0 Cycle Q Clear(g_c), s 0.0 Cycle Q Clear(g_c), veh/h 15 J/C Ratio(X) 0.0 Avail Cap(c_a), veh/h 15 CM Platoon Ratio 1.0 Jniform Delay (d), s/veh 49. ncr Delay(d2), s/veh 0. %ile BackOfQ(50%), veh/ln 0. More Delay, (d), s/veh 49. n.Grd Delay(d), s/veh 49.	6 1925 7 0.87 2 2 5 1984 9 0.37 8 5375 6 1925 8 1792 4 42.2 0 0 5 1984 4 0.97 5 1984 4 0.97 5 1984 0 1.00	134 0.87 2 781 0.37 1502 134 1502 5.6 5.6 1.00 781 0.17	267 0.97 2 791 0.24 3274 267 1637 8.1 8.1 8.1 1.00	1365 0.97 2 2790 0.52 5375 1365 1792 19.6	5 0.97 2 780 0.52 1502 5 1502	451 0.94 2 510 0.15 3375	0 0.94 2 0 0.00 0	518 0.94 2 590 0.15 1502	34 0.67 2 79 0.05 1688	42 0.67 2 82 0.05	0.67 2 8 0.05
Peak Hour Factor 0.8 Percent Heavy Veh, % 2 Cap, veh/h 15 Arrive On Green 0.0 Sat Flow, veh/h 168 Grp Volume(V), veh/h 168 Grp Volume(V), veh/h 168 Q Serve(g.s), s 0. Cycle Q Clear(g_c), s 0. Cycle Q Clear(g_c), s 0. Lane Grp Cap(c), veh/h 15 V/C Ratio(X) 0.0 Avail Cap(c_a), veh/h 15 HOM Platoon Ratio 1.0 Upstream Filter(I) 1.0 Uniform Delay (d), s/veh 49. Incirial Q Delay(d3), s/veh 0. Wile BackOfQ(05%), veh/in 0. Mital BackOfQ(5%), veh/in 0. More Delay(d), s/veh 49. InGrp Delay(d), s/veh 49.	7 0.87 2 2 2 5 1984 9 0.37 8 5375 6 1925 8 1792 4 42.2 4 42.2 0 5 1984 4 0.97 5 1984 0 1.00	0.87 2 781 0.37 1502 134 1502 5.6 5.6 1.00 781 0.17	0.97 2 791 0.24 3274 267 1637 8.1 8.1 8.1 1.00	0.97 2 2790 0.52 5375 1365 1792 19.6	0.97 2 780 0.52 1502 5 1502	0.94 2 510 0.15 3375	0.94 2 0 0.00 0	0.94 2 590 0.15 1502	0.67 2 79 0.05 1688	0.67 2 82 0.05	0.6
Percent Heavy Veh, % Cap, veh/h 15 Arrive On Green 0.0 Sat Flow, veh/h 168 Grp Volume(v), veh/h 168 Grp Volume(v), veh/h 168 Grp Sat Flow(s), veh/h/ln 168 JS Serve(g. s), s 0.0 Q Serve(g. s), s 0.0 Agenz(g. c), s 0.0 Aron In Lane 1.0 Jpstream Filter(I) 1.0 Upstream Filter(I) 1.0 Upstream Filter(I) 1.0 Unform Delay (d), s/veh 49. Movement Delay, (d3), s/veh 0.0 Wall BackOfQ(50%), veh/ln 0. Movement Delay, s/veh 49. _nGrp Delay(d), s/veh 49.	2 2 2 5 1984 9 0.37 8 5375 6 1925 8 1792 4 42.2 4 42.2 0 5 1984 4 0.97 5 1984 0 1.00	2 781 0.37 1502 134 1502 5.6 5.6 1.00 781 0.17	2 791 0.24 3274 267 1637 8.1 8.1 8.1 1.00	2 2790 0.52 5375 1365 1792 19.6	2 780 0.52 1502 5 1502	2 510 0.15 3375	2 0 0.00 0	2 590 0.15 1502	2 79 0.05 1688	2 82 0.05	2 8 0.0
Cap, veh/h 15 Arrive On Green 0.0 Sat Flow, veh/h 168 Srp Volume(v), veh/h 168 Grp Sat Flow(s), veh/h/in 168 Spr Volume(v), veh/h 168 Q Serve(g_s), s 0. Cycle Q Clear(g_c), s 0. Cycle Q Clear(g_c), veh/h 15 Y/C Ratio(X) 0.0 Avail Cap(c_a), veh/h 15 CHOM Platoon Ratio 1.0 Jniform Delay (d), s/veh 49. ncr Delay(d3), s/veh 0. Mital Q Delay(d5), s/veh 0. Morement Delay, s/veh 0. Jnsig. Movement Delay, s/veh 1.0 Jnerg Delay(d), s/veh 49. _nGrp Delay(d), s/veh 49.	5 1984 9 0.37 8 5375 6 1925 8 1792 4 42.2 0 0 5 1984 4 0.97 5 1984 0 1.00	781 0.37 1502 134 1502 5.6 5.6 1.00 781 0.17	791 0.24 3274 267 1637 8.1 8.1 8.1 1.00	2790 0.52 5375 1365 1792 19.6	780 0.52 1502 5 1502	510 0.15 3375	0 0.00 0	590 0.15 1502	79 0.05 1688	82 0.05	8 0.0
Arrive On Green 0.0 Sat Flow, veh/h 168 Grp Volume(v), veh/h 168 Grp Volume(v), veh/h 168 Q Serve(g_s), s 0. Cycle Q Clear(g_c), s 0. Prop In Lane 10 Lane Grp Cap(c), veh/h 15 V/C Ratio(X) 0.0 Avail Cap(c_a), veh/h 15 V/D Ratio Ratio 1.0 Upstream Filter(I) 1.0 Uniform Delay (d), s/veh 49. Incir Delay(d3), s/veh 0. %ile BackOfQ(50%), veh/ln 0. Morement Delay, s/veh 1.0 LnGrp Delay(d), s/veh 49.	9 0.37 8 5375 6 1925 8 1792 4 42.2 4 42.2 0 0 5 1984 4 0.97 5 1984 0 1.00	0.37 1502 134 1502 5.6 5.6 1.00 781 0.17	0.24 3274 267 1637 8.1 8.1 1.00	0.52 5375 1365 1792 19.6	0.52 1502 5 1502	0.15 3375	0.00 0	0.15 1502	0.05 1688	0.05	0.0
Sat Flow, veh/h 168 Grp Volume(v), veh/h Grp Sat Flow(s), veh/h/ln Grp Sat Flow(s), veh/h/ln 168 J Serve(g.s), s 0. Cycle Q Clear(g_c), s 0. Cycle Q Clear(g_c), s 0. Aren Grp Cap(c), veh/h 15 V/C Ratio(X) 0.0 Avail Cap(c, a), veh/h 15 HCM Platoon Ratio 1.0 Upstream Filter(I) 1.0 Upstream Filter(I) 1.0 Unifical Q Delay(d2), s/veh 4.9 nitial Q Delay(d3), s/veh 0. %ile BackOfQ(50%), veh/ln 0. Morement Delay, s/veh .9 _nGrp Delay(d), s/veh 49.	8 5375 6 1925 8 1792 4 42.2 4 42.2 0 0 5 1984 4 0.97 5 1984 0 1.00	1502 134 1502 5.6 5.6 1.00 781 0.17	3274 267 1637 8.1 8.1 1.00	5375 1365 1792 19.6	1502 5 1502	3375	0	1502	1688		
Grp Volume(v), veh/h Grp Sat Flow(s), veh/h/ln 168 Q Serve(g_s), s 0. Cycle Q Clear(g_c), s 0. Cycle Q Clear(g_c), s 0. Arop In Lane 1.0 .ane Grp Cap(c), veh/h 15 V/C Ratio(X) 0.0 V/C Ratio(X) 0.0 Jpstream Filter(I) 1.0 Jniform Delay (d), s/veh 49. Initial Q Delay(d), s/veh 49. InGrp Lack 49.	6 1925 8 1792 4 42.2 4 42.2 0 0 5 1984 4 0.97 5 1984 0 1.00	134 1502 5.6 5.6 1.00 781 0.17	267 1637 8.1 8.1 1.00	1365 1792 19.6	5 1502					1770	169
Grp Sat Flow(s), veh/h/ln 168 Q Serve(g_s), s 0. Cycle Q Clear(g_c), s 0. Cycle Q Clear(g_c), s 0. Cycle Q Clear(g_c), s 0. Lane Grp Cap(c), veh/h 15 V/C Ratio(X) 0.0 Avail Cap(c_a), veh/h 15 CHM Platon Ratio 1.0 Jniform Delay (d), s/veh 49. ner Delay (d2), s/veh 0. Mital Q Delay(d3), s/veh 0. Mais BackOfQ(50%), veh/ln 0. Jnsig. Movement Delay, s/veh 1.0 Jnsig. Movement Delay, s/veh 1.0 Jnsig. Movement Delay, S/veh 1.0	8 1792 4 42.2 4 42.2 0 0 5 1984 4 0.97 5 1984 0 1.00	1502 5.6 5.6 1.00 781 0.17	1637 8.1 8.1 1.00	1792 19.6	1502	451	0	510			
Q Serve(g_s), s 0. Cycle Q Clear(g_c), s 0. Prop In Lane 1.0 Lane Grp Cap(c), veh/h 15 V/C Ratio(X) 0.0 Avail Cap(c_a), veh/h 15 V/C Ratio(X) 0.0 Just Cap(c_a), veh/h 15 V/C Ratio(X) 0.0 Just Cap(c_a), veh/h 15 Just Cap(c_a), veh/h 1.0 Just Cap(c_a), veh/h 1.0 Just Cap(c_a), s/veh 0. Initial Q Delay(d3), s/veh 0. Just BackOfQ(50%), veh/ln 0. Just Movement Delay, s/veh 1.0 .nGrp Delay(d), s/veh 49.	4 42.2 4 42.2 5 1984 4 0.97 5 1984 0 1.00	5.6 5.6 1.00 781 0.17	8.1 8.1 1.00	19.6				010	34	0	46
Cycle Q Člear(g_c), s 0. Prop In Lane 1.0 ane Grp Cap(c), veh/h 15 V/C Ratio(X) 0.0 Avail Cap(c, a), veh/h 15 HCM Platoon Ratio 1.0 Upstream Filter(I) 1.0 Jniform Delay (d), s/veh 49. ncr Delay (d2), s/veh 0. %ile BackOfQ(50%), veh/ln 0. Jnsig. Movement Delay, s/veh .0 GPD Delay(d), s/veh 49.	4 42.2 0 1984 4 0.97 5 1984 0 1.00	5.6 1.00 781 0.17	8.1 1.00		0.0	1688	0	1502	1688	0	1938
Prop In Lane 1.0 Lane Grp Cap(c), veh/h 15 V/C Ratio(X) 0.0 Avail Cap(c, a), veh/h 15 HCM Platoon Ratio 1.0 Upstream Filter(I) 1.0 Uniform Delay (d), s/veh 0.0 Initial Q Delay(d3), s/veh 0.0 Mile BackOfQ(50%), veh/ln 0.0 Unsig. Movement Delay, s/veh 1.0 LnGrp Delay(d), s/veh 49. LnGrp LOS I	0 5 1984 4 0.97 5 1984 0 1.00	1.00 781 0.17	1.00	19.6	0.2	15.7	0.0	9.4	2.4	0.0	2.8
Lane Grp Cap(c), veh/h 15 V/C Ratio(X) 0.0. Avail Cap(c_a), veh/h 15 HCM Platon Ratio 1.0 Upstream Filter(I) 1.0 Uniform Delay (d), s/veh 49. Incit Delay(d3), s/veh 0. Mile BackOfQ(50%), veh/ln 0. Unsig: Movement Delay, s/veh 1.0 LnGrp Delay(d), s/veh 49. LnGrp LOS I	5 1984 4 0.97 5 1984 0 1.00	781 0.17		13.0	0.2	15.7	0.0	9.4	2.4	0.0	2.8
V/C Ratio(X) 0.0 Avail Cap(c_a), veh/h 15 HCM Platoon Ratio 1.0 Upstream Filter(I) 1.0 Uniform Delay (d), s/veh 49. Initial Q Delay(d3), s/veh 0. Wile BackOfQ(50%), veh/ln 0. Unsig. Movement Delay, s/veh 1.0 LnGrp Delay (d), s/veh 49. InGrb S I	4 0.97 5 1984 0 1.00	0.17	701		1.00	1.00		1.00	1.00		0.09
Avail Cap(c_a), veh/h 15 HCM Platoon Ratio 1.0 Upstream Filter(I) 1.0 Uniform Delay (d), s/veh 49. Inntro Delay (d2), s/veh 0. Initial Q Delay(d3), s/veh 0. Wile BackOfQ(50%), veh/ln 0. Unsig. Movement Delay, s/veh InGrp Delay (d), s/veh LnGrp Delay(d), s/veh 49.	5 1984 0 1.00		131	2790	780	510	0	590	79	0	90
HCM Platoon Ratio 1.0 Upstream Filter(I) 1.0 Uniform Delay (d), s/veh 49. Initial Q Delay(d3), s/veh 0. Initial Q Delay(d3), s/veh 0. %ile BackOfQ(50%), veh/in 0. Unsig. Movement Delay, s/veh 1.0 LnGrp Delay(d), s/veh 49. LnGrp LOS I	0 1.00		0.34	0.49	0.01	0.88	0.00	0.88	0.43	0.00	0.51
Upstream Filter(I) 1.0 Uniform Delay (d), s/veh 49. Incr Delay (d2), s/veh 0. Initial Q Delay(d3), s/veh 0. %ile BackOfQ(50%), veh/in 0. Unsig: Movement Delay, s/veh 1.0 InGrp Delay(d), s/veh 49. InGrp Delay(d), s/veh 1.0		781	791	2790	780	591	0	626	122	0	141
Jniform Delay (d), s/veh 49. ncr Delay (d2), s/veh 0. nitial Q Delay(d3), s/veh 0. Jnsig. Movement Delay, s/veh 1. Jnsig. Movement Delay, s/veh 49. _nGr Delay(d3), s/veh 49. _nGr Delay(d3), s/veh 1.		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incr Delay (d2), s/veh 0. Initial Q Delay(d3), s/veh 0. Wile BackOfQ(50%), veh/ln 0. Unsig. Movement Delay, s/veh LnGrp Delay(d), s/veh 49. LnGrp LOS []	0 1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Initial Q Delay(d3),s/veh 0. %ile BackOfQ(50%),veh/ln 0. Unsig. Movement Delay, s/veh LnGrp Delay(d),s/veh 49. LnGrp LOS I	7 37.2	15.2	37.6	18.6	13.9	49.9	0.0	33.8	55.7	0.0	55.9
%ile BackOfQ(50%), veh/ln 0. Unsig. Movement Delay, s/veh 0. LnGrp Delay(d),s/veh 49. LnGrp LOS 1	0 14.3	0.5	0.1	0.6	0.0	12.4	0.0	12.3	1.4	0.0	1.6
Unsig. Movement Delay, s/veh LnGrp Delay(d),s/veh 49. LnGrp LOS I	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LnGrp Delay(d),s/veh 49. LnGrp LOS I	2 20.8	2.8	3.3	8.2	0.1	7.5	0.0	15.7	1.0	0.0	1.4
LnGrp LOS I											
	7 51.5	15.6	37.7	19.2	13.9	62.3	0.0	46.1	57.1	0.0	57.5
Approach Vol, veh/h	D D	В	D	В	В	E	А	D	E	А	E
	2065			1637			969			80	
Approach Delay, s/veh	49.2			22.2			53.6			57.3	
Approach LOS	D			С			D			E	
Timer - Assigned Phs	1 2		4	5	6		8				
Phs Duration (G+Y+Rc), s 35.			10.9 * 5.3	17.0	68.0		24.1 6.0				
Change Period (Y+Rc), s 6.				6.0	5.7						
Max Green Setting (Gmax), s 23. Max Q Clear Time (g c+l1), s 10.			* 8.7 4.8	5.0 2.4	62.3 21.6		21.0 17.7				
	=		4.8	2.4	4.7		0.4				
Green Ext Time (p_c), s 0.	2 0.0		0.0	0.0	4./		0.4				
Intersection Summary											
HCM 6th Ctrl Delay		40.9									
HCM 6th LOS		D									
Notos											
Notes User approved pedestrian interval to	ho loog th	on phose	mov area								
User approved volume balancing an						ng tho he	rrior				
* HCM 6th computational engine rec	luires equa	ii clearanc	e umes fo	r ine pha	Ses cross	ing the ba	IIIIEF.				
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Hayden One Existing PM

7: Hayden Road & Frank Lloyd Wright Boulevard HCM 6th Signalized Intersection Summary

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	٦	-	1	+	1	Ť	1	1	Ŧ	
ane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	
ane Configurations	5		ľ	A	1	1	1	ľ	eî	
Traffic Volume (vph)	13	810	62	508	145	12	130	90	24	
Future Volume (vph)	13	810	62	508	145	12	130	90	24	
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	
Protected Phases		6		2	7	4			8	
Permitted Phases	6		2		4		4	8		
Detector Phase	6	6	2	2	7	4	4	8	8	
Switch Phase										
Vinimum Initial (s)	10.0	10.0	10.0	10.0	5.0	7.0	7.0	7.0	7.0	
Vinimum Split (s)	26.9	26.9	26.9	26.9	9.6	32.4	32.4	32.4	32.4	
Total Split (s)	74.0	74.0	74.0	74.0	26.0	46.0	46.0	20.0	20.0	
Total Split (%)	61.7%	61.7%	61.7%	61.7%	21.7%	38.3%	38.3%	16.7%	16.7%	
Yellow Time (s)	4.7	4.7	4.7	4.7	3.0	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.2	1.2	1.2	1.2	1.6	1.8	1.8	1.8	1.8	
ost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.9	5.9	5.9	5.9	4.6	5.4	5.4	5.4	5.4	
_ead/Lag					Lead			Lag	Lag	
_ead-Lag Optimize?			0.11	0.14	Yes			Yes	Yes	
Recall Mode	None 74.4	None 74.4	C-Max 74.4	C-Max 74.4	None 35.1	None 34.3	None 34.3	None 12.3	None 12.3	
Act Effct Green (s)	0.62	0.62	0.62	0.62	0.29	0.29	0.29	0.10	0.10	
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.29	0.29	0.29	0.10	0.10	
Control Delay	11.3	13.1	15.1	11.3	37.2	27.6	9.1	82.3	32.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	02.5	0.0	
Total Delay	11.3	13.1	15.1	11.3	37.2	27.6	9.1	82.3	32.5	
LOS	H.3	B	13.1 B	H.5	57.2 D	27.0 C	3.1 A	02.5 F	52.5 C	
Approach Delay	U	13.1	U	11.7	U	24.1	А		65.5	
Approach LOS		B		B		C			60.0 E	
••									-	
ntersection Summary										
Cycle Length: 120	0									
Actuated Cycle Length: 12 Offset: 2 (2%), Referenced			hart of Cr							
Vatural Cycle: 70	i to phase z	WDIL, C	dan of Gr	een						
Control Type: Actuated-Co	ordinatod									
Maximum v/c Ratio: 0.74	ordinated									
ntersection Signal Delay:	18 3			Ir	ntersectio					
ntersection Capacity Utiliz					CU Level		⊳ B			
Analysis Period (min) 15				IV.		0.001400				
analysis r chou (min) 15										
Splits and Phases: 1:83	Brd Place & I	Hayden F	Road							
+		.,								
🖗 Ø2 (R)							10	+		
74 s							46 s			
							1	,		₽ 08

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SE
Lane Configurations	3	≜ †⊅		5	≜ †⊅		5	†	1	5	4Î	
Traffic Volume (veh/h)	13	810	68	62	508	17	145	12	130	90	24	
Future Volume (veh/h)	13	810	68	62	508	17	145	12	130	90	24	
Initial Q (Qb), veh	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.
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.
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	17
Adj Flow Rate, veh/h	14	890	48	65	535	7	188	16	59	100	27	
Peak Hour Factor	0.91	0.91	0.91	0.95	0.95	0.95	0.77	0.77	0.77	0.90	0.90	0.
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	553	2376	128	369	2488	33	355	488	372	179	143	
Arrive On Green	0.66	0.66	0.66	0.66	0.66	0.66	0.11	0.25	0.25	0.09	0.09	0.
Sat Flow, veh/h	818	3609	195	566	3781	49	1688	1969	1502	1255	1508	3
Grp Volume(v), veh/h	14	461	477	65	265	277	188	16	59	100	0	
Grp Sat Flow(s),veh/h/ln	818	1870	1934	566	1870	1960	1688	1969	1502	1255	0	18
Q Serve(g_s), s	0.8	13.4	13.4	7.1	6.8	6.8	11.6	0.7	3.7	9.4	0.0	2
Cycle Q Clear(g_c), s	7.6	13.4	13.4	20.5	6.8	6.8	11.6	0.7	3.7	9.4	0.0	2
Prop In Lane	1.00		0.10	1.00		0.03	1.00		1.00	1.00		0.
Lane Grp Cap(c), veh/h	553	1231	1273	369	1231	1290	355	488	372	179	0	1
V/C Ratio(X)	0.03	0.37	0.37	0.18	0.21	0.22	0.53	0.03	0.16	0.56	0.00	0.
Avail Cap(c_a), veh/h	553	1231	1273	369	1231	1290	463	666	508	213	0	2
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.
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.
Uniform Delay (d), s/veh	9.7	9.3	9.3	14.0	8.2	8.2	40.5	34.2	35.3	53.4	0.0	50
Incr Delay (d2), s/veh	0.0	0.1	0.1	1.0	0.4	0.4	0.5	0.0	0.1	1.0	0.0	(
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	(
%ile BackOfQ(50%),veh/ln	0.1	5.2	5.4	1.0	2.8	2.9	4.9	0.4	1.4	3.0	0.0	1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.7	9.4	9.4	15.0	8.6	8.6	41.0	34.2	35.4	54.5	0.0	50
LnGrp LOS	A	A	A	В	A	A	D	С	D	D	A	
Approach Vol, veh/h		952			607			263			134	
Approach Delay, s/veh		9.4			9.2			39.3			53.4	
Approach LOS		А			А			D			D	
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		84.9		35.1		84.9	18.4	16.7				_
Change Period (Y+Rc), s		* 5.9		* 5.4		* 5.9	* 4.6	* 5.4				
Max Green Setting (Gmax), s		* 68		* 41		* 68	* 21	* 15				
Max Q Clear Time (q c+l1), s		22.5		5.7		15.4	13.6	11.4				
Green Ext Time (p_c), s		1.5		0.1		2.2	0.2	0.1				
u = 7:				0.1			0.2	0.11				
Intersection Summary												
HCM 6th Ctrl Delay HCM 6th LOS			16.4 B									
Notes												
User approved pedestrian inte	nual to be											

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<i></i>													
ntersection nt Delay, s/veh	4.3												
	-												
lovement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
ane Configurations	<u> </u>	_ ††	1	<u> </u>	t₽				1		4		
raffic Vol, veh/h	20	958	57	263	508	5	0	0	237	4	2	87	
uture Vol, veh/h	20	958	57	263	508	5	0	0	237	4	2	87	
onflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
lign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
T Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
torage Length	135	-	135	175	-	-	-	-	0	-	-	-	
eh in Median Storage	,# -	0	-	-	0	-	-	0	-	-	1	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
eak Hour Factor	92	92	92	96	96	96	90	90	90	66	66	66	
leavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Ivmt Flow	22	1041	62	274	529	5	0	0	263	6	3	132	
/lajor/Minor	lajor1		Ν	/lajor2		Ν	/linor1		I	/linor2			
Conflicting Flow All	534	0	0	1103	0	0	-	-	521	1645	2227	267	
Stage 1	-	-	-	-	-	-	-	-	-	1080	1080	-	
Stage 2										565	1147		
Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	7.54	6.54	6.94	
Critical Hdwy Stg 1									-	6.54	5.54	-	
Critical Hdwy Stg 2		-	-	-		-	-	-	-	6.54	5.54	-	
follow-up Hdwy	2.22			2.22		-			3.32	3.52	4.02	3.32	
Pot Cap-1 Maneuver	1030	-		629		-	0	0	500	66	43	731	
Stage 1	-			-020			0	0	-	233	293	-	
Stage 2	-	-	-	-	-	-	0	0	-	477	272	-	
Platoon blocked, %							Ű	Ű					
Nov Cap-1 Maneuver	1030	-	-	629		-	-		500	20	24	731	
Nov Cap-2 Maneuver	-			- 10		-				~ -84	~ -16	-	
Stage 1		-		-		-			-	228	165	-	
Stage 2										221	266		
oldgo z										221	200		
							ND			00			
	EB 0.2		_	WB 5.1			NB 19.9	_		SB 3.1	_	_	
	0.2			5.1									
Approach ICM Control Delay, s							С			A			
ICM Control Delay, s ICM LOS								W/DD	SBLn1				
ICM Control Delay, s ICM LOS /inor Lane/Major Mvm	t	NBLn1	EBL	EBT	EBR	WBL	WBT	VVDR -					
ICM Control Delay, s ICM LOS /inor Lane/Major Mvm Capacity (veh/h)	t	500	1030	-	-	629	-	-	+				
ICM Control Delay, s ICM LOS /inor Lane/Major Mvm Capacity (veh/h) ICM Lane V/C Ratio	t	500 0.527	1030 0.021	-	EBR - -	629 0.436	- WBT	-	+				
ICM Control Delay, s ICM LOS /inor Lane/Major Mvm Capacity (veh/h) ICM Lane V/C Ratio ICM Control Delay (s)	t	500 0.527 19.9	1030 0.021 8.6	-	-	629 0.436 15.1	-	-	+ - 3.1				
ICM Control Delay, s ICM LOS Inor Lane/Major Mvm Capacity (veh/h) ICM Lane V/C Ratio ICM Control Delay (s) ICM Lane LOS	t	500 0.527 19.9 C	1030 0.021 8.6 A	-	-	629 0.436 15.1 C	-	-	+				
ICM Control Delay, s ICM LOS finor Lane/Major Mvm Capacity (veh/h) ICM Lane V/C Ratio ICM Control Delay (s)	t <u></u>	500 0.527 19.9	1030 0.021 8.6	-	-	629 0.436 15.1	-	-	+ - 3.1				

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Hayden One Existing PM mitigated 3: 84th Street & Hayden Road HCM 6th TWSC

Novement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
ane Configurations	5	- 11	1	1	۸ ۴		1	ef 🕺		1	ef 👘		
Fraffic Vol, veh/h	13	1125	27	36	686	16	10	0	42	69	1	51	
Future Vol, veh/h	13	1125	27	36	686	16	10	0	42	69	1	51	
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	135		100	145	-	-	45	-	-	0	-	-	
eh in Median Storage	,# -	0	-	-	0	-	-	1	-	-	1	-	
Grade, %	-	0	-	-	0	-		0	-	-	0	-	
Peak Hour Factor	95	95	95	93	93	93	46	46	46	63	63	63	
leavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
lymt Flow	14	1184	28	39	738	17	22	0	91	110	2	81	
								-			_		
ajor/Minor N	/lajor1	_		Major2	_	h	/linor1	_		Minor2	_		
Conflicting Flow All	755	0	0	1212	0	0	1660	2045	592	1445	2065	378	
		-	-		-	-			592			3/8	
Stage 1	-	-		-		-	1212	1212		825	825		
Stage 2	-	-	-	-	-	-	448	833	-	620	1240	-	
Critical Hdwy	4.14			4.14			7.54	6.54	6.94	7.54	6.54	6.94	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-	
Critical Hdwy Stg 2	-			-			6.54	5.54	-	6.54	5.54	-	
ollow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32	
Pot Cap-1 Maneuver	851	-	-	571	-	-	64	55	449	~ 93	54	620	
Stage 1	-	-	-	-	-	-	193	253	-	333	385	-	
Stage 2						-	560	382	-	442	245	-	
Platoon blocked, %		-	-		-	-							
Nov Cap-1 Maneuver	851			571		-	52	50	449	~ 69	50	620	
lov Cap-2 Maneuver	-	-	-	-	-	-	140	154	-	176	139	-	
Stage 1					-	-	190	249	-	328	359	-	
Stage 2			-	-	-	-	452	356	-	346	241	-	
pproach	EB			WB			NB			SB		_	
ICM Control Delay, s	0.1			0.6			19			36.2			
ICM LOS				2.0			C			E			
							5			-			
linor Lane/Major Mvm	+ 1	NBLn11	VIRI n?	EBL	EBT	EBR	WBL	WBT	WRP	SBLn1	SBI n2		
Capacity (veh/h)	. 1	140	449	851		LDI	571	-	ANDIX (176	581		
CM Lane V/C Ratio			0.203		-	-	0.068	-	-	0.622			
CM Control Delay (s)		35.4	15.1	9.3			11.8	-		54.3	12.2		
ICM Lane LOS		35.4 E	15.1 C	9.3 A	-	-	11.0 B	-		54.5 F	IZ.Z		
ICM Lane LOS ICM 95th %tile Q(veh)		0.5	0.8	A 0	-	-	0.2	-	-	3.5	0.5		
· · · ·		0.5	0.8	0	-	-	0.2	-	-	3.3	0.5		
lotes													
: Volume exceeds cap	acity	\$ De	elay exc	S shaa	00c	+: Com	nutation	Not D	ofinod	*· All	major	i anuno ir	n platoon

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Hayden One Existing PM mitigated

4: Northeast Access & Hayden Road HCM 6th TWSC

Intersection						
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	^	1		1		1
Traffic Vol, veh/h	1236	0	0	738	0	0
Future Vol. veh/h	1236	0	0	738	0	0
Conflicting Peds, #/hr	0	Ő	Ű	0	Ű	Ő
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-		-	None	-	None
Storage Length	-	135		-		0
Veh in Median Storage		-	-	0	0	-
Grade. %	0, // 0			0	0	
Peak Hour Factor	92	92	93	93	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mymt Flow	1343	0	0	794	0	0
	1010	Ű	Ŭ		Ŭ	Ű
1.1 · A.C					<i>r</i> 4	
	Major1		Major2		/linor1	
Conflicting Flow All	0	0		-	-	672
Stage 1	-	-		-		-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-		-		6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-		-
Follow-up Hdwy	-	-		-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	398
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver				-	-	398
Mov Cap-2 Maneuver	-	-		-	-	-
Stage 1	-				-	
Stage 2	-	-		-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		0	
HCM LOS	· ·				Ă	
Aliana Lana Maria - Ma			EDT	EDD		
Minor Lane/Major Mvr	nt	NBLn1	EBT	EBR	WBT	
Capacity (veh/h)		-			-	

Capacity (veh/h)					
HCM Lane V/C Ratio	-		-	-	
HCM Control Delay (s)	0	-	-	-	
HCM Lane LOS	Α	-	-	-	
HCM 95th %tile Q(veh)	-	-	-	-	

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Hayden One Existing PM mitigated

5: Burger King Drwy & Hayden Road HCM 6th TWSC

Int Delay, s/veh	1	EDT					ND	NDT	NDD		007	000
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	្តិ	† †	1	1		1			40	40		40
Traffic Vol, veh/h	7	1216	42	22	721	19	11	0	19	12	0	18
Future Vol, veh/h	7	1216	42	22	721	19	11	0	19	12	0	18
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	-	75	90		100		-		-		
Veh in Median Storage,	# -	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	96	96	96	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	1351	47	23	751	20	15	0	25	16	0	24
Major/Minor M	lajor1		N	Major2		1	Minor1		Ν	/linor2		
Conflicting Flow All	771	0	0	1398	0	0	1789	2184	676	1489	2211	376
Stage 1	-	-	-	-	-	-	1367	1367	-	797	797	-
Stage 2	-		-	-			422	817		692	1414	
Critical Hdwy	4.14	-	-	4.14	-		7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-			-			6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-			6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22		-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	840			485	-	-	51	45	396	86	44	622
Stage 1	- 040			405			155	213	- 330	346	397	- 022
Stage 2		-	-		-	-	580	388	-	400	202	-
Platoon blocked, %	-			-	-		500	300	-	400	202	-
	840	-	-	485	-	-	47	42	396	77	41	622
Mov Cap-1 Maneuver	840	-	-		-	-	47	42	390	193		622
Mov Cap-2 Maneuver		-	-	-	-						126	-
Stage 1	-		-			-	153	211	-	343	378	
Stage 2		-	-	-	-	-	531	370	-	371	200	-
Approach	EB			WB			NB			SB		
HCM Control Delay, s	0.1			0.4			25.3			17.5		
HCM LOS							D			С		
Minor Lane/Major Mvmt		NBLn1	EBL	EBT	EBR	WBL	WBT	WBR				
Capacity (veh/h)		217	840	-	-	485	-	-	329			
HCM Lane V/C Ratio			0.009	-	-	0.047			0.122			
HCM Control Delay (s)		25.3	9.3	-		12.8	-	-	17.5			
HCM Lane LOS		D	A	-	-	В		-	С			
HCM 95th %tile Q(veh)		0.7	0	-	-	0.1	-	-	0.4			

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Hayden One Existing PM mitigated

6: Northsight Boulevard & Hayden Road HCM 6th Roundabout

Intersection Delay, s/veh 13.9 Intersection LOS B Approach EB WB NB SB Entry Lanes 2 2 2 1 Conflicting Circle Lanes 2 2 2 2 2 2 Adj Approach Flow, veh/h 1274 590 641 415 2 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th>									
Intersection LOS B Approach EB WB NB SB Entry Lanes 2 2 2 1 Conflicting Circle Lanes 2	Intersection								
Approach EB WB NB SB Conflicting Circle Lanes 2 2 2 1 Conflicting Circle Lanes 2 2 2 2 2 Adj Approach Flow, veh/h 1274 590 641 415 Demand Flow Rate, veh/h 1300 602 655 423 Vehicles Circulating, veh/h 292 556 1174 661 Vehicles Exiting, veh/h 782 1273 418 507 Ped Vol Crossing Leg, #/h 0 0 0 0 0 Ped Cap Adj 1.000 1.000 1.000 1.000 1.000 Approach LOS B A C B Lane Left Right									
Entry Lanes 2 2 2 2 1 Conflicting Circle Lanes 2	Intersection LOS	В							
Conflicting Circle Lanes 2 2 2 2 2 2 2 Adj Approach Flow, weh/h 1274 590 6641 415 Demand Flow Rate, weh/h 1300 602 655 423 Vehicles Circulating, veh/h 292 556 1174 651 Vehicles Exiting, veh/h 782 1273 418 507 Ped Val Crossing Leg, #/h 0 0 0 0 0 Ped Cap Adj 1.000 1.000 1.000 1.000 1.000 1.000 Approach Delay, si/veh 11.6 8.5 24.8 11.8 Approach LOS B A C B Lane Left Right Left Right Left Designated Moves LT T R LT R LTR ASsumed Moves LT T R LT R LT R LT R LT R LT R LT R	Approach		EB		WB		NB	SB	
Adj Approach Flow, veh/h 1274 590 641 415 Demand Flow Rate, veh/h 1300 602 655 423 Vehicles Circulating, veh/h 292 556 1174 651 Vehicles Exiting, veh/h 782 1273 418 507 Ped Vol Crossing Leg, #h 0 0 0 0 Ped Vol Crossing Leg, #h 0 1.000 1.000 1.000 Approach Delay, siveh 116 8.5 24.8 11.8 Approach Delay, siveh 116 8.5 24.8 11.8 Approach Delay, siveh 117 T R LT Ped Vol Crossing Leg, #h 0 0.00 1.000 1.000 Approach Delay, siveh 116 8.5 24.8 11.8 Approach Delay, siveh 117 T R LT RT T R LT R LT RT LT T R LT R Cape Intul <t< td=""><td>Entry Lanes</td><td></td><td>2</td><td></td><td>2</td><td></td><td>2</td><td>1</td><td></td></t<>	Entry Lanes		2		2		2	1	
Demand Flow Rate, veh/h 1300 602 655 423 Vehicles Circulating, veh/h 292 556 1174 651 Vehicles Circulating, veh/h 782 1273 418 507 Ped Vol Crossing Leg, #/h 0 0 0 0 0 Ped Vol Crossing Leg, #/h 0 0 0 0 0 0 Ped Vol Crossing Leg, #/h 0 1.000 1.000 1.000 1.000 1.000 1.000 Approach Delay, siveh 11.6 8.5 24.8 11.8 Approach LOS B A C B Lane Left Right Left Right Left Right Left Designated Moves LT T R LT R LTR Assumed Moves LT T R LT R LT R LT R LT R C B A C S 2.535 2.535 2.535 2.535	Conflicting Circle Lanes		2		2		2	2	
Vehicles Circulating, veh/h 292 556 1174 651 Vehicles Exiting, veh/h 782 1273 418 507 Ped Vol Crossing Leg, #/h 0 0 0 0 Ped Vol Crossing Leg, #/h 0 0 0 0 Approach Delay, siveh 11.6 8.5 24.8 11.8 Approach LOS B A C B Lane Left Right	Adj Approach Flow, veh/h		1274		590		641	415	
Vehicles Exiting, veh/h 782 1273 418 507 Ped Vol Crossing Leg, #/h 0	Demand Flow Rate, veh/h		1300		602		655	423	
Ped Vol Crossing Leg, #/h 0 0 0 0 0 Ped Cap Adj 1.000 1.000 1.000 1.000 1.000 Approach Delay, siveh 11.6 8.5 24.8 11.8 Approach Delay, siveh 11.6 8.5 24.8 11.8 Approach Delay, siveh 11.6 8.5 24.8 11.8 Approach LOS B A C B Lane Left Right Left Right Left Designated Moves LT TR LT R LTR Assumed Moves LT TR LT R LTR Assumed Moves LT TR LT R LTR Chanelized Lane Util 0.470 0.530 0.470 0.530 0.482 0.518 1.000 Cap Entry Headway, s 2.667 2.535 2.667 2.535 2.635 2.535 Critical Headway, s 4.645 4.328 4.645 4	Vehicles Circulating, veh/h		292		556		1174	651	
Ped Cap Adj 1.000 1.000 1.000 1.000 1.000 Approach Delay, siveh 11.6 8.5 24.8 11.8 Approach Delay, siveh 11.6 8.5 24.8 11.8 Approach LOS B A C B Lane Left Right Left Right Left Designated Moves LT TR LT TR LT R Assumed Moves LT TR LT TR LT R LTR Assumed Moves LT TR LT TR LT R LTR Assumed Moves LT TR LT TR LT R LTR Assumed Moves 2.667 2.535 2.667 2.535 2.535 2.535 Colficul Headway, s 4.645 4.328 4.645 4.328 4.328 Entry Flow, veh/h 611 689 283 319 316 339 423	Vehicles Exiting, veh/h		782		1273		418	507	
Approach Delay, siveh 11.6 8.5 24.8 11.8 Approach LOS B A C B Lane Left Right Lift Right Right <t< td=""><td>Ped Vol Crossing Leg, #/h</td><td></td><td>0</td><td></td><td>0</td><td></td><td>0</td><td>0</td><td></td></t<>	Ped Vol Crossing Leg, #/h		0		0		0	0	
Approach LOS B A C B Lane Left Right Right Left Right Left Right Left Right Left Right Lit Right Lit	Ped Cap Adj		1.000		1.000		1.000	1.000	
Lane Left Right Left Designated Moves LT TR LT R LTR Right Left Right Lift Right Lift Right Lift	Approach Delay, s/veh		11.6		8.5		24.8	11.8	
Designated Moves LT TR LT TR LT R LTR Assumed Moves LT TR LT TR LT R LTR Assumed Moves LT TR LT TR LT R LTR Assumed Moves LT TR LT TR LT R LTR Assumed Moves LT TR LT TR LT R LTR Assumed Moves LT TR LT TR LT R LTR Cane Util 0.470 0.530 0.470 0.530 0.482 0.518 1.000 Follow-Up Headway, s 2.667 2.535 2.667 2.535 2.653 2.535	Approach LOS		В		A		С	В	
Assumed Moves LT TR LT TR LT R LT LT R LT	Lane	Left	Right	Left	Right	Left	Right	Left	
RT Channelized RT	Designated Moves	LT	TR	LT	TR	LT	R	LTR	
Lane Util 0.470 0.530 0.470 0.530 0.482 0.518 1.000 Follow-Up Headway, s 2.667 2.535 2.667 2.535 2.635 2.535 Critical Headway, s 4.645 4.328 4.645 4.328 4.645 4.328 4.328 Critical Headway, s 4.645 4.328 4.645 4.328 4.328 Cap Entry Lane, veh/h 1012 1108 809 885 458 523 817 Cap Entry Lane, veh/h 1032 1108 809 885 458 523 817 Filow Entry, veh/h 599 675 2.77 312 309 332 415 Cap Entry, veh/h 1011 1086 793 867 449 513 802 V/C Ratio 0.592 0.622 0.350 0.360 0.688 0.518 Control Delay, s/veh 11.6 11.7 8.7 8.3 27.4 22.3 11.8 LOS	Assumed Moves	LT	TR	LT	TR	LT	R	LTR	
Follow-Up Headway, s 2.667 2.535 2.667 2.535 2.667 2.535 2.535 Critical Headway, s 4.645 4.328 4.645 4.328 4.328 4.328 Entry Flow, veh/h 611 689 283 319 316 339 423 Cap Entry Lane, veh/h 1032 1108 809 885 458 523 817 Entry Flow, veh/h 0390 0.980 0.979 0.979 0.982 Flow Entry, veh/h 599 675 277 312 309 332 415 Cap Entry, veh/h 1011 1086 793 867 449 513 802 V/C Ratio 0.592 0.622 0.350 0.608 0.648 0.518 Control Delay, s/veh 11.6 11.7 8.7 8.3 27.4 22.3 11.8 LOS B A A D C B 8 A A D C	RT Channelized								
Critical Headway, s 4.645 4.328 4.645 4.328 4.645 4.328 4.328 Entry Flow, veh/h 611 669 283 319 316 339 423 Cap Entry Lane, veh/h 1032 1108 809 885 458 523 817 Entry Flow, veh/h 1032 1108 809 885 458 523 817 Entry HV Adj Factor 0.980 0.979 0.980 0.979 0.982 Flow Entry, veh/h 1011 1086 793 867 449 513 802 V/C Ratio 0.592 0.622 0.350 0.669 0.648 0.518 Control Delay, s/veh 11.6 11.7 8.7 8.3 27.4 22.3 11.8 LOS B A A D C B	Lane Util	0.470	0.530	0.470	0.530	0.482	0.518	1.000	
Entry Flow, veh/h 611 689 283 319 316 339 423 Cap Entry Lane, veh/h 1032 1108 809 885 458 523 817 Entry HV Adj Factor 0.980 0.979 0.980 0.979 0.979 0.979 0.982 Flow Entry, veh/h 599 675 277 312 309 332 415 Cap Entry, veh/h 1011 1086 793 867 449 513 802 VIC Ratio 0.592 0.622 0.350 0.360 0.689 0.648 0.518 Control Delay, s/veh 11.6 11.7 8.7 8.3 27.4 22.3 11.8 LOS B B A D C B	Follow-Up Headway, s	2.667		2.667		2.667			
Cap Entry Lane, veh/h 1032 1108 809 885 458 523 817 Entry HV Adj Factor 0.980 0.979 0.980 0.979 0.979 0.980 Flow Entry, veh/h 599 675 277 312 309 332 415 Cap Entry, veh/h 1011 1086 793 867 449 513 802 V/C Ratio 0.592 0.622 0.350 0.360 0.689 0.648 0.518 Control Delay, s/veh 11.6 11.7 8.7 8.3 27.4 22.3 11.8 LOS B B A D C B	Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328	
Entry HV Adj Factor 0.980 0.980 0.979 0.980 0.979 0.979 0.982 Flow Entry, veh/h 599 675 277 312 309 332 415 Cap Entry, veh/h 1011 1086 793 867 449 513 802 V/C Ratio 0.592 0.622 0.350 0.360 0.689 0.648 0.518 Control Delay, s/veh 11.6 11.7 8.7 8.3 27.4 22.3 11.8 LOS B B A A D C B		611	689	283	319	316	339	423	
Flow Entry, veh/h 599 675 277 312 309 332 415 Cap Entry, veh/h 1011 1086 793 867 449 513 802 V/C Ratio 0.592 0.622 0.350 0.360 0.689 0.648 0.518 Control Delay, s/veh 11.6 11.7 8.7 8.3 27.4 22.3 11.8 LOS B B A A D C B	Cap Entry Lane, veh/h	1032	1108	809	885	458	523	817	
Cap Entry, veh/h 1011 1086 793 867 449 513 802 V/C Ratio 0.592 0.622 0.350 0.360 0.689 0.648 0.518 Control Delay, s/veh 11.6 11.7 8.7 8.3 27.4 22.3 11.8 LOS B B A A D C B	Entry HV Adj Factor	0.980	0.980	0.979	0.980	0.979	0.979	0.982	
V/C Ratio 0.592 0.622 0.350 0.360 0.689 0.648 0.518 Control Delay, s/veh 11.6 11.7 8.7 8.3 27.4 22.3 11.8 LOS B A A D C B	Flow Entry, veh/h	599	675	277	312	309	332	415	
Control Delay, s/veh 11.6 11.7 8.7 8.3 27.4 22.3 11.8 LOS B B A A D C B						449			
LOS B B A A D C B	V/C Ratio	0.592	0.622	0.350	0.360	0.689	0.648	0.518	
LOS B B A A D C B	Control Delay, s/veh	11.6	11.7	8.7	8.3	27.4	22.3	11.8	
95th %tile Queue, veh 4 5 2 2 5 5 3	LOS	В	В	А		D	С	В	
	95th %tile Queue, veh	4	5	2	2	5	5	3	

	≯	-	\rightarrow	1	+		1	T.	1	1	Ŧ	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
ane Configurations	1	***	1	ሻሻ	1	1	ľ	ę	1	ľ	¢Î	
Traffic Volume (vph)	5	1675	231	259	1324	13	418	8	687	23	28	
Future Volume (vph)	5	1675	231	259	1324	13	418	8	687	23	28	
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2	8	1	6		8	8	1	4	4	
Permitted Phases			2			6			8			
Detector Phase	5	2	8	1	6	6	8	8	1	4	4	
Switch Phase												
Vinimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	5.0	5.0	6.0	6.0	
Vinimum Split (s)	11.0	38.7	47.0	11.0	25.7	25.7	47.0	47.0	11.0	44.3	44.3	
Total Split (s)	11.0	50.0	27.0	29.0	68.0	68.0	27.0	27.0	29.0	14.0	14.0	
Total Split (%)	9.2%	41.7%	22.5%	24.2%	56.7%	56.7%	22.5%	22.5%	24.2%	11.7%	11.7%	
Yellow Time (s)	4.0	4.7	4.0	4.0	4.7	4.7	4.0	4.0	4.0	3.3	3.3	
All-Red Time (s)	2.0	1.0	2.0	2.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.7	6.0	6.0	5.7	5.7	6.0	6.0	6.0	5.3	5.3	
Lead/Lag	Lag	Lead		Lag	Lead	Lead			Lag			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	None	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	5.0	50.0	75.0	23.0	76.8	76.8	19.3	19.3	43.5	7.0	7.0	
Actuated g/C Ratio	0.04	0.42	0.62	0.19	0.64	0.64	0.16	0.16	0.36	0.06	0.06	
//c Ratio	0.09	0.86	0.26	0.43	0.40	0.01	0.89	0.80	1.20	0.35	0.50	
Control Delay	58.2	38.3	1.9	45.2	12.3	0.0	82.6	68.5	133.3	64.0	56.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	58.2	38.3	1.9	45.2	12.3	0.0	82.6	68.5	133.3	64.0	56.7	
LOS	E	D	A	D	В	A	F	E	F	E	E	
Approach Delay		33.9			17.6			111.2			59.3	
Approach LOS		С			В			F			E	
ntersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 103 (86%), Reference	ced to phase	se 2:EBT	and 6:WE	31, Start o	of Green							
Natural Cycle: 145												
Control Type: Actuated-Coc	ordinated											
Vaximum v/c Ratio: 1.20												
ntersection Signal Delay: 4					ntersectio		-					
ntersection Capacity Utiliza	ition 94.8%)		10	CU Level	of Service	€ F					
Analysis Period (min) 15												
Splits and Phases: 7: Hay	yden Road	& Frank	Lloyd Wri	ght Boule	evard							
⇒ 1 Ø2 (R)				€ ø:	1			Ø4	1	Ø8		
50 s				29.5	1		14		27 s	100		
<u>+</u>												-
Ø6 (R)						-	Ø5					
68 s						11 s						

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Novement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
ane Configurations	۲.	ተተተ	1	ሻሻ	^	1	۲	ર્સ	1	٦	4Î	
Traffic Volume (veh/h)	5	1675	231	259	1324	13	418	8	687	23	28	13
Future Volume (veh/h)	5	1675	231	259	1324	13	418	8	687	23	28	13
nitial 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
Nork Zone On Approach	4770	No	4770	4770	No	4770	4770	No	4770	4770	No	4770
Adj Sat Flow, veh/h/ln	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
Adj Flow Rate, veh/h Peak Hour Factor	6 0.87	1925 0.87	134 0.87	267 0.97	1365 0.97	5 0.97	451 0.94	0 0.94	518 0.94	34 0.67	42 0.67	4 0.67
Percent Heavy Veh, %	0.87	0.87	0.87	0.97	0.97	0.97	0.94	0.94	0.94	0.67	0.67	0.67
Cap, veh/h	155	1984	781	791	2790	780	510	0	590	79	82	8
Arrive On Green	0.09	0.37	0.37	0.24	0.52	0.52	0.15	0.00	0.15	0.05	0.05	0.05
Sat Flow, veh/h	1688	5375	1502	3274	5375	1502	3375	0.00	1502	1688	1770	169
Grp Volume(v), veh/h	6	1925	134	267	1365	5	451	0	518	34	0	46
Grp Sat Flow(s), veh/h/ln	1688	1792	1502	1637	1792	1502	1688	0	1502	1688	0	1938
Q Serve(g_s), s	0.4	42.2	5.6	8.1	19.6	0.2	15.7	0.0	9.4	2.4	0.0	2.8
Cycle Q Clear(g_c), s	0.4	42.2	5.6	8.1	19.6	0.2	15.7	0.0	9.4	2.4	0.0	2.8
Prop In Lane	1.00	72.2	1.00	1.00	10.0	1.00	1.00	0.0	1.00	1.00	0.0	0.09
ane Grp Cap(c), veh/h	155	1984	781	791	2790	780	510	0	590	79	0	90
V/C Ratio(X)	0.04	0.97	0.17	0.34	0.49	0.01	0.88	0.00	0.88	0.43	0.00	0.51
Avail Cap(c a), veh/h	155	1984	781	791	2790	780	591	0	626	122	0	141
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
Jpstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Jniform Delay (d), s/veh	49.7	37.2	15.2	37.6	18.6	13.9	49.9	0.0	33.8	55.7	0.0	55.9
ncr Delay (d2), s/veh	0.0	14.3	0.5	0.1	0.6	0.0	12.4	0.0	12.3	1.4	0.0	1.6
nitial 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/In	0.2	20.8	2.8	3.3	8.2	0.1	7.5	0.0	15.7	1.0	0.0	1.4
Jnsig. Movement Delay, s/veh												
.nGrp Delay(d),s/veh	49.7	51.5	15.6	37.7	19.2	13.9	62.3	0.0	46.1	57.1	0.0	57.5
_nGrp LOS	D	D	В	D	В	В	E	A	D	E	A	E
Approach Vol, veh/h		2065			1637			969			80	
Approach Delay, s/veh		49.2			22.2			53.6			57.3	
Approach LOS		D			С			D			E	
limer - Assigned Phs	1	2	_	4	5	6		8				_
Phs Duration (G+Y+Rc), s	35.0	50.0		10.9	17.0	68.0		24.1				
Change Period (Y+Rc), s	6.0	5.7		* 5.3	6.0	5.7		6.0				
Max Green Setting (Gmax), s	23.0	44.3		* 8.7	5.0	62.3		21.0				
Max Q Clear Time (g_c+I1), s	10.1	44.2		4.8	2.4	21.6		17.7				
Green Ext Time (p_c), s	0.2	0.0		0.0	0.0	4.7		0.4				
ntersection Summary												
HCM 6th Ctrl Delay			40.9									
HCM 6th LOS			-10.0 D									
			-									
Notes Jser approved pedestrian inter												
Jser approved volume balanci												
HCM 6th computational engir	ne requir	es equal	clearance	times fo	r the pha	ses crossi	ng the ba	irrier.				



	HA	YD	EN	&	83RC)			Sy	stem #	171	
•							Section	#		Date Upd	ated	
L L	OORDII	NA	IUR				0			1/24/20	17	
	PHASE	1	2	3	4	5	6	7	8			
	FDW		14		20		14		20			
	YELLOW		4.7		3.6		4.7	3	3.6			
	ALL RED		1.2		1.8		1.2	1.6	1.8			
	WALK		14		20		14		20			
	R1	2	Ļ	0	111	0	1111	4	Ļ	COORD PATTERN	OFFSET	
	R2	6	1	0	111	8	\rightarrow	7	Ĺ	Balanced	2	
PLAN 1			RI	NG	1		RIN	G 2				
AM PLAN	PHASE		2		4		6	7	8			
OPERATIVE TIMES	SPLIT		76		44		76	24	20	Target Cy	cle Length	
TIVIES	COORD		Х				Х			120 Actual Cycle Length		
	RECALLS		Р				Р					
	GREEN		70.1		38.6		70.1	19.4	14.6	12	20	
	R1	2	Ţ	0	111	0	1111	4	←	COORD PATTERN	OFFSET	
	R2	6	†	-		8	→	7	Г	Balanced	50	
PLAN 4		0		NG	1	0	RIN	,	*	bulunceu	50	
MIDDAY PLAN	PHASE		2		4		6	7	8			
OPERATIVE	SPLIT		68		52		68	27	25	Target Cy	rle Length	
TIMES	COORD		X		52		X	27	25		20	
	RECALLS		P				P			Actual Cv	cle Length	
	GREEN		62.2		46.6		62.2	22.4	19.6	12	-	
										COORD		
	R1	2	Ţ	0	111	0	1111	4	←	PATTERN	OFFSET	
	R2	6	1			8	\rightarrow	7	L	Balanced	72	
PLAN 7			RI	NG	1		RIN	G 2				
PM PLAN OPERATIVE	PHASE		2		4		6	7	8			
	SPLIT		74		46		74	26	20	Target Cy	cle Length	
TIMES	COORD		Х				Х			12	20	
						_		_				
	RECALLS		Р				Р			Actual Cy	cle Length	



FRANK	LLOYE) WI	RIGI	HT	& F	IAY	DEN		Sy	stem #	172	
0	ORDIN	1470	סר			Se	ction	#		Date Upd	ated	
	JUKUIN	AI	Л			803				10/11/2016		
	PHASE	1	2	3	4	5	6	7	8			
	FDW		23		35		13		37			
	YELLOW	4	4.7		3.3	4	4.7		4			
	ALL RED	2	1		2	2	1		2			
	WALK		23		35		13		37			
	R1	2	\rightarrow	1	L	4	Ļ	8	1	COORD PATTERN	OFFSET	
	R2	6	+	5	Ĺ					Balanced	103	
PLAN 1			RING	51			RING	32				
AM PLAN OPERATIVE	PHASE	1	2		4	5	6		8			
TIMES	SPLIT	40	35		12	11	64		33	Target Cy	cle Lengt	
TIMES	COORD		Х				Х			12	20	
	RECALLS		V				V			Actual Cyc	le Lengt	
	GREEN	34.0	29.3		6.7	5.0	58.3		27.0	12	20	
	R1	2	\rightarrow	1	L	4	Ļ	8	1	COORD PATTERN	OFFSET	
	R2	6	Ļ	5	Ĺ					Balanced	87	
PLAN 4 MIDDAY PLAN			RING	51			RING	<u>3</u> 2				
OPERATIVE	PHASE	1	2		4	5	6		8			
TIMES	SPLIT	27	52		12	11	68		29	Target Cyc		
	COORD		Х				Х				20	
	RECALLS		V				V			Actual Cyc	-	
	GREEN	21.0	46.3		6.7	5.0	62.3		23.0	12	20	
	R1	2	\rightarrow	1	Ĺ	4	Ļ	8	1	COORD PATTERN	OFFSET	
	R2	6	←	5	ſ					Balanced	72	
PLAN 7			RING	51			RING	62				
PM PLAN	PHASE	1	2		4	5	6		8			
TIMES	SPLIT	29	50		14	11	68		27	Target Cy	cle Lengtl	
TIMES	COORD		Х				Х			12	20	
	RECALLS		V				V			Actual Cyc	le Lengtl	
	GREEN	23.0	44.3		8.7	5.0	62.3		21.0	12	20	
	R1	1	L	2	\rightarrow	4	Ļ	8	1	COORD PATTERN	OFFSET	
PLAN 10	R2	6	Ļ	5	Ţ					Balanced	78	
MIDNIGHT			RING	51			RINC	<u>3</u> 2				
PLAN	PHASE	1	2		4	5	6		8			
OPERATIVE	SPLIT	24	29		13	11	42		24	Target Cy	le Lengt	
TIMES	COORD		Х				Х			9	0	
	RECALLS		V				V			Actual Cyc		
	GREEN	18.0	23.3		7.7	5.0	36.3		18.0	9	0	

APPENDIX D

SIGNAL WARRANT ANALYSIS





CORE CENTER Warrants 1, 2 & 3

84th St & Hayden Rd

ADOT Traffic Engineering Guidelines and Policies section 611 includes methodology to consider signal warrants for future intersections using projected ADT. The methodology includes multiplying factors to the projected ADT to provide high hour, 4th high hour and 8th high hour volumes to compare with threshold volumes of the peak hour warrant, the 4-hour warrant and the 8-hour warrants The factors are as follows:

<u>High Hour</u>	Hourly Adjustment Factor
1	0.0771
4	0.0656
8	0.0572

Right-turn	factor	applied	
------------	--------	---------	--

g	NB	SB	EB	WB
Existing AM	0%	0%	0%	0%
Existing PM	0%	0%	0%	0%

Determine approach PM peak hour volumes	NB	SB	EB	WB
Existing AM	72	40	625	684
Existing PM	52	121	1165	738

Approximate approach ADT volumes by dividing by the high hour adjustment factor (0.0771)

	NB	SB	EB	WB	NB+SB	EB+WB
Existing AM	934	519	8,106	8,872	1,453	16,978
Existing PM	674	1,569	15,110	9,572	2,244	24,682

Apply adjustment factors	8th hig	h hour	4th hig	h hour	Hig	h hour
	Major, both approaches	Minor, larger approach	Major, both approaches	Minor, larger approach	Major, both approaches	Minor, larger approach
Existing AM	971	53	1,114	61	1,309	72
Existing PM	1,412	90	1,619	103	1,903	121



CORE CENTER

Warrants 1, 2 & 3 84th St & Hayden Rd

Thresholds are dependent on the number of lanes on each street approaching the intersection (prior to auxiliary lanes) and the speed limit on the major roadway.

Number of lanes moving traffic on major street?2Number of lanes moving traffic on major approach of minor street?1Posted or 85 percentile speed over 40 mph?yes

Now compare to applicable signal warrant criteria of MUTCD

Warrant 1 (Eight-Hour Vehicular Volume)

Thresholds to pass	i		
Condition A	Major	420 Minor	105
Condition B	Major	630 Minor	53
Combo (A)	Major	336 Minor	84
Combo (B)	Major	504 Minor	42

	Major, both	Minor, larger
Volumes to compare	approaches	approach
Existing AM	971	53
Existing PM	1,412	90

Compare criteria for each scenario	Condition A	Condition B	Combination	Signal Warrant met
Existing AM	No	No	No	No
Existing PM	No	Yes	Yes	Yes



May 2019 Appendix D

CORE CENTER Warrants 1, 2 & 3 84th St & Hayden Rd

Signal Warrant 2 (Four-Hour Vehicular Volume)





*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

Lege	nd	Major, both	Minor, larger approach	Approximate Threshold for Minor
● Ĕ	Existing AM	1,114	61	60
	Existing PM	1,619	103	60

Signal Warra	nt 2 is met?
Existing AM	Yes
Existing PM	Yes



May 2019 Appendix D

CORE CENTER

Warrants 1, 2 & 3 84th St & Hayden Rd

Signal Warrant 3 (Peak Hour)



*Note: 100 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 75 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor) (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)

Legend	Major, both approaches	Minor, larger approach	Approximate Threshold for Minor
 Existing AM Existing PM 	1,309	72	75
	1,903	121	75

Signal Warra	ant 3 is met?
Existing AM	<u>No</u>
Existing PM	Yes

May 2019 Appendix D



CORE CENTER

Major Street: Minor Street: Locale:		et						Spee	d Limit: d Limit: mber of <i>i</i>			Lanes:* Lanes:* of Moving	2													MUT	CD W	arrant	ts 1-3
Ma Minor Stree	ajor Stree t volume ·					84 4	62 5	49 4	81 2	146 5	404 18	683 42	1,007 69	1,439 105	1,350 76	1,168 54	1,160 37	1,164 45	1,256 71	1,350 113	1,695 116	2,050 260	1,869 193	1,023 37	715 16	504 4	241 4	130 5	83 4
Di	rection of	higher-\		ginning	oproach of hour <i>uilt-up an</i>	Critic							SB 7:00 X x	SB 8:00	SB 9:00	SB 10:00	SB 11:00	SB 12:00	SB 13:00	SB 14:00	SB 15:00	SB 16:00	SB 17:00	SB 18:00	SB 19:00	SB 20:00	SB 21:00	SB 22:00	SB 23:00
Warrant 1, Eight-Hou	ır Vehicu	lar Volu	me																										
<u>Condition A</u> Lanes (M/m): Minimum Regmts (100% ^a) Lanes (M/m): Minimum Regmts (70% ^c)	<i>Minimum</i> <u>1/1</u> 500 150 <u>1/1</u> 350 105	Vehicula <u>2+/1</u> 600 150 <u>2+/1</u> 420 105	ar Volum <u>2+/2+</u> 600 200 <u>2+/2+</u> 420 140	ne <u>1/2+</u> 500 200 <u>1/2+</u> 350 140	Criteria <u>2/2</u> 420 140	Hour 1 No No	2 No No	3 No No	4 No No	5 No No	6 No No	7 Yes No	8 Yes No	9 Yes No	10 Yes No	11 Yes No	12 Yes No	13 Yes No	14 Yes No	15 Yes No	16 Yes No	17 Yes Yes	18 Yes Yes	19 Yes No	20 Yes No	21 Yes No	22 No No	23 No No	24 No No
Warrant met?	No					No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No
Condition B Lanes (M/m): Minimum Reqmts (100% ^a)	<u>1/1</u> 750 75	<u>2+/1</u> 900 75	<u>2+/2+</u> 900 100	<u>1/2+</u> 750 100	Criteria	Hour 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Lanes (M/m): Minimum Reqmts (70%°) Warrant met?	<u>1/1</u> 525 53 No	<u>2+/1</u> 630 53	<u>2+/2+</u> 630 70	<u>1/2+</u> 525 70	<u>2/2</u> 630 70	No No No	No No No	No No No	No No No	No No No	No No No	Yes No No	Yes No No	Yes Yes Yes	Yes Yes Yes	Yes No No	Yes No No	Yes No No	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes Yes Yes	Yes No No	Yes No No	No No No	No No No	No No No	No No No
Combination Lanes (M/m): Condition A (80% ^b) Condition B (80% ^b)	of Conditi <u>1/1</u> 400 120 600 60	ions A & <u>2+/1</u> 480 120 720 60	B 2+/2+ 480 160 720 80	<u>1/2+</u> 400 160 600 80	Criteria	Hour 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Lanes (M/m): Condition A (56% ^d) Condition B (56% ^d) Warrant met?	<u>1/1</u> 280 84 420 42 No	<u>2+/1</u> 336 84 504 42	<u>2+/2+</u> 336 112 504 56	<u>1/2+</u> 280 112 420 56	<u>2/2</u> 336 112 504 56	No No No No	No No No No	No No No No	No No No No	No No No No	Yes No No No	Yes No Yes No No	Yes No Yes Yes No	Yes No Yes Yes No	Yes No Yes Yes No	Yes No Yes No No	Yes No Yes No No	Yes No Yes No No	Yes No Yes Yes No	Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes	Yes Yes Yes Yes Yes	Yes No Yes No No	Yes No Yes No No	Yes No Yes No No	No No No No	No No No No	No No No No
Warrant 2, Four Hou		ar Volui	ne		Criteria	Hour																							
	<u>1/1</u> See to the See to the Yes		<u>2+/2+</u>	<u>1/2+</u>	<u>2/2</u> Use	1 No No	2 No No	3 No No	4 No No	5 No No	6 No No	7 No No	8 No No	9 Yes Yes	10 No No	11 No No	12 No No	13 No No	14 No No	15 Yes Yes	16 Yes Yes	17 Yes Yes	18 Yes Yes	19 No No	20 No No	21 No No	22 No No	23 No No	24 No No
	r <u>1/1</u> See to the See to the	•	<u>2+/2+</u>		Criteria <u>2/2</u> Use	1	2	3	4 No	5	6 No	7 No	8 No	9	10 No	11 No	12 No	13 No	14 No	15 Voc	16 Vos	17 Ves	18 Voc	19 No	20 No	21 No	22 No	23 No	24 No
70% Warrant met?	Yes	engni			USe	No No	No No	No No	No No	No No	No	No No	NO NO	Yes Yes	No No	NO NO	No No	No No	No No	Yes Yes	Yes Yes	Yes Yes	Yes Yes	No No	No No	NO NO	NO NO	No No	No No



August 2019

19-ZN-2013#2 8/8/2019

Signal Warrant Analysis

Warrant		Hour(s) of the Day	Hours Required to Meet Warrant	Hours Met	ls Warrant Met?
	Condition A: Minimum Vehicular Volume	Any Eight Hours	8	2	No
Warrant 1. Eight-Hour	Condition B: Interruption of Continuous Traffic	Any Eight Hours	8	7	No
Vehicular Volume	Combination of Condition A & Condition B	Any Eight Hours	8	4	No
	(at least 1 of the 3 of	Overall conditions re	quired to mee	et warrant)	No
	rrant 2. ehicular Volume	Any Four Hours	4	5	Yes
	rrant 3. k Hour	Any One/Peak Hour	1	5	Yes

Volume-Based Traffic Signal Warrants Analysis Summary



0 August 2019 **19-ZN-2013#2** 8/8/2019

APPENDIX E

TRIP GENERATION





CORE CENTER

Newly Proposed (19-0480)

Trip Generation

May 2019

Methodology Overview

This form facilitates trip generation estimation using data within the Institute of Transportation Engineer's (ITE) *Trip Generation Manual*, 10th Edition and methodology described within ITE's *Trip Generation Handbook*, 3rd Edition. These references will be referred to as *Manual and Handbook*, respectively. The *Manual* contains data collected by various transportation professionals for a wide range of different land uses, with each land use category represented by a land use code (LUC). Average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized LUC in various settings and time periods. The *Handbook* indicates an established methodology for how to use data contained within the Manual when to use the fitted curve instead of the average rate and when to adjustments to the volume of trips are appropriate and how to do so. The methodology steps are represented visually in boxes in Figure 3.1. This worksheet applies calculations for each box if applicable.

Box 1 - Define Study Site Land Use Type & Site Characteristics

The analyst is to pick an appropriate LUC(s) based on the subject's zoning/land use(s)/future land use(s). The size of the land use(s) is described in reference to an independent variable(s) specific to (each) the land use (example: 1,000 square feet of building area is relatively common).

Land Use Types and Size

Proposed Use	Amount Units	ITE LUC	ITE Land Use Name
General Office Building	124.000 1,000 square feet	710	General Office Building
Shopping Center	35.000 1,000 square feet	820	Shopping Center
Quality Restaurant	35.000 1,000 square feet	931	Quality Restaurant

Equation Type: Equation Used [Equated Rate] (Type Abbreviations: Weighted Average Rate ("WA"), Fitted Curve ("FC"), or Custom ("C"))

Proposed Use	ADT	AM Peak Hour	PM Peak Hour	(not used)
General Office Building	FC: LN(T)=0.97*LN(X)+2.5 [10.54]	FC: T=0.94*X+26.49 [1.15]	FC: LN(T)=0.95*LN(X)+0.36 [1.13]	
Shopping Center	WA: T=X*37.75 [37.75]	WA: T=X*0.94 [0.94]	WA: T=X*3.81 [3.81]	
Quality Restaurant	WA: T=X*83.84 [83.84]	C: T=X* [0.00]	WA: T=X*7.8 [7.80]	

Baseline Vehicular Trips

	ADT				AM Peak Hour				PM Peak Hour				(not used)
Proposed Use	% In	In	Out	Total	% In	In	Out	Total	% In	In	Out	Total	
General Office Building	50%	654	654	1,308	86%	123	20	143	16%	22	118	140	
Shopping Center	50%	661	661	1,322	62%	20	13	33	48%	64	69	133	
Quality Restaurant	50%	1,467	1,467	2,934	85%	22	4	26	67%	183	90	273	
Totals		2,782	2,782	5,564		165	37	202		269	277	546	


CORE CENTER

Newly Proposed (19-0480)

Trip Generation May 2019

Adjustments for Internal Trips

	ADT				AM Peak Hour			PM Peak Hour				(not used)	
Proposed Use	Percent	In	Out	Total	Percent	In	Out	Total	Percent	In	Out	Total	
General Office Building	0%	0	0	0	0%	0	0	0	0%	0	0	0	
Shopping Center	22%	145	145	290	19%	4	2	6	24%	15	17	32	
Quality Restaurant	22%	323	323	646	19%	4	1	5	24%	44	22	66	
Totals		468	468	936		8	3	11		59	39	98	

Adjustments for Alternate Mode Trips

		Α	DT			PM Peak Hour				(not used)			
Proposed Use	Percent	In	Out	Total	Percent	In	Out	Total	Percent	In	Out	Total	
General Office Building	4%	26	26	52	4%	5	1	6	4%	1	5	6	
Shopping Center	4%	26	26	52	4%	1	0	1	4%	3	2	5	
Quality Restaurant	4%	59	59	118	4%	1	0	1	4%	7	4	11	
Totals	4%	111	111	222	4%	7	1	8	4%	11	11	22	

External Vehicular Trips

	А	DT		AM Peak Hour			PM Pe	ak Hour		(not used)
Proposed Use	In	Out	Total	In	Out	Total	In	Out	Total	
General Office Building	628	628	1,256	118	19	137	21	113	134	
Shopping Center	490	490	980	15	11	26	46	50	96	
Quality Restaurant	1,085	1,085	2,170	17	3	20	132	64	196	
Totals	2,203	2,203	4,406	150	33	183	199	227	426	



	NCHRP 684 Internal Trip Capture Estimation Tool											
Project Name:	t Name: CORE CENTER Organization: CivTech Inc.											
Project Location:	84th Street & Hayden Road		Performed By:	Briallen Rees								
Scenario Description:	Newly Proposed		Date:	5/29/2019								
Analysis Year:			Checked By:									
Analysis Period:	AM Street Peak Hour		Date:									

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Developm	ent Data (For In	formation Only)	Estimated Vehicle-Trips ³					
Land Ose	ITE LUCs ¹	Quantity	Units	Total	Entering	Exiting			
Office				143	123	20			
Retail				33	20	13			
Restaurant				26	22	4			
Cinema/Entertainment				0					
Residential				0					
Hotel				0					
All Other Land Uses ²				0					
				202	165	37			

	Table 2-A: Mode Split and Vehicle Occupancy Estimates											
Land Use		Entering Tri	ps		Exiting Trips							
Land Ose	Veh. Occ.4	% Transit	% Non-Motorized		Veh. Occ. ⁴	% Transit	% Non-Motorized					
Office												
Retail												
Restaurant				ĺ								
Cinema/Entertainment												
Residential												
Hotel												
All Other Land Uses ²												

	Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)											
Origin (Fram)		Destination (To)										
Origin (From)	Office	Residential	Hotel									
Office												
Retail												
Restaurant												
Cinema/Entertainment												
Residential												
Hotel												

	Table 4-A: Internal Person-Trip Origin-Destination Matrix*											
Origin (From)			Destination (To)									
Oligili (Floili)	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel						
Office		6	5	0	0	0						
Retail	4		2	0	0	0						
Restaurant	1	1		0	0	0						
Cinema/Entertainment	0	0	0		0	0						
Residential	0	0	0	0		0						
Hotel	0	0	0	0	0							

Table 5-A	Computatio	ons Summary	Table 6-A: Internal Trip Capture Percentages by Land Use					
	Total	Entering	Exiting	Land Use	Entering Trips	Exiting Trips		
All Person-Trips	202	165	37	Office	4%	55%		
Internal Capture Percentage	19%	12%	51%	Retail	35%	46%		
				Restaurant	32%	50%		
External Vehicle-Trips ⁵	164	146	18	Cinema/Entertainment	N/A	N/A		
External Transit-Trips ⁶	0	0	0	Residential	N/A	N/A		
External Non-Motorized Trips ⁶	0	0	0	Hotel	N/A	N/A		

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

⁶Person-Trips

Г

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	CORE CENTER
Analysis Period:	AM Street Peak Hour

	Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends											
Land Use	Tab	ole 7-A (D): Enter	ing Trips			Table 7-A (O): Exiting Trips						
Lanu Use	Veh. Occ.	Vehicle-Trips Person-Trips*			Veh. Occ.	Vehicle-Trips	Person-Trips*					
Office	1.00	123	123		1.00	20	20					
Retail	1.00	20	20		1.00	13	13					
Restaurant	1.00	22	22		1.00	4	4					
Cinema/Entertainment	1.00	0	0		1.00	0	0					
Residential	1.00	0	0		1.00	0	0					
Hotel	1.00	0	0		1.00	0	0					

	Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)										
Origin (From)	Destination (To)										
Origin (From)	Office Retai		Restaurant	Cinema/Entertainment	Residential	Hotel					
Office		6	13	0	0	0					
Retail	4		2	0	2	0					
Restaurant	1	1		0	0	0					
Cinema/Entertainment	0	0	0		0	0					
Residential	0	0	0	0		0					
Hotel	0	0	0	0	0						

	Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)									
Origin (From)				Destination (To)						
Oligili (Fiolili)	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel				
Office		6	5	0	0	0				
Retail	5		11	0	0	0				
Restaurant	17	2		0	0	0				
Cinema/Entertainment	0	0	0		0	0				
Residential	4	3	4	0		0				
Hotel	4	1	1	0	0					

	Table 9-A (D): Internal and External Trips Summary (Entering Trips)								
Destination Land Use		Person-Trip Esti	mates			External Trips by Mode*			
Destination Land Use	Internal	External	Total		Vehicles ¹	Transit ²	Non-Motorized ²		
Office	5	118	123		118	0	0		
Retail	7	13	20		13	0	0		
Restaurant	7	15	22		15	0	0		
Cinema/Entertainment	0	0	0		0	0	0		
Residential	0	0	0		0	0	0		
Hotel	0	0	0		0	0	0		
All Other Land Uses ³	0	0	0		0	0	0		

	Table 9-A (O): Internal and External Trips Summary (Exiting Trips)								
Origin Land Line		Person-Trip Esti	mates			External Trips by Mode*			
Origin Land Use	Internal	External	Total		Vehicles ¹	Transit ²	Non-Motorized ²		
Office	11	9	20		9	0	0		
Retail	6	7	13		7	0	0		
Restaurant	2	2	4		2	0	0		
Cinema/Entertainment	0	0	0		0	0	0		
Residential	0	0	0		0	0	0		
Hotel	0	0	0		0	0	0		
All Other Land Uses ³	0	0	0		0	0	0		

¹Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

²Person-Trips

³Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator *Indicates computation that has been rounded to the nearest whole number.

	NCHRP 684 Internal Trip Capture Estimation Tool								
Project Name: CORE CENTER Organization: CivTech Inc.									
Project Location:	84th Street & Hayden Road		Performed By:	Briallen Rees					
Scenario Description:	Newly Proposed		Date:	5/29/2019					
Analysis Year:			Checked By:						
Analysis Period:	PM Street Peak Hour		Date:						

	Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)								
Land Use	Developm	ent Data (For Info	ormation Only)			Estimated Vehicle-Trips ³			
Lanu Use	ITE LUCs ¹	Quantity	Units		Total	Entering	Exiting		
Office					140	22	118		
Retail					133	64	69		
Restaurant					273	183	90		
Cinema/Entertainment					0				
Residential					0				
Hotel					0				
All Other Land Uses ²					0				
					546	269	277		

	Table 2-P: Mode Split and Vehicle Occupancy Estimates								
		Entering Tri	ps		Exiting Trips				
Land Use	Veh. Occ. ⁴	% Transit	% Non-Motorized	Veh. Occ. ⁴	% Transit	% Non-Motorized			
Office									
Retail									
Restaurant									
Cinema/Entertainment									
Residential									
Hotel									
All Other Land Uses ²									

	Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)								
Origin (From)				Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel			
Office									
Retail									
Restaurant									
Cinema/Entertainment									
Residential									
Hotel									

Table 4-P: Internal Person-Trip Origin-Destination Matrix*									
Origin (From)				Destination (To)					
Oligili (Floili)	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel			
Office		5	4	0	0	0			
Retail	1		20	0	0	0			
Restaurant	3	32		0	0	0			
Cinema/Entertainment	0	0	0		0	0			
Residential	0	0	0	0		0			
Hotel	0	0	0	0	0				

Table 5-P	: Computatio	ns Summary	Table 6-P: Internal Trip Capture Percentages by Land Use			
Total Entering Exiting		Land Use	Entering Trips	Exiting Trips		
All Person-Trips	546	269	277	Office	18%	8%
Internal Capture Percentage	24%	24%	23%	Retail	58%	30%
· · · · · · · · · · · · · · · · · · ·				Restaurant	13%	39%
External Vehicle-Trips ⁵	416	204	212	Cinema/Entertainment	N/A	N/A
External Transit-Trips ⁶	0	0	0	Residential	N/A	N/A
External Non-Motorized Trips ⁶	0	0	0	Hotel	N/A	N/A

¹Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

²Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

³Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

⁴Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made ⁵Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

⁶Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Project Name:	CORE CENTER
Analysis Period:	PM Street Peak Hour

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends								
Land Use	Table	7-P (D): Entering	g Trips		Table 7-P (O): Exiting Trips			
	Veh. Occ.	Vehicle-Trips	Person-Trips*		Veh. Occ.	Vehicle-Trips	Person-Trips*	
Office	1.00	22	22		1.00	118	118	
Retail	1.00	64	64		1.00	69	69	
Restaurant	1.00	183	183		1.00	90	90	
Cinema/Entertainment	1.00	0	0		1.00	0	0	
Residential	1.00	0	0		1.00	0	0	
Hotel	1.00	0	0		1.00	0	0	

	Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)								
Origin (From)				Destination (To)					
Oligin (Floin)	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel			
Office		24	5	0	2	0			
Retail	1		20	3	18	3			
Restaurant	3	37		7	16	6			
Cinema/Entertainment	0	0	0		0	0			
Residential	0	0	0	0		0			
Hotel	0	0	0	0	0				

	Table 8-P (D):	Internal Person	-Trip Origin-Desti	nation Matrix (Computed a	t Destination)	
Origin (From)				Destination (To)		
Oligin (Floin)	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		5	4	0	0	0
Retail	7		53	0	0	0
Restaurant	7	32		0	0	0
Cinema/Entertainment	1	3	5		0	0
Residential	13	6	26	0		0
Hotel	0	1	9	0	0	

	Tal	ole 9-P (D): Inter	nal and External T	rips	Summary (Entering Ti	rips)	
Destination Land Use	P	erson-Trip Estima	ates			External Trips by Mode*	
Destination Land Ose	Internal	External	Total		Vehicles ¹	Transit ²	Non-Motorized ²
Office	4	18	22		18	0	0
Retail	37	27	64		27	0	0
Restaurant	24	159	183		159	0	0
Cinema/Entertainment	0	0	0		0	0	0
Residential	0	0	0		0	0	0
Hotel	0	0	0		0	0	0
All Other Land Uses ³	0	0	0		0	0	0

	Та	ble 9-P (O): Inter	nal and External	Trips	Summary (Exiting Tr	ips)	
Origin Land Use	P	erson-Trip Estima	ites			External Trips by Mode*	
Origin Land Ose	Internal	External	Total		Vehicles ¹	Transit ²	Non-Motorized ²
Office	9	109	118	7 [109	0	0
Retail	21	48	69		48	0	0
Restaurant	35	55	90		55	0	0
Cinema/Entertainment	0	0	0		0	0	0
Residential	0	0	0	7 [0	0	0
Hotel	0	0	0		0	0	0
All Other Land Uses ³	0	0	0		0	0	0

¹ Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P
² Person-Trips
³ Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator
*Indicates computation that has been rounded to the nearest whole number.

APPENDIX F

BACKGROUND TRAFFIC CALCULATIONS





Location of counts: Northsight Blvd/Thunderbird Road, southeast of 87th Street

Source(s): https://www.scottsdaleaz.gov/transportation/studies-reports/traffic-volume

	Year	Volume
Start	2014	9,700
End	2016	10,100
AAGR		2.0%
Exp Factor		1.041

Growth Rate Used	2.0%
Per-Year Multiplier	1.020

	Expansion	
Year	Factor(s)	
2019	1.000	
2020		Opening
2021	1.040	
2022	1.061	
2023	1.082	
2024	1.104	
2025	1.126	
2026	1.149	
2027	1.172	
2028	1.195	
2029	1.219	
2030	1.243	
2031	1.268	
2032	1.294	
2033	1.319	
2034	1.346	
2035	1.373	
2036	1.400	
2037	1.428	
2038	1.457	
2039	1.486	
2040	1.516	
2041	1.546	
2042	1.577	
2043	1.608	
2044	1.641	
2045	1.673	
2046	1.707	
2047	1.741	
2048	1.776	
2049	1.811	
2050	1.848	
2051	1.885	



May 2019 Appendix F

APPENDIX G

2020 PEAK HOUR ANALYSIS





	≯	-	1	+	1	1	1	1	ŧ	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	
Lane Configurations	<u>۲</u>	↑ ĵ ₂	<u>۲</u>	↑ ĵ ₂	- T	↑	7	ሻ	4	
Traffic Volume (vph)	19	549	45	438	28	27	78	18	17	
Future Volume (vph)	19	549	45	438	28	27	78	18	17	
Turn Type	Perm	NA	Perm		pm+pt	NA	Perm	Perm	NA	
Protected Phases		6		2	7	4			8	
Permitted Phases	6		2		4		4	8		
Detector Phase	6	6	2	2	7	4	4	8	8	
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	26.9	26.9	26.9	26.9	9.6	32.4	32.4	32.4	32.4	
Total Split (s)	76.0	76.0	76.0	76.0	24.0	44.0	44.0	20.0	20.0	
Total Split (%)	63.3%	63.3%	63.3%	63.3%	20.0%	36.7%	36.7%	16.7%	16.7%	
Yellow Time (s)	4.7	4.7	4.7	4.7	3.0	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.2	1.2	1.2	1.2	1.6	1.8	1.8	1.8	1.8	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.9	5.9	5.9	5.9	4.6	5.4	5.4	5.4	5.4	
Lead/Lag					Lead			Lag	Lag	
Lead-Lag Optimize?					Yes			Yes	Yes	
Recall Mode	None	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	93.0	93.0	93.0	93.0	16.5	15.7	15.7	8.0	8.0	
Actuated g/C Ratio	0.78	0.78	0.78	0.78	0.14	0.13	0.13	0.07	0.07	
v/c Ratio	0.03	0.22	0.09	0.19	0.23	0.14	0.36	0.33	0.27	
Control Delay	4.9	4.5	5.2	4.3	45.2	43.4	11.5	63.3	47.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.9	4.5	5.2	4.3	45.2	43.4	11.5	63.3	47.5	
LOS	A	A	A	A	D	D	В	E	D	
Approach Delay		4.6		4.4		25.0			54.4	
Approach LOS		A		A		С			D	
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 2 (2%), Referenced to	o phase 2	WBTL, S	tart of Gr	een						
Natural Cycle: 70										
Control Type: Actuated-Cool	rdinated									
Maximum v/c Ratio: 0.36										
Intersection Signal Delay: 9.					ntersectio					
Intersection Capacity Utilizat	ion 46.0%			10	CU Level	of Service	e A			
Analysis Period (min) 15										
Splits and Phases: 1: 83rd	I Place & I	Havdor E	load							
opins and Phases: 1: 83r	I FIACE &	nayuen h	Udu							
Ø2 (R)							-	Ø4		
76 s							44 s			
406								Ø7		₽ 08

	≯	-	\mathbf{r}	4	-	•	1	1	1	1	Ŧ	*
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SI
Lane Configurations	1	≜ †î≽		۲	≜ †⊅		۲	•	1	۲	4Î	
Traffic Volume (veh/h)	19	549	20	45	438	47	28	27	78	18	17	
Future Volume (veh/h)	19	549	20	45	438	47	28	27	78	18	17	
Initial Q (Qb), veh	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.
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.
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	17
Adj Flow Rate, veh/h	21	617	10	50	487	35	36	35	69	28	27	
Peak Hour Factor	0.89	0.89	0.89	0.90	0.90	0.90	0.77	0.77	0.77	0.64	0.64	0.
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	689	2970	48	625	2791	200	155	231	176	121	87	
Arrive On Green	0.79	0.79	0.79	0.79	0.79	0.79	0.03	0.12	0.12	0.05	0.05	0.
Sat Flow, veh/h	834	3767	61	756	3540	254	1688	1969	1502	1222	1741	1
Grp Volume(v), veh/h	21	306	321	50	257	265	36	35	69	28	0	
Grp Sat Flow(s),veh/h/ln	834	1870	1958	756	1870	1923	1688	1969	1502	1222	0	19
Q Serve(g_s), s	0.8	5.0	5.0	2.1	4.0	4.1	2.4	1.9	5.1	2.7	0.0	
Cycle Q Clear(g_c), s	4.8	5.0	5.0	7.1	4.0	4.1	2.4	1.9	5.1	2.7	0.0	
Prop In Lane	1.00		0.03	1.00		0.13	1.00		1.00	1.00		0.
Lane Grp Cap(c), veh/h	689	1475	1544	625	1475	1516	155	231	176	121	0	
V/C Ratio(X)	0.03	0.21	0.21	0.08	0.17	0.17	0.23	0.15	0.39	0.23	0.00	0.
Avail Cap(c_a), veh/h	689	1475	1544	625	1475	1516	378	633	483	209	0	2
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.
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.
Uniform Delay (d), s/veh	3.7	3.2	3.2	4.1	3.1	3.1	50.2	47.6	49.0	55.4	0.0	55
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.1	0.5	0.4	0.0	(
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	(
%ile BackOfQ(50%),veh/In	0.1	1.5	1.6	0.3	1.3	1.4	1.0	1.0	1.9	0.8	0.0	(
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.7	3.2	3.2	4.4	3.4	3.4	50.5	47.7	49.5	55.8	0.0	5
LnGrp LOS	A	A	A	A	A	A	D	D	D	E	A	
Approach Vol, veh/h		648			572			140			58	
Approach Delay, s/veh		3.3			3.5			49.3			55.7	
Approach LOS		A			А			D			E	
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		100.5		19.5		100.5	8.1	11.4				
Change Period (Y+Rc), s		* 5.9		* 5.4		* 5.9	* 4.6	* 5.4				
Max Green Setting (Gmax), s		* 70		* 39		* 70	* 19	* 15				
Max Q Clear Time (q c+l1), s		9.1		7.1		7.0	4.4	4.7				
Green Ext Time (p_c), s		1.3		0.2		1.4	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay			10.0							_	_	
HCM 6th LOS			B									
Notes												
User approved pedestrian inte	rval to be	e less tha	n phase r	nax gree	٦.							
* HCM 6th computational engin						ses cross	ing the ba	arrier.				

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Hayden One Background AN	1									2:	Cost	co Dr	wy & Hayden Roa HCM 6th TW
Intersection													
Int Delay, s/veh	2.3												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	5	^	1	1	đ₽				1		4		
Traffic Vol, veh/h	38	565	27	98	510	12	3	0	91	8	0	11	
Future Vol. veh/h	38	565	27	98	510	12	3	0	91	8	0	11	
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	135	-	135	175		-			0	-		-	
Veh in Median Storage		0	-	-	0			0	-	-	1	-	
Grade, %		0			0			0			0		
Peak Hour Factor	91	91	91	96	96	96	72	72	72	43	43	43	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	-3	2	-3	
Mvmt Flow	42	621	30	102	531	13	4	0	126	19	0	26	
WWITCTIOW	42	021	50	102	551	15	4	U	120	15	0	20	
Major/Minor I	Major1		Ν	Major2		1	Minor1			Minor2			
Conflicting Flow All	544	0	0	651	0	0	1175	-	311	1137	1477	272	
Stage 1	-	-	-	-	-	-	705	-	-	742	742	-	
Stage 2	-	-		-	-	-	470	-	-	395	735	-	
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	-	6.94	7.54	6.54	6.94	
Critical Hdwy Stg 1	-	-		-	-	-	6.54	-	-	6.54	5.54	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	-	-	6.54	5.54	-	
Follow-up Hdwy	2.22	-		2.22	-	-	3.52	-	3.32	3.52	4.02	3.32	
Pot Cap-1 Maneuver	1021	-	-	931	-	-	147	0	685	157	125	726	
Stage 1		-	-	-		-	393	0	-	374	420	-	
Stage 2	-	-		-	-	-	543	0	-	602	424	-	
Platoon blocked. %		-	-			-							
Mov Cap-1 Maneuver	1021	-	-	931		-	126	-	685	114	107	726	
Mov Cap-2 Maneuver	-	-	-	-		-	126	-	-	218	201	-	
Stage 1		-	-	-	-	-	377	-	-	359	374	-	
Stage 2		-	-	-			466			471	407		
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.5			1.5			11.4			16.2			
HCM LOS							В			С			
Minor Lane/Major Mvm	t.	NBLn1	EBL	EBT	EBR	WBL	WBT	WRP	SBLn1				
		685	1021	LUI	LDIX	931	1101	101	366				
Capacity (veh/h) HCM Lane V/C Ratio		0.185	0.041	-		0.11		-	0.121				
		11.4	0.041	-		9.3	-	-	16.2				
HCM Control Delay (s)							-						
HCM Lane LOS		B	A	-	-	A	-	-	C				
HCM 95th %tile Q(veh)		0.7	0.1	-		0.4	-	-	0.4				

05/30/2019 CivTech BR Synchro 10 Report Page 3 Hayden One Background AM

05/30/2019

CivTech BR

3: 84th Street & Hayden Road HCM 6th TWSC

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	3		1	5	≜ 1₽		1	1.	- HBH	002	4	OBIT
Traffic Vol, veh/h	18	609	10	16	606	75	16	2	55	28	0	13
Future Vol. veh/h	18	609	10	16	606	75	16	2	55	28	0	13
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	135	-	100	145		-	45		-	-		-
Veh in Median Storage,	# -	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0			0			0		-	0	
Peak Hour Factor	95	95	95	93	93	93	90	90	90	56	56	56
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	19	641	11	17	652	81	18	2	61	50	0	23
Major/Minor N	lajor1			Major2		1	Minor1		Ν	/linor2		
Conflicting Flow All	733	0	0	652	0	0	1039	1446	321	1087	1417	367
Stage 1	-	-	-	-	-	-	679	679	-	727	727	-
Stage 2		-					360	767		360	690	
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1	-		-	-	-	-	6.54	5.54	-	6.54	5.54	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	868	-	-	930	-	-	185	131	675	170	136	630
Stage 1	-	-	-	-	-	-	408	449	-	381	427	-
Stage 2	-	-	-	-	-	-	631	410	-	631	444	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	868	-	-	930	-	-	173	126	675	149	131	630
Mov Cap-2 Maneuver	-	-	-	-	-	-	290	244	-	266	251	-
Stage 1	-	-	-	-	-	-	399	439	-	373	419	-
Stage 2	-	-	-	-		-	597	403	-	558	434	-
Approach	EB		_	WB	_		NB			SB		
HCM Control Delay, s	0.3			0.2			12.8			19.2		
HCM LOS							В			С		
Minor Lane/Major Mvmt		NBLn11	VBLn2	EBL	EBT	EBR	WBL	WBT	WBRS	SBLn1		
Capacity (veh/h)		290	636	868	-	-	930	-	-	326		
HCM Lane V/C Ratio		0.061	0.1	0.022			0.018			0.225		
		18.2	11.3	9.2	-	-	8.9	-	-	19.2		
HCM Control Delay (s)		C	В	A	-	-	A	-	-	С		
HCM Control Delay (s) HCM Lane LOS												
		0.2	0.3	0.1	-	-	0.1	-	-	0.8		

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Hayden One Background AM

4: Northeast Access & Hayden Road HCM 6th TWSC

Intersection	_		_		_	
Int Delay, s/veh	0					
	EDT			MDT	ND	NDD
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations		1	~	^	-	1
Traffic Vol, veh/h	694	0	0	698	0	0
Future Vol, veh/h	694	0	0	698	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	-	135	-	-	-	0
Veh in Median Storage,	# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	93	93	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mymt Flow	754	0	0	751	0	0
		U U	Ū		Ū	Ŭ
	lajor1		Major2		Ainor1	
Conflicting Flow All	0	0	-	-	-	377
Stage 1	-	-	-	-	-	-
Stage 2	-	-		-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy		-		-	-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	621
Stage 1			0		0	
Stage 2	-	-	0	-	0	-
Platoon blocked, %		-	0	-	0	
Mov Cap-1 Maneuver	-	-	-	-		621
Mov Cap-1 Maneuver Mov Cap-2 Maneuver	-	-	-	-	-	621
		-			-	
Stage 1	-	-			-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0	_	0		0	
HCM LOS	0		0		A	
I IOWI LUG					A	
Minor Lane/Major Mvmt	t N	VBLn1	EBT	EBR	WBT	
Capacity (veh/h)		-	-	-	-	
HCM Lane V/C Ratio				-		
HCM Control Delay (s)		0	-	-	-	
HCM Lane LOS		A	-	-		
HCM 95th %tile Q(veh)		- A	-	-	-	
HOW SOUL WILL CONTRACT						

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Hayden One Background AM

5: Burger King Drwy & Hayden Road HCM 6th TWSC

Intersection Int Delay, s/veh	0.8												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	<u></u>	<u></u>	1	NDL 1	**BT		NDL	4	NDIN	ODL	4		
Traffic Vol, veh/h	4	646	45	44	664	12	13	0	15	3	0	2	
Future Vol. veh/h	4	646	45	44	664	12	13	0	15	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		75	90		100			-		-	-	
Veh in Median Storage,		0	-	-	0	-	-	1	-	-	0	-	
Grade, %		0			0			0			0	-	
Peak Hour Factor	93	93	93	96	96	96	78	78	78	63	63	63	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	4	695	48	46	692	13	17	0	19	5	0	3	
WWINCTIOW	-	000	-10	-10	052	10	17	0	15	5	0	5	
Major/Minor N	lajor1			Major2			Minor1		A	/linor2			
Conflicting Flow All	705	0	0	743	0	0	1141	1500	348	1140	1535	346	
Stage 1	105	-	0	143	-	-	703	703	340	784	784	340	
Stage 2	-	-		-	-	-	438	703	-	356	704		
Critical Hdwy	4.14	-		4.14	-	-	438	6.54	6.94	7.54	6.54	6.94	
	4.14			4.14	-	-	6.54	0.54 5.54	0.94	6.54	6.54 5.54	0.94	
Critical Hdwy Stg 1	-	-	-	-	-		6.54	5.54	-	6.54	5.54		
Critical Hdwy Stg 2	2.22			2.22	-	-	6.54 3.52	5.54 4.02	3.32	6.54 3.52	5.54 4.02	3.32	
Follow-up Hdwy	889	-		860	-	-	3.52	4.02	5.5Z			5.5Z	
Pot Cap-1 Maneuver	889		-		-					156	115 402		
Stage 1	-	-	-	-	-	-	394 567	438 397	-	352 634	402	-	
Stage 2	-		-	-	-	-	100	397	-	634	410	-	
Platoon blocked, %	000	-	-	000	-	-	148	444	040	145	400	650	
Mov Cap-1 Maneuver	889		-	860	-		271	114 235	648	145	108	650	
Mov Cap-2 Maneuver	-	-	-	-	-	-	392	235 436	-		108 381	-	
Stage 1	-	-	-	-						351		-	
Stage 2	-		-	-	-	-	534	376	-	612	414	-	
Approach	EB			WB			NB			SB			
Approach	0.1	_	_	0.6	_		15.1		_	22.8		_	
HCM Control Delay, s	0.1			0.0									
HCM LOS							С			С			
Minor Lane/Major Mvmt		NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	CDI n4				
Capacity (veh/h)		394	889	EDI	EDR	860	-	WDR -	210				
HCM Lane V/C Ratio			0.005			0.053			0.038				
HCM Control Delay (s)		15.1	9.1		-	9.4		-					
HCM Lane LOS		13.1 C	3.1 A			3.4 A			22.0 C				
HCM 95th %tile Q(veh)		0.3	0			0.2			0.1				
		0.5	0	-		0.2			0.1				

Hayden One Background AM

6: Northsight Boulevard & Hayden Road HCM 6th Roundabout

laters offer Delever buch	7.0							
Intersection Delay, s/veh	7.2							
Intersection LOS	А							
Approach		EB		WB		NB	SB	
Entry Lanes		2		2		2	1	
Conflicting Circle Lanes		2		2		2	2	
Adj Approach Flow, veh/h		560		655		358	335	
Demand Flow Rate, veh/h		571		668		365	341	
Vehicles Circulating, veh/h		270		353		502	730	
Vehicles Exiting, veh/h		801		514		339	291	
Ped Vol Crossing Leg, #/h		0		0		0	0	
Ped Cap Adj		1.000		1.000		1.000	1.000	
Approach Delay, s/veh		5.9		7.0		6.3	10.9	
Approach LOS		A		A		А	В	
Lane	Left	Right	Left	Right	Left	Right	Left	
Designated Moves	LT	TR	LT	TR	LT	R	LTR	
Assumed Moves	LT	TR	LT	TR	LT	R	LTR	
RT Channelized								
Lane Util	0.469	0.531	0.470	0.530	0.540	0.460	1.000	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328	
Entry Flow, veh/h	268	303	314	354	197	168	341	
Cap Entry Lane, veh/h	1053	1129	976	1052	851	927	763	
Entry HV Adj Factor	0.983	0.980	0.981	0.981	0.978	0.982	0.982	
Flow Entry, veh/h	263	297	308	347	193	165	335	
Cap Entry, veh/h	1035	1106	957	1032	832	910	750	
V/C Ratio	0.255	0.268	0.322	0.337	0.232	0.181	0.447	
Control Delay, s/veh	5.9	5.8	7.1	6.9	6.8	5.7	10.9	
LOS	А	А	А	А	A	А	В	
95th %tile Queue, veh	1	1	1	1	1	1	2	

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	≯	-	\mathbf{i}	4	+	•	1	1	1	1	.↓	
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Configurations	1	ተተተ	1	ሻሻ	<u>_</u>	7	٦	ب ا	7	٦	4Î	
Traffic Volume (vph)	4	1100	200	375	1321	29	213	12	271	12	8	
Future Volume (vph)	4	1100	200	375	1321	29	213	12	271	12	8	
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases Permitted Phases	5	2	8	1	6	6	8	8	1	4	4	
Detector Phase	5	2	2	1	6	6	8	8	0 1	4	4	
Switch Phase	5	2	0		0	0	0	0		4	4	
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	5.0	5.0	6.0	6.0	
Minimum Split (s)	11.0	38.7	47.0	11.0	25.7	25.7	47.0	47.0	11.0	44.3	44.3	
Total Split (s)	11.0	35.0	33.0	40.0	64.0	64.0	33.0	33.0	40.0	12.0	12.0	
Total Split (%)	9.2%	29.2%	27.5%	33.3%	53.3%	53.3%	27.5%	27.5%	33.3%	10.0%	10.0%	
Yellow Time (s)	4.0	4.7	4.0	4.0	4.7	4.7	4.0	4.0	4.0	3.3	3.3	
All-Red Time (s)	2.0	1.0	2.0	2.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.7	6.0	6.0	5.7	5.7	6.0	6.0	6.0	5.3	5.3	
Lead/Lag Lead-Lag Optimize?	Lag Yes	Lead Yes		Lag Yes	Lead Yes	Lead Yes			Lag Yes			
Recall Mode	None	C-Max	None	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	5.0	57.7	75.9	25.2	86.7	86.7	12.5	12.5	40.1	6.1	6.1	
Actuated g/C Ratio	0.04	0.48	0.63	0.21	0.72	0.72	0.10	0.10	0.33	0.05	0.05	
v/c Ratio	0.07	0.50	0.23	0.61	0.38	0.03	0.72	0.65	0.48	0.18	0.14	
Control Delay	57.5	24.5	2.2	46.7	8.4	0.0	75.0	66.7	13.0	59.5	47.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	57.5	24.5	2.2	46.7	8.4	0.0	75.0	66.7	13.0	59.5	47.7	
LOS	E	С	A	D	Α	A	E	E	В	E	D	
Approach Delay		21.2			16.6			39.3			53.8	
Approach LOS		С			В			D			D	
Intersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120 Offset: 103 (86%), Reference		2.EDT	and G-W/	OT Stort	of Croop							
Natural Cycle: 145	ed to phas	SE Z.EDI	and 0.000	ST, Start	JI Gleen							
Control Type: Actuated-Coc	ordinated											
Maximum v/c Ratio: 0.72	an an actor a											
Intersection Signal Delay: 2	1.6			h	ntersectio	n LOS: C						
Intersection Capacity Utiliza		5				of Service						
Analysis Period (min) 15												
Splits and Phases: 7: Hay	yden Road	& Frank	Lloyd Wr	ight Boule	evard		1.6					
▼Ø2 (R)			01					04 ·	N Ø8			
35 s		40 s					12 s	33	3 s			
4 ⁽¹⁾						•						
64 s					1	15						
		-	01			▶ 	12 s	33	₩ Ø8 3 s			

EBL 4 4 0 1.00 1.00 772 5 0.85	EBT 1100 1100 0 1.00 No	EBR 200 200 0 1.00	WBL 375 375 0	WBT 1321 1321	WBR	NBL	NBT €Î	NBR	SBL	SBT	SBR
4 4 0 1.00 1.00 772 5	1100 1100 0 1.00	200 200 0	375 375	1321			4	1	*	1 .	
4 0 1.00 1.00 772 5	1100 0 1.00	200 0	375 375	1321	29					4Î	
0 1.00 1.00 772 5	0 1.00	0				213	12	271	12	8	3
1.00 1.00 772 5	1.00				29	213	12	271	12	8	3
1.00 772 5				0	0	0	0	0	0	0	0
772 5			1.00		1.00	1.00		1.00	1.00		1.00
5		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
5		4770	4770	No	4770	4770	No	4770	4770	No	4770
	1969 1294	1772 147	1772 417	1969 1468	1772 21	1772 236	1969 0	1772 182	1772 15	1969 10	1772
0.00	0.85	0.85	0.90	0.90	0.90	0.94	0.94	0.94	0.82	0.82	0.82
2	0.05	0.05	0.90	0.90	0.90	2	0.94	0.94	0.62	0.62	0.02
347	1312	498	1463	2611	730	295	0	803	50	47	2
0.21	0.24	0.24	0.45	0.49	0.49	0.09	0.00	0.09	0.03	0.03	0.03
688	5375	1502	3274	5375	1502	3375	0.00	1502	1688	1593	319
											12
-							-			-	1911
											0.7
											0.7
	20.0			20.2			0.0			0.0	0.17
347	1312	498	1463	2611		295	0		50	0	57
0.01	0.99	0.30	0.28	0.56	0.03	0.80	0.00	0.23	0.30	0.00	0.21
347	1312	498	1463	2611	730	759	0	1009	94	0	107
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
38.0	45.1	29.7	21.0	21.8	16.1	53.7	0.0	14.8	57.0	0.0	56.8
0.0	21.7	1.5	0.0	0.9	0.1	1.9	0.0	0.1	1.2	0.0	0.7
0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.1	15.3	3.8	3.7	9.8	0.3	3.6	0.0	2.6	0.5	0.0	0.4
38.0										0.0	57.5
D		С	С		В	E		В	E	A	E
	E			С			D			E	
1	2		4	5	6		8				
59.6											
34.0	29.3		* 6.7	5.0	58.3		27.0				
11.7	30.8		3.0	2.3	25.2		10.2				
0.3	0.0		0.0	0.0	5.1		0.3				
		20.0									
		D									
	5 688 0.3 0.3 0.0 347 0.01 347 0.01 347 0.00 0.0 0.0 0.0 0.0 0.1 88.0 D 1 39.6 6.0 44.0 1.7 0.3	5 1294 5 1294 688 1792 0.3 28.8 100 347 347 1312 100 1.00 347 1312 100 1.00 8.0 45.1 0.0 21.7 0.0 21.7 0.0 1.15.3 88.0 66.9 D E 1446 63.1 6.3 5.7 14.0 29.3 1.7 30.8 0.3 0.0	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$

	٦	-	4	+	1	1	1	1	Ŧ	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	
Lane Configurations	7	≜ †}⊳	5	đħ	ኘ	1	1	5	ĥ	
Traffic Volume (vph)	13	826	63	518	148	12	133	92	24	
Future Volume (vph)	13	826	63	518	148	12	133	92	24	
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	
Protected Phases		6		2	7	4			8	
Permitted Phases	6	0	2	0	4		4	8	0	
Detector Phase Switch Phase	6	6	2	2	7	4	4	8	8	
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	26.9	26.9	26.9	26.9	9.6	32.4	32.4	32.4	32.4	
Total Split (s)	74.0	74.0	74.0	74.0	26.0	46.0	46.0	20.0	20.0	
Total Split (%)	61.7%	61.7%	61.7%	61.7%	21.7%	38.3%	38.3%	16.7%	16.7%	
Yellow Time (s)	4.7	4.7	4.7	4.7	3.0	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.2	1.2	1.2	1.2	1.6	1.8	1.8	1.8	1.8	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.9	5.9	5.9	5.9	4.6	5.4	5.4	5.4	5.4	
Lead/Lag					Lead			Lag	Lag	
Lead-Lag Optimize?					Yes			Yes	Yes	
Recall Mode	None	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s) Actuated g/C Ratio	74.2 0.62	74.2 0.62	74.2 0.62	74.2 0.62	35.3 0.29	34.5 0.29	34.5 0.29	12.4 0.10	12.4 0.10	
v/c Ratio	0.02	0.62	0.62	0.62	0.29	0.29	0.29	0.10	0.10	
Control Delay	11.4	13.4	15.5	11.4	37.2	27.5	10.2	83.6	32.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	11.4	13.4	15.5	11.4	37.2	27.5	10.2	83.6	32.5	
LOS	В	В	В	В	D	С	В	F	С	
Approach Delay Approach LOS		13.3 B		11.8 B		24.5 C			66.6 E	
Intersection Summary Cycle Length: 120 Actuated Cycle Length: 120 Offset: 72 (60%), Reference Natural Cycle: 75 Control Type: Actuated-Coc Maximum v/c Ratio: 0.75 Intersection Signal Delay: 1 Intersection Signal Delay: 1 Intersection Capacity Utiliza Analysis Period (min) 15	ed to phase ordinated 8.6		, Start of	Ir	ntersectio CU Level	n LOS: B of Service	e B			
Splits and Phases: 1: 83r	d Place &	Hayden F	Road							
Ø2 (R)							Tø4	ł		
74 s							46 s			
							1 1 Ø7	,		
74 s							26 s			20 s
										Synchro 10 Report

ayden One ackground PM											zed Inters		Road ummary
	_	۶	-	\mathbf{i}	4	-	×	1	t	1	1	Ŧ	-
lovement	E	BL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
ane Configurations		ň.	^1 >		5	≜ †₽		3	1	1	٦	f)	
raffic Volume (veh/h)		13	826	69	63	518	17	148	12	133	92	24	22
uture Volume (veh/h)		13	826	69	63	518	17	148	12	133	92	24	22
nitial Q (Qb), veh		0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)		.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
Vork Zone On Approach			No			No			No			No	
dj Sat Flow, veh/h/ln		72	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
dj Flow Rate, veh/h		14	908	49	66	545	7	192	16	63	102	27	7
Peak Hour Factor	0	.91	0.91	0.91	0.95	0.95	0.95	0.77	0.77	0.77	0.90	0.90	0.90
Percent Heavy Veh, %		2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h		543	2362	127	359	2475	32	361	495	378	181	145	38
Arrive On Green		.65	0.65	0.65	0.65	0.65	0.65	0.12	0.25	0.25	0.10	0.10	0.10
Sat Flow, veh/h		311	3609	195	556	3782	49	1688	1969	1502	1250	1508	391
Grp Volume(v), veh/h		14	471	486	66	269	283	192	16	63	102	0	34
Srp Sat Flow(s), veh/h/ln		311	1870	1934	556	1870	1960	1688	1969	1502	1250	0	1898
Q Serve(g_s), s		0.9	13.9	13.9	7.5	7.0	7.0	11.9	0.7	3.9	9.6	0.0	2.0
Cycle Q Clear(g_c), s		7.8	13.9	13.9	21.4	7.0	7.0	11.9	0.7	3.9	9.6	0.0	2.0
Prop In Lane		.00 543	1224	0.10	1.00 359	1224	0.02 1283	1.00 361	495	1.00 378	1.00 181	0	0.21 183
ane Grp Cap(c), veh/h		.03	0.38	0.38	0.18			0.53	495	0.17	0.56	0.00	0.19
//C Ratio(X)		.03 543	1224	1265	359	0.22 1224	0.22 1283	465	666	508	212	0.00	231
wail Cap(c_a), veh/h ICM Platoon Ratio		.00	1.00	1.00	1.00	1.00	1203	405	1.00	1.00	1.00	1.00	1.00
		.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
Jpstream Filter(I) Jniform Delay (d), s/veh		.00 0.0	9.6	9.6	14.5	8.4	8.4	40.2	33.9	35.1	53.3	0.00	49.9
ncr Delay (d2), s/veh		0.0	9.6	9.6	14.5	8.4 0.4	8.4 0.4	40.2	33.9 0.0	35.1 0.1	53.3 1.0	0.0	49.9
ntial Q Delay(d2), s/ven		0.0	0.1	0.1	0.0	0.4	0.4	0.5	0.0	0.1	0.0	0.0	0.2
6ile BackOfQ(50%).veh/ln		0.0	0.0 5.4	0.0 5.6	1.0	2.9	3.0	0.0 5.0	0.0	0.0	0.0 3.1	0.0	1.0
		U.Z	0.4	0.0	1.0	2.9	3.0	5.0	0.4	1.5	3.1	0.0	1.0
Insig. Movement Delay, s/vel		0.0	0.0	0.0	15.0	0.0	0.0	40.7	22.0	25.0	EA A	0.0	E0.4
nGrp Delay(d),s/veh	1	0.0	9.6	9.6	15.6	8.8	8.8	40.7	33.9	35.2	54.4	0.0	50.1
nGrp LOS		A	A	A	В	A	A	D	C	D	D	A	D
pproach Vol, veh/h			971			618			271			136	
opproach Delay, s/veh			9.7 A			9.5 A			39.0 D			53.3 D	
Approach LOS			A			A			D			D	
imer - Assigned Phs	_	_	2		4	_	6	10.0	0			_	
Phs Duration (G+Y+Rc), s			84.4 * 5.9		35.6 * 5.4		84.4	18.6 * 4.6	17.0 * 5.4				
Change Period (Y+Rc), s			^ 5.9 * 68		^ 5.4 * 41		* 5.9 * 68	^ 4.6 * 21	^ 5.4 * 15				
Max Green Setting (Gmax), s													
/lax Q Clear Time (g_c+l1), s Green Ext Time (p_c), s), S		23.4 1.6		5.9 0.1		15.9 2.3	13.9 0.2	11.6 0.1				
bleen Ext Time (p_c), s			1.0		0.1		2.3	0.2	0.1				
ntersection Summary													
ICM 6th Ctrl Delay				16.6									
ICM 6th LOS				В									
lotes													
Jser approved pedestrian inte HCM 6th computational engi							ses cross	ng the ba	arrier.				
												nchro 10	Densi
5/30/2019													

ntersection														
nt Delay, s/veh	6.2													
Novement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
ane Configurations	7	^	1	5	≜ ⊅		ň	ţ,			4			
Traffic Vol, veh/h	13	1148	28	37	700	16	10	0	43	70	1	52		
uture Vol, veh/h	13	1148	28	37	700	16	10	0	43	70	1	52		
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	1100	1100	None	-	-	None	-	-	None	0.00	otop	None		
Storage Length	135		100	145		-	45		-			-		
/eh in Median Storage		0	-	-	0	-	-	1			1	-		
Grade. %		0	-		0	-	-	0			0			
Peak Hour Factor	95	95	95	93	93	93	46	46	46	63	63	63		
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2		
Mymt Flow	14	1208	29	40	753	17	22	0	93	111	2	83		
WWWITCHIOW	14	1200	23	40	155	17	22	0	30		2	00		
Major/Minor N	/lajor1			Major2			/linor1		Λ	/linor2				
Conflicting Flow All	770	0	0	1237	0	0	1694	2086	604	1474	2107	385		
Stage 1	110	0	-	1201	-	-	1236	1236	-00	842	842	505		
Stage 2							458	850		632	1265			
Critical Hdwy	4.14		-	4.14	-		7.54	6.54	6.94	7.54	6.54	6.94		
Critical Hdwy Stg 1	4.14			4.14			6.54	5.54	0.34	6.54	5.54	0.34		
Critical Hdwy Stg 1	-	-	-	-		-	6.54	5.54	-	6.54	5.54	-		
Follow-up Hdwy	2.22		-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32		
Pot Cap-1 Maneuver	840	-	-	559	-		5.5Z	4.02	441	~ 88	4.02	613		
Stage 1	040		-	009			187	246	441	325	378	015		
Stage 2	-		-	-			552	375		435	239	-		
Platoon blocked, %				-			552	575	-	400	200			
Mov Cap-1 Maneuver	840		-	559			48	47	441	~ 65	47	613		
Mov Cap-1 Maneuver	040		-	559	-	-	40	149	441	~ 65	134	013		
	-	-	-	-			184	242	-	319	351	-		
Stage 1	-		-	-			441	348		319	235	-		
Stage 2			-			-	441	340	-	337	235	-		
Approach	EB			WB			NB			SB				
	0.1			0.6			19.3			60.4				
HCM Control Delay, s	0.1			0.0			19.3 C			60.4 F				
HCM LOS							U			F				
Minor Lane/Major Mvm	-	NBLn1	NRI n2	EBL	EBT	EBR	WBL	WBT	WBR S	SBI n1				
Capacity (veh/h)		135	441	840		-LDR	559		-	244				
HCM Lane V/C Ratio		0.161					0.071			0.8				
HCM Control Delay (s)		36.7	15.3	9.4			11.9	-		60.4				
HCM Lane LOS		E	C	A			B			F				
HCM 95th %tile Q(veh)		0.6	0.8	0.1	-	-	0.2	-	-	6				
Notes														
				eeds 30		_		n Not D					n platoon	

Hayden One Background PM

4: Northeast Access & Hayden Road HCM 6th TWSC

Intersection	_		_		_	
Int Delay, s/veh	0					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
			VVDL		INDL	
Lane Configurations			0		0	
Traffic Vol, veh/h	1261	0	0	753	0	0
Future Vol, veh/h	1261	0	0	753	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-		-	None	-	None
Storage Length	-	135	-	-	-	0
Veh in Median Storage	,# 0	-	-	0	0	-
Grade, %	0	-		0	0	-
Peak Hour Factor	92	92	93	93	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mymt Flow	1371	0	0	810	0	0
WWWINC FIOW	10/1	0	0	010	0	0
	Major1		Major2	1	Minor1	
Conflicting Flow All	0	0	-	-	-	686
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-		3.32
Pot Cap-1 Maneuver	-	-	0	-	0	390
Stage 1		-	0	-	0	
Stage 2			0		0	-
			0		0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver		-	-	-		390
Mov Cap-2 Maneuver	-	-	-	-		-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		0	
HCM LOS	0		0		A	
HCM LUS					A	
Minor Lane/Major Mvm	it I	NBLn1	EBT	EBR	WBT	
		-	-	-	-	
Capacity (veh/h)			-	-	-	
Capacity (veh/h) HCM Lane V/C Ratio		-	-			
HCM Lane V/C Ratio		- 0	-	-	-	
HCM Lane V/C Ratio HCM Control Delay (s)		0			-	
HCM Lane V/C Ratio			-	-		

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Havdan One
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Background PM

5: Burger King Drwy & Hayden Road HCM 6th TWSC

latan attan	_	_	_	_	_	_	_	_	_	_	_	_
Intersection Int Delay, s/veh	1			_			_	_			_	
Int Delay, s/ven	1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	- 11	1	5	- 11	1		\$			4	
Traffic Vol, veh/h	7	1240	43	22	735	19	11	0	19	12	0	18
Future Vol, veh/h	7	1240	43	22	735	19	11	0	19	12	0	18
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	-	75	90	-	100	-	-	-	-	-	-
Veh in Median Storage	,# -	0	-	-	0	-	-	1	-	-	1	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	96	96	96	75	75	75	75	75	75
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	1378	48	23	766	20	15	0	25	16	0	24
Major/Minor N	Major1		1	Major2		1	Minor1			Minor2		
Conflicting Flow All	786	0	0	1426	0	0	1823	2226	689	1517	2254	383
Stage 1	- 100	-	0	1420	-	0	1394	1394	- 003	812	812	- 505
Stage 2							429	832		705	1442	
Critical Hdwy	4.14			4.14			7.54	6.54	6.94	7.54	6.54	6.94
Critical Hdwy Stg 1		-	-			-	6.54	5.54	0.04	6.54	5.54	0.04
Critical Hdwy Stg 2	-	_	-	-			6.54	5.54	-	6.54	5.54	-
Follow-up Hdwy	2.22			2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32
Pot Cap-1 Maneuver	829	-	-	473	-	-	48	43	388	82	41	615
Stage 1	- 020						149	207	-	339	390	-
Stage 2		-	-	-	-		574	382		393	196	-
Platoon blocked, %		-										
Mov Cap-1 Maneuver	829	-	-	473	-	-	44	40	388	73	39	615
Mov Cap-2 Maneuver				-			118	135	-	188	122	-
Stage 1	-	-	-	-	-	-	148	205	-	336	371	-
Stage 2				-	-		525	363		364	194	-
Annroach	EB			WB			NB			SB		
Approach		_			_		26		_	17.8		
HCM Control Delay, s	0.1			0.4								
HCM LOS							D			С		
Minor Lane/Major Mvm	t M	VBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			
Capacity (veh/h)		211	829	-	-	473	-	-	322			
HCM Lane V/C Ratio		0.19	0.009	-	-	0.048	-	-	0.124			
HCM Control Delay (s)		26	9.4	-	-	13	-	-	17.8			
HCM Lane LOS		D	А	-	-	В	-	-	С			
HCM 95th %tile Q(veh)		0.7	0	-	-	0.2	-	-	0.4			

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Hayden One Background PM

6: Northsight Boulevard & Hayden Road HCM 6th Roundabout

Intersection Delay, s/veh	14.6							
Intersection LOS	В							
Approach		EB		WB		NB		SB
Entry Lanes		2		2		2		1
Conflicting Circle Lanes		2		2		2		2
Adj Approach Flow, veh/h		1300		603		652		423
Demand Flow Rate, veh/h		1326		616		666		431
Vehicles Circulating, veh/h		298		565		1196		665
Vehicles Exiting, veh/h		798		1297		428		516
Ped Vol Crossing Leg, #/h		0		0		0		0
Ped Cap Adj		1.000		1.000		1.000	1	.000
Approach Delay, s/veh		12.1		8.7		26.7		12.3
Approach LOS		В		A		D		В
Lane	Left	Right	Left	Right	Left	Right	Left	
Designated Moves	LT	TR	LT	TR	LT	R	LTR	
Assumed Moves	LT	TR	LT	TR	LT	R	LTR	
RT Channelized								
Lane Util	0.470	0.530	0.471	0.529	0.482	0.518	1.000	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328	
Entry Flow, veh/h	623	703	290	326	321	345	431	
Cap Entry Lane, veh/h	1026	1102	803	878	449	514	807	
Entry HV Adj Factor	0.980	0.980	0.978	0.981	0.979	0.980	0.982	
Flow Entry, veh/h	611	689	284	320	314	338	423	
Cap Entry, veh/h	1006	1080	785	862	440	503	792	
V/C Ratio	0.607	0.638	0.361	0.371	0.715	0.672	0.534	
Control Delay, s/veh	12.0	12.2	9.0	8.5	29.7	23.9	12.3	
LOS	В	В	А	А	D	С	В	
95th %tile Queue, veh	4	5	2	2	6	5	3	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Configurations	5	^	1	ካካ	<u> </u>	1	3	ર્સ	1	5	ĥ	
Traffic Volume (vph)	5	1709	236	264	1350	13	426	8	701	23	29	
Future Volume (vph)	5	1709	236	264	1350	13	426	8	701	23	29	
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2	. 8	1	6		. 8	8	. 1	4	4	
Permitted Phases			2			6			8			
Detector Phase	5	2	8	1	6	6	8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	5.0	5.0	6.0	6.0	
Minimum Split (s)	11.0	38.7	47.0	11.0	25.7	25.7	47.0	47.0	11.0	44.3	44.3	
Total Split (s)	11.0	50.0	27.0	29.0	68.0	68.0	27.0	27.0	29.0	14.0	14.0	
Total Split (%)	9.2%	41.7%	22.5%	24.2%	56.7%	56.7%	22.5%	22.5%	24.2%	11.7%	11.7%	
Yellow Time (s)	4.0	4.7	4.0	4.0	4.7	4.7	4.0	4.0	4.0	3.3	3.3	
All-Red Time (s)	2.0	1.0	2.0	2.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.7	6.0	6.0	5.7	5.7	6.0	6.0	6.0	5.3	5.3	
Lead/Lag	Lag	Lead		Lag	Lead	Lead			Lag			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	None	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	5.0	49.6	74.9	23.0	76.4	76.4	19.6	19.6	43.8	7.0	7.0	
Actuated g/C Ratio	0.04	0.41	0.62	0.19	0.64	0.64	0.16	0.16	0.36	0.06	0.06	
v/c Ratio	0.09	0.89	0.26	0.44	0.41	0.01	0.89	0.80	1.22	0.35	0.51	
Control Delay	58.2	39.8	1.9	45.3	12.5	0.0	82.8	68.5	141.3	63.7	57.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	58.2	39.8	1.9	45.3	12.5	0.0	82.8	68.5	141.3	63.7	57.8	
LOS	E	D	А	D	В	А	F	E	F	E	E	
Approach Delay		35.3			17.8			116.2			59.9	
Approach LOS		D			В			F			E	
Internetion Commons												
Intersection Summary			_		_				_	_		
Cycle Length: 120 Actuated Cycle Length: 120												
Offset: 72 (60%), Reference		- 2.EDT -	nd G-M/D	T Stort of	Croor							
Natural Cvcle: 145	ed to phase	2.EDI 8		I, Start O	Green							
	undin at a d											
Control Type: Actuated-Coc Maximum v/c Ratio: 1.22	numated											
	0 0				atoro ot'-	n LOS: D						
Intersection Signal Delay: 4						of Service						
Intersection Capacity Utiliza Analysis Period (min) 15	10011 90.4%	D		I.	CO Level	OI SEIVICE	÷ F					
Analysis Fellou (IIIII) 15												
Splits and Phases: 7: Ha	yden Road	& Frank	Lloyd Wri	ight Boule	evard							
(0)				fi ø			T.	Ø4		Ø8		
🐨 Ø2 (R)				▼ (Ø)	1	_	14		27.0	1/28		
50 s												

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SB
Lane Configurations	ী	***	1	ሻሻ	*** 1350	1	ሻ	ર્ન	1	<u>۲</u>	₽	
Traffic Volume (veh/h)	5		236	264		13	426	8	701	23	29	1
Future Volume (veh/h)	5	1709	236	264	1350	13	426	8	701	23	29	1
Initial Q (Qb), veh	0 1.00	0	0	0	0	0 1.00	0 1.00	0	0 1.00	0 1.00	0	1.0
Ped-Bike Adj(A_pbT) 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	1.00	1.0
Work Zone On Approach	1.00	No	1.00	1.00	No	1.00	1.00	No	1.00	1.00	No	1.0
Adj Sat Flow, veh/h/ln	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	17
Adj Flow Rate, veh/h	6	1964	139	272	1303	5	459	0	533	34	43	17.
Peak Hour Factor	0.87	0.87	0.87	0.97	0.97	0.97	0.94	0.94	0.94	0.67	0.67	0.6
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	0.0
Cap, veh/h	151	1984	784	783	2790	780	517	0	589	79	83	
Arrive On Green	0.09	0.37	0.37	0.24	0.52	0.52	0.15	0.00	0.15	0.05	0.05	0.0
Sat Flow, veh/h	1688	5375	1502	3274	5375	1502	3375	0	1502	1688	1774	1
Grp Volume(v), veh/h	6	1964	139	272	1392	5	459	0	533	34	0	
Grp Sat Flow(s),veh/h/ln	1688	1792	1502	1637	1792	1502	1688	0	1502	1688	0	19
Q Serve(g_s), s	0.4	43.6	5.8	8.3	20.2	0.2	16.0	0.0	11.4	2.4	0.0	2
Cycle Q Clear(g_c), s	0.4	43.6	5.8	8.3	20.2	0.2	16.0	0.0	11.4	2.4	0.0	2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.
Lane Grp Cap(c), veh/h	151	1984	784	783	2790	780	517	0	589	79	0	9
V/C Ratio(X)	0.04	0.99	0.18	0.35	0.50	0.01	0.89	0.00	0.90	0.43	0.00	0.
Avail Cap(c_a), veh/h	151	1984	784	783	2790	780	591	0	622	122	0	14
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.
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.
Uniform Delay (d), s/veh	49.9	37.6	15.1	37.9	18.7	13.9	49.8 12.9	0.0	34.3	55.7	0.0	55
Incr Delay (d2), s/veh	0.0 0.0	17.9	0.5 0.0	0.1	0.6	0.0 0.0		0.0	15.6 0.0	1.4	0.0	1 0
Initial Q Delay(d3),s/veh %ile BackOfQ(50%),veh/In	0.0	0.0 22.0	2.9	0.0 3.3	0.0 8.4	0.0	0.0 7.7	0.0 0.0	4.9	0.0 1.0	0.0	1
Unsig. Movement Delay, s/veh		22.0	2.9	3.3	0.4	0.1	1.1	0.0	4.9	1.0	0.0	
LnGrp Delay(d),s/veh	50.0	55.6	15.6	38.0	19.4	13.9	62.7	0.0	49.9	57.0	0.0	57
LIGIP Delay(d), siven	D	55.0 E	13.0 B	00.0 D	13.4 B	13.5 B	62.7 E	A	43.3 D	57.0 E	A	JI
Approach Vol, veh/h	0	2109		0	1669			992	0		81	
Approach Delay, s/veh		52.9			22.4			55.8			57.4	
Approach LOS		D			C			E			E	
					-							
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	34.7	50.0		10.9	16.7	68.0		24.4				
Change Period (Y+Rc), s	6.0	5.7		* 5.3	6.0	5.7		6.0				
Max Green Setting (Gmax), s	23.0	44.3		* 8.7	5.0	62.3		21.0				
Max Q Clear Time (g_c+I1), s	10.3 0.2	45.6 0.0		4.8 0.0	2.4 0.0	22.2 4.8		18.0 0.4				
Green Ext Time (p_c), s	0.2	0.0		0.0	0.0	4.0		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			43.1									
HCM 6th LOS			D									
Notes												
User approved pedestrian inte User approved volume balanci * HCM 6th computational engi	ng amor	ng the lan	es for turr	ning mov	ement.		ing the ba	rrior				
HOW OUT COMPUTATIONAL ENGIN	ie requir	es equal	скагапсе	e unies fo	i uie pras	es crossi	ng uie ba	mer.				
05/30/2019										Sv	nchro 10	Don

	≯	-	4	+	1	Ť	1	1	Ŧ	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	
Lane Configurations	٦	↑ ĵ,	٦	↑ ĵ,	٦	1	7	٦	f,	
Traffic Volume (vph)	19	576	48	444	28	27	93	18	17	
Future Volume (vph)	19	576	48	444	28	27	93	18	17	
Turn Type	Perm	NA	Perm		pm+pt	NA	Perm	Perm	NA	
Protected Phases		6		2	7	4			8	
Permitted Phases	6		2		4		4	8		
Detector Phase	6	6	2	2	7	4	4	8	8	
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	5.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	26.9	26.9	26.9	26.9	9.6	32.4	32.4	32.4	32.4	
Total Split (s)	76.0	76.0	76.0	76.0	24.0	44.0	44.0	20.0	20.0	
Total Split (%)	63.3%	63.3%	63.3%	63.3%	20.0%	36.7%	36.7%	16.7%	16.7%	
Yellow Time (s)	4.7	4.7	4.7	4.7	3.0	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.2	1.2	1.2	1.2	1.6	1.8	1.8	1.8	1.8	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.9	5.9	5.9	5.9	4.6	5.4	5.4	5.4	5.4	
Lead/Lag					Lead			Lag	Lag	
Lead-Lag Optimize?					Yes			Yes	Yes	
Recall Mode	None	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	93.0	93.0	93.0	93.0	16.5	15.7	15.7	8.0	8.0	
Actuated g/C Ratio	0.78	0.78	0.78	0.78	0.14	0.13	0.13	0.07	0.07	
v/c Ratio	0.03	0.23	0.10	0.19	0.23	0.14	0.40	0.33	0.27	
Control Delay	4.9	4.6	5.2	4.3	45.2	43.4	11.3	63.3	47.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.9	4.6	5.2	4.3	45.2	43.4	11.3	63.3	47.5	
LOS	А	A	A	A	D	D	В	E	D	
Approach Delay		4.6		4.4		23.5			54.4	
Approach LOS		A		A		С			D	
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 2 (2%), Referenced to	o phase 2	WBTL, S	tart of Gr	een						
Natural Cycle: 70										
Control Type: Actuated-Cool	rdinated									
Maximum v/c Ratio: 0.40										
Intersection Signal Delay: 8.				lr	ntersectio	n LOS: A				
Intersection Capacity Utilizat	tion 46.7%			10	CU Level	of Service	e A			
Analysis Period (min) 15										
Colite and Dhasas: 1.92-	Diago 9		lood							
Splits and Phases: 1:83rd	Place &	nayaen h	060							
Ø2 (R)							1	Ø4		
76 s							44 s			
								Ø7		₽ 08

								-				
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Configurations	7	† 1>		<u> </u>	† î≽		5	1	1	5	î,	
Traffic Volume (veh/h)	19	576	20	48	444	47	28	27	93	18	17	
Future Volume (veh/h)	19	576	20	48	444	47	28	27	93	18	17	
Initial Q (Qb), veh	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		
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	
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	
Adj Flow Rate, veh/h	21	647	10	53	493	35	36	35	89	28	27	
Peak Hour Factor	0.89	0.89	0.89	0.90	0.90	0.90	0.77	0.77	0.77	0.64	0.64	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	685	2973	46	608	2794	198	155	231	176	120	87	
Arrive On Green	0.79	0.79	0.79	0.79	0.79	0.79	0.03	0.12	0.12	0.05	0.05	
Sat Flow, veh/h	829	3770	58	736	3543	251	1688	1969	1502	1200	1741	
Grp Volume(v), veh/h	21	321	336	53	260	268	36	35	89	28	0	
Grp Sat Flow(s),veh/h/ln	829	1870	1958	736	1870	1924	1688	1969	1502	1200	0	
Q Serve(g_s), s	0.8	5.3	5.3	2.4	4.1	4.1	2.4	1.9	6.7	2.7	0.0	
Cycle Q Clear(g_c), s	4.9	5.3	5.3	7.6	4.1	4.1	2.4	1.9	6.7	2.7	0.0	
Prop In Lane	1.00		0.03	1.00		0.13	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	685	1475	1544	608	1475	1517	155	231	176	120	0	
V/C Ratio(X)	0.03	0.22	0.22	0.09	0.18	0.18	0.23	0.15	0.51	0.23	0.00	
Avail Cap(c_a), veh/h	685	1475	1544	608	1475	1517	378	633	483	206	0	
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	
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	3.7	3.2	3.2	4.2	3.1	3.1	50.2	47.6	49.7	55.5	0.0	
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.1	0.8	0.4	0.0	
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	
%ile BackOfQ(50%),veh/ln	0.1	1.6	1.7	0.4	1.4	1.4	1.0	1.0	2.6	0.8	0.0	
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.7	3.3	3.3	4.5	3.4	3.4	50.5	47.7	50.5	55.8	0.0	
LnGrp LOS	A	A	A	A	А	A	D	D	D	E	A	
Approach Vol, veh/h		678			581			160			58	
Approach Delay, s/veh		3.3			3.5			49.9			55.8	
Approach LOS		А			А			D			E	
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		100.5		19.5		100.5	8.1	11.4				
Change Period (Y+Rc), s		* 5.9		* 5.4		* 5.9	* 4.6	* 5.4				
Max Green Setting (Gmax), s		* 70		* 39		* 70	* 19	* 15				
Max Q Clear Time (q c+I1), s		9.6		8.7		7.3	4.4	4.7				
Green Ext Time (p_c), s		1.3		0.2		1.5	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay			10.5									
HCM 6th LOS			B									
			5									
Notes	14.2	1 11										
User approved pedestrian inter * HCM 6th computational engin						ses cross	ing the ba	arrier.				
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Hayden One Total AM

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19-ZN-2013#2 8/8/2019

1: 83rd Place & Hayden Road HCM 6th Signalized Intersection Summary

Hayden One Total AM										2:	Cost	co Dr	wy & Hayden Roa HCM 6th TWS
Intersection													
Int Delay, s/veh	2.3												
-													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	<u> </u>	<u>^</u>	1	<u> </u>	_ ≜ ⊅				7		÷		
Traffic Vol, veh/h	38	607	27	98	519	12	3	0	91	8	0	11	
Future Vol, veh/h	38	607	27	98	519	12	3	0	91	8	0	11	
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	135	-	135	175	-	-	-	-	0	-	-	-	
Veh in Median Storage,		0	-	-	0	-	-	0	-	-	1	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	91	91 2	91	96	96 2	96	72	72	72	43	43	43	
Heavy Vehicles, %	2 42	667	2 30	2	2 541	2 13	2		2	2	2	2 26	
Mvmt Flow	42	667	30	102	541	13	4	0	126	19	0	20	
Major/Minor N	lajor1		Ν	/lajor2		1	Minor1		I	/linor2			
Conflicting Flow All	554	0	0	697	0	0	1226	-	334	1170	1533	277	
Stage 1	-	-	-	-	-	-	751	-	-	752	752	-	
Stage 2	-	-	-	-	-	-	475	-	-	418	781	-	
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	-	6.94	7.54	6.54	6.94	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	-	-	6.54	5.54	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	-	-	6.54	5.54	-	
Follow-up Hdwy	2.22	-	-	2.22	-	-	3.52	-	3.32	3.52	4.02	3.32	
Pot Cap-1 Maneuver	1012	-	-	895	-	-	135	0	662	148	115	720	
Stage 1	-	-	-	-	-	-	369	0	-	368	416	-	
Stage 2	-	-	-	-	-	-	539	0	-	583	403	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	1012	-	-	895	-	-	115	-	662	106	98	720	
Mov Cap-2 Maneuver	-	-	-	-	-	-	115	-	-	209	190	-	
Stage 1	-	-	-	-	-		354	-	-	353	369	-	
Stage 2	-	-	-	-	-	-	461	-	-	452	386	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.5			1.5			11.7			16.6			
HCM LOS	0.0						В			C			
Minor Lane/Major Mvmt		NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SRI n1				
		662	1012	EDI	LDIX	895	1001	WDIX (355				
Capacity (veh/h)					-		-	-					
HCM Lane V/C Ratio		0.191	0.041 8.7	-	-	0.114 9.5	-	-	0.124				
HCM Control Delay (s) HCM Lane LOS		H.7 B	0.7 A	-		9.5 A			10.0 C				

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Hayden One Total AM

3: 84th Street & Hayden Road HCM 6th TWSC

Int Delay, s/veh	2.8									0.01			
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations Traffic Vol, veh/h	10	↑↑ 629		104	†	75	1 25	€	63	00		13	
Future Vol, veh/h	18		32 32	121 121	606	75	25 25	2		28	0	13	
	18	629 0	32	121	606 0	75 0	25	2	63 0	28 0	0	13	
Conflicting Peds, #/hr	-	-	-	-	-			-			-	-	
Sign Control RT Channelized	Free -		Free	Free -	Free	Free None	Stop	Stop	Stop	Stop -	Stop	Stop	
Storage Length	135		None 100	- 145	-	None -	- 0	-	None		-	None	
			100	145	0	-	-	- 1	-	-	- 1	-	
Veh in Median Storage, Grade, %					0			0			0	-	
Grade, % Peak Hour Factor	95	0 95	- 95	- 93	93	93	- 90	90	- 90	- 56	56	- 56	
	95		95	93	93	93	90	90	90	2	2	2	
Heavy Vehicles, %	2 19		34	130	652	81	28	2	70	2 50	2	23	
Mvmt Flow	19	002	- 34	130	052	01	28	2	70	50	0	23	
Major/Minor M	ajor1		1	Major2			Minor1		N	/linor2	_		
Conflicting Flow All	733	0	0	696	0	0		1693	331	1323	1687	367	
Stage 1		-	-	- 000	-	-	700	700	-	953	953		
Stage 2							586	993		370	734		
Critical Hdwy	4.14			4.14			7.54	6.54	6.94	7.54	6.54	6.94	
Critical Hdwy Stg 1			-			-	6.54	5.54	- 0.54	6.54	5.54	- 0.04	
Critical Hdwy Stg 7		-				-	6.54	5.54	-	6.54	5.54	-	
Follow-up Hdwy	2.22			2.22			3.52	4.02	3.32	3.52	4.02	3.32	
Pot Cap-1 Maneuver	868			896	-	-	122	92	665	114	93	630	
Stage 1	- 000			- 050			396	440	- 005	278	336	- 000	
Stage 2	-		-	-	-	-	463	322	-	622	424	-	
Platoon blocked, %								022		ULL			
Mov Cap-1 Maneuver	868		-	896		-	103	77	665	88	78	630	
Mov Cap-2 Maneuver	-			-			218	179	-	188	166	-	
Stage 1	-		-	-	-	-	387	430	-	272	287	-	
Stage 2							381	275		542	415		
Oldgo 2							001	210		0.12	-10		
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.2			1.5			15			26.2			
HCM LOS							С			D			
Minor Lane/Major Mvmt		NBLn1		EBL	EBT	EBR	WBL	WBT	WBR			_	
Capacity (veh/h)		218	614	868	-	-	896	-	-	242			
			0.118			-		-		0.303			
HCM Lane V/C Ratio		23.9	11.6	9.2	-	-	9.7	-	-	26.2			
HCM Control Delay (s)						-	A	-	-	D			
		C 0.4	B 0.4	A 0.1	-	-	0.5	-	-	1.2			

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Hayden One Total AM

Intersection

4: Northeast Access & Hayden Road HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	<u></u>	1		101		1
Traffic Vol, veh/h	707	20	0	803	0	15
Future Vol, veh/h	707	20	0	803	0	15
Conflicting Peds, #/hr		20	0	003	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-		-	None	-	
Storage Length	-	135		-	-	0
Veh in Median Storag				0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	93	93	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	768	22	0	863	0	17
N. 1. 10.17					<i>P</i> 4	
Major/Minor	Major1		Major2		/linor1	
Conflicting Flow All	0	0		-	-	384
Stage 1	-		-			
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-		-	3.32
Pot Cap-1 Maneuver	-	-	0	-	0	614
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %		-	· ·		· ·	
Mov Cap-1 Maneuver		_		_		614
Mov Cap-1 Maneuver Mov Cap-2 Maneuver		-	-	-		- 014
Stage 1	-	-	-	-	-	-
Stage 2	-			-	-	-
Approach	EB		WB		NB	
HCM Control Delay, s			0		11	
HCM LOS	v		Ŭ		В	
TIOW LOG					٥	
Minor Lane/Major Mvr	nt	NBLn1	EBT	EBR	WBT	
Capacity (veh/h)		614	-	-	-	
HCM Lane V/C Ratio		0.027		-		
HCM Control Delay (s)	11	-	-	-	
HCM Lane LOS	/	В	-			
		0.4				

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HCM 95th %tile Q(veh)

0.1 - - -

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Hayden One Total AM

5: Burger King Drwy & Hayden Road HCM 6th TWSC

Intersection Int Delay, s/veh	0.8												
	EBL	EBT		WBL			NDI	NDT		SBL	ODT	SBR	
Movement			EBR		WBT	WBR	NBL	NBT	NBR	SDL	SBT	SDK	
Lane Configurations Traffic Vol, veh/h	ካ 4	↑↑ 669	1 45	أ 44	↑↑ 769	12	13	↔ 0	15	3	↔ 0	2	
	4					12	13	0	15	3			
Future Vol, veh/h	4	669 0	45 0	44 0	769 0	12	13	0	15	3	0	2	
Conflicting Peds, #/hr	-	-		-	-	-	-	-	-	-	-	-	
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-		None	-	-	None	-		None			None	
Storage Length	100	-	75	90	-	100	-	-	-	-	-	-	
Veh in Median Storage,		0	-	-	0	-	-	1	-	-	0		
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	93	93	93	96	96	96	78	78	78	63	63	63	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	4	719	48	46	801	13	17	0	19	5	0	3	
				4 . 0			<i>a i</i>						
	Major1			Major2	-		Minor1	4000		/linor2	4000	101	
Conflicting Flow All	814	0	0	767	0	0	1220	1633	360	1261	1668	401	
Stage 1	-	-	-	-	-	-	727	727	-	893	893	-	
Stage 2	-	-	-	-	-	-	493	906	-	368	775	-	
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94	
Critical Hdwy Stg 1	-	-	-	-		-	6.54	5.54	-	6.54	5.54	-	
Critical Hdwy Stg 2	-	-	-	-		-	6.54	5.54	-	6.54	5.54	-	
Follow-up Hdwy	2.22	-	-	2.22		-	3.52	4.02	3.32	3.52	4.02	3.32	
Pot Cap-1 Maneuver	809	-	-	842		-	136	100	637	127	95	599	
Stage 1	-	-	-	-	-	-	381	427	-	303	358	-	
Stage 2	-	-	-	-	-	-	526	353	-	624	406	-	
Platoon blocked, %		-	-		-	-							
Mov Cap-1 Maneuver	809	-	-	842		-	129	94	637	118	89	599	
Mov Cap-2 Maneuver	-	-	-	-	-	-	253	212	-	118	89	-	
Stage 1	-	-	-	-	-	-	379	425	-	301	338	-	
Stage 2	-	-	-	-	-	-	495	334	-	602	404	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.1			0.5			15.6			26.7			
HCM LOS							С			D			
					-			1100					
Minor Lane/Major Mvm	t	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1			_	
Capacity (veh/h)		374	809		-	842			174				
HCM Lane V/C Ratio			0.005	-	-	0.054	-		0.046				
HCM Control Delay (s)		15.6	9.5	-	-	9.5	-	-					
HCM Lane LOS		C	A	-	-	A	-	-	D				
HCM 95th %tile Q(veh)		0.3	0	-	-	0.2	-	-	0.1				

Hayden One Total AM

6: Northsight Boulevard & Hayden Road HCM 6th Roundabout

Intersection Delay, s/veh	8.1							
Intersection LOS	A							
Approach		EB		WB		NB		SB
Entry Lanes		2		2		2		1
Conflicting Circle Lanes		2		2		2		2
Adj Approach Flow, veh/h		584		718		384		365
Demand Flow Rate, veh/h		596		732		391		372
Vehicles Circulating, veh/h		270		384		520		820
Vehicles Exiting, veh/h		922		527		346		296
Ped Vol Crossing Leg, #/h		0		0		0		0
Ped Cap Adj		1.000		1.000		1.000	1	.000
Approach Delay, s/veh		6.0		7.8		6.7		13.4
Approach LOS		A		A		А		В
Lane	Left	Right	Left	Right	Left	Right	Left	
Designated Moves	LT	TR	LT	TR	LT	R	LTR	
Assumed Moves	LT	TR	LT	TR	LT	R	LTR	
RT Channelized								
Lane Util	0.470	0.530	0.470	0.530	0.570	0.430	1.000	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328	
Entry Flow, veh/h	280	316	344	388	223	168	372	
Cap Entry Lane, veh/h	1053	1129	948	1025	837	913	707	
Entry HV Adj Factor	0.980	0.980	0.981	0.981	0.981	0.982	0.981	
Flow Entry, veh/h	275	310	337	381	219	165	365	
Cap Entry, veh/h	1032	1106	930	1005	820	896	694	
V/C Ratio	0.266	0.280	0.363	0.379	0.267	0.184	0.526	
Control Delay, s/veh	6.1	5.9	7.9	7.6	7.3	5.8	13.4	
LOS	А	А	А	А	А	А	В	
95th %tile Queue, veh	1	1	2	2	1	1	3	

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Hayden One 7: Hayden Road & Frank Lloyd Wright Boulevard Total AM Timings ⊁ . * Lane Group EBL EBT EBR WBL WBT SBT WBR NBL NBT SBL **†††** 1100 **†††** 1321 Lane Configurations × **ካካ** 428 4 1. Traffic Volume (vph) 214 206 29 283 4 Future Volume (vph) 4 1100 206 428 1321 29 214 12 283 12 8 NA pm+ov Turn Type Prot NA pm+ov Prot NA Perm Split Split NA Protected Phases 5 2 8 6 8 8 4 4 1 1 Permitted Phases 2 8 Detector Phase 5 2 8 8 4 4 8 1 6 6 1 Switch Phase Minimum Initial (s) 5.0 10.0 5.0 5.0 10.0 10.0 5.0 5.0 5.0 6.0 6.0 Minimum Split (s) 11.0 38.7 47.0 11.0 25.7 25.7 47.0 47.0 11.0 44.3 44.3 12.0 Total Split (s) 11.0 35.0 33.0 40.0 64.0 64.0 33.0 33.0 40.0 12.0 53.3% Total Split (%) 9.2% 29.2% 27.5% 33.3% 53.3% 27.5% 27.5% 33.3% 10.0% 10.0% 3.3 Yellow Time (s) 4.0 4.7 4.0 4.0 4.7 4.7 4.0 4.0 4.0 3.3 All-Red Time (s) 2.0 1.0 2.0 2.0 1.0 1.0 2.0 2.0 2.0 2.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Lost Time Adjust (s) 0.0 0.0 0.0 0.0 Total Lost Time (s) 6.0 6.0 5.7 5.7 6.0 6.0 6.0 5.3 5.3 5.7 6.0 Lead/Lag Lag Lead Lag Lead Lead Lag Lead-Lag Optimize? Yes Yes Yes Yes Yes Yes Recall Mode None C-Max None None C-Max C-Max None None None None None Act Effct Green (s) 5.0 57.6 75.9 86.6 12.6 12.6 40.2 6.1 6.1 25.2 86.6 Actuated g/C Ratio 0.04 0.48 0.63 0.21 0.72 0.72 0.10 0.10 0.34 0.05 0.05 0.14 v/c Ratio 0.07 0.50 0.23 0.70 0.38 0.03 0.72 0.64 0.50 0.18 57.5 59.5 47.7 Control Delay 24.6 2.2 49.4 8.4 0.0 74.9 66.3 13.9 Queue Delay 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 47.7 Total Delay 57.5 24.6 49.4 74.9 66.3 13.9 59.5 2.2 8.4 0.0 LOS E С D А E Е В E D Α А 53.8 Approach Delay 21.2 18.2 39.1 Approach LOS В D D С Intersection Summary Cycle Length: 120 Actuated Cycle Length: 120 Offset: 103 (86%), Referenced to phase 2:EBT and 6:WBT, Start of Green Natural Cycle: 145 Control Type: Actuated-Coordinate Maximum v/c Ratio: 0.72 Intersection Signal Delay: 22.3 Intersection LOS: C Intersection Capacity Utilization 60.8% ICU Level of Service B Analysis Period (min) 15 Splits and Phases: 7: Hayden Road & Frank Lloyd Wright Boulevard 108 101 Ø4 ₩⁰Ø2 (R) Ø6 (R) .≯ ø₅ 11 s 05/30/2019 Synchro 10 Report CivTech BR Page 8

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Lane Group	EE
ane Configurations	1		1	ኘኘ		1	100		1	5000	12	0011	Lane Configurations	
Fraffic Volume (veh/h)	4	↑↑↑ 1100	206	428	††† 1321	29	214	କୀ 12	283	12	8	3	Traffic Volume (vph)	
Future Volume (veh/h)	4	1100	206	428	1321	29	214	12	283	12	8	3	Future Volume (vph)	1
nitial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0	Turn Type	Per
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00	Protected Phases	
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	Permitted Phases	
Nork Zone On Approach		No			No			No			No		Detector Phase	
Adj Sat Flow, veh/h/ln	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772	Switch Phase	
Adj Flow Rate, veh/h	5	1294	154	476	1468	21	237	0	195	15	10	2	Minimum Initial (s)	10
Peak Hour Factor	0.85	0.85	0.85	0.90	0.90	0.90	0.94	0.94	0.94	0.82	0.82	0.82	Minimum Split (s)	26
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2	Total Split (s)	76
Cap, veh/h	346	1312	499	1462	2611	730	296	0	803	50	47	9	Total Split (%)	63.3
Arrive On Green	0.20	0.24 5375	0.24 1502	0.45 3274	0.49 5375	0.49 1502	0.09 3375	0.00 0	0.09 1502	0.03 1688	0.03 1593	0.03	Yellow Time (s) All-Red Time (s)	4
Sat Flow, veh/h	5	1294	1502	476	1468	21	237	0			0	319	Lost Time Adjust (s)	0.
Grp Volume(v), veh/h Grp Sat Flow(s),veh/h/ln		1294	154	1637		1502	1688	0	195 1502	15 1688	0	12 1911	Total Lost Time (s)	5.
Q Serve(g_s), s	1688 0.3	28.8	9.2	11.3	1792 23.2	0.9	8.3	0.0	0.0	1.0	0.0	0.7	Lead/Lag	J.
Cycle Q Clear(g_c), s	0.3	28.8	9.2	11.3	23.2	0.9	8.3	0.0	0.0	1.0	0.0	0.7	Lead-Lag Optimize?	
Prop In Lane	1.00	20.0	1.00	1.00	20.2	1.00	1.00	0.0	1.00	1.00	0.0	0.17	Recall Mode	Non
ane Grp Cap(c), veh/h	346	1312	499	1462	2611	730	296	0	803	50	0	57	Act Effct Green (s)	93.
//C Ratio(X)	0.01	0.99	0.31	0.33	0.56	0.03	0.80	0.00	0.24	0.30	0.00	0.21	Actuated g/C Ratio	0.7
Avail Cap(c a), veh/h	346	1312	499	1462	2611	730	759	0	1009	94	0	107	v/c Ratio	0.0
ICM 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	Control Delay	4.
Jpstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	Queue Delay	0.
Jniform Delay (d), s/veh	38.0	45.1	29.8	21.5	21.8	16.1	53.7	0.0	14.9	57.0	0.0	56.8	Total Delay	4.
ncr Delay (d2), s/veh	0.0	21.7	1.6	0.0	0.9	0.1	1.9	0.0	0.1	1.2	0.0	0.7	LOS	
nitial 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	Approach Delay	
%ile BackOfQ(50%),veh/In	0.1	15.3	4.0	4.3	9.8	0.3	3.6	0.0	2.8	0.5	0.0	0.4	Approach LOS	
Jnsig. Movement Delay, s/veh													Intersection Summary	
_nGrp Delay(d),s/veh	38.0	66.9	31.4	21.5	22.7	16.2	55.6	0.0	15.0	58.2	0.0	57.5	Cycle Length: 120	
nGrp LOS	D	E	С	С	С	В	E	A	В	E	A	E	Actuated Cycle Length: 12	0
Approach Vol, veh/h		1453			1965			432			27		Offset: 2 (2%), Referenced	
Approach Delay, s/veh		63.0			22.4			37.3			57.9		Natural Cycle: 70	
Approach LOS		E			С			D			E		Control Type: Actuated-Co	ordinated
Timer - Assigned Phs	1	2		4	5	6		8					Maximum v/c Ratio: 0.40	
Phs Duration (G+Y+Rc), s	59.6	35.0		8.9	30.6	64.0		16.5					Intersection Signal Delay:	
Change Period (Y+Rc), s	6.0	5.7		* 5.3	6.0	5.7		6.0					Intersection Capacity Utiliz	ation 46.7
Max Green Setting (Gmax), s	34.0	29.3		* 6.7	5.0	58.3		27.0					Analysis Period (min) 15	
Max Q Clear Time (g_c+I1), s		30.8		3.0	2.3	25.2		10.3						
Green Ext Time (p_c), s	0.3	0.0		0.0	0.0	5.1		0.3					Splits and Phases: 1:83	ard Place
ntersection Summary													Ø2 (R)	
HCM 6th Ctrl Delay			39.5										76 s	
HCM 6th LOS			D											
												_		
lotes	1.4 - 2	1											/6 S	
Jser approved pedestrian inte												_		
Jser approved volume balanci							a a dha d							
HCM 6th computational engin	ne requir	res equal	clearance	e times fo	r the phas	ses crossi	ing the ba	arrier.						
)5/30/2019										0	nchro 10	_	08/02/2019	

	٦	-	1	-	1	1	1	1	Ļ	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	
Lane Configurations	3	≜ †⊅	5	≜ †}	<u> </u>	1	1	5	₽ 17	
Traffic Volume (vph)	19	576	48	444	28	27	93	18	17	
Future Volume (vph)	19	576	48	444	28	27	93	18	17	
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	
Protected Phases		6		2	7	4			8	
Permitted Phases	6		2		4		4	8		
Detector Phase	6	6	2	2	7	4	4	8	8	
Switch Phase										
Vinimum Initial (s)	10.0	10.0	10.0	10.0	5.0	7.0	7.0	7.0	7.0	
Vinimum Split (s)	26.9	26.9	26.9	26.9	9.6	32.4	32.4	32.4	32.4	
Total Split (s)	76.0	76.0	76.0	76.0	24.0	44.0	44.0	20.0	20.0	
Total Split (%)	63.3%	63.3%	63.3%	63.3%	20.0%	36.7%	36.7%	16.7%	16.7%	
Yellow Time (s)	4.7	4.7	4.7	4.7	3.0	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.2	1.2	1.2	1.2	1.6	1.8	1.8	1.8	1.8	
Lost Time Adjust (s)	0.0	0.0	0.0 5.9	0.0 5.9	0.0	0.0	0.0 5.4	0.0	0.0	
Total Lost Time (s) Lead/Lag	5.9	5.9	5.9	5.9	4.6 Lead	5.4	5.4	5.4 Lag	5.4 Lag	
Lead-Lag Optimize?					Yes			Yes	Yes	
Recall Mode	None	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	93.0	93.0	93.0	93.0	16.5	15.7	15.7	8.0	8.0	
Actuated g/C Ratio	0.78	0.78	0.78	0.78	0.14	0.13	0.13	0.07	0.07	
v/c Ratio	0.03	0.23	0.10	0.19	0.23	0.14	0.40	0.33	0.27	
Control Delay	4.9	4.6	4.4	3.5	45.2	43.4	11.3	63.3	47.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	4.9	4.6	4.4	3.5	45.2	43.4	11.3	63.3	47.5	
LOS	A	A	А	А	D	D	В	E	D	
Approach Delay		4.6		3.6		23.5			54.4	
Approach LOS		А		A		С			D	
Intersection Summary										
Cvcle Lenath: 120										
Actuated Cycle Length: 120										
Offset: 2 (2%), Referenced		WBTL, S	tart of Gr	een						
Natural Cycle: 70										
Control Type: Actuated-Coc	rdinated									
Maximum v/c Ratio: 0.40										
Intersection Signal Delay: 8					ntersectio					
Intersection Capacity Utiliza	tion 46.7%	1		10	CU Level	of Service	θA			
Analysis Period (min) 15										
Splits and Phases: 1: 83r	d Place &	Havdon	Poad							
		laydenn	loau				≜			
🛒 Ø2 (R)							1	Ø4		
76 s							44 s			
								Ø7		
76 s							24 s			20 s
										Synchro 10 Repor
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layden One otal AM Mitigated								1:83n HCM 6t	d Plac h Signaliz		,	
	۶	-	\mathbf{r}	•	-	×	1	t	/	1	ţ	1
ovement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Configurations	<u> </u>	≜ 1}		٦	≜ †⊅		<u>1</u>	1	1	٦	4	
c Volume (veh/h)	19	576	20	48	444	47	28	27	93	18	17	6
e Volume (veh/h)	19	576	20	48	444	47	28	27	93	18	17	6
Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
ke Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
ng 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
Zone On Approach		No	(== 0	(== 0	No	(No	(No	
at Flow, veh/h/ln	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
ow Rate, veh/h Hour Factor	21	647	10	53	493 0.90	35	36	35	89	28	27	3
	0.89 2	0.89 2	0.89 2	0.90 2	0.90	0.90 2	0.77 2	0.77 2	0.77 2	0.64 2	0.64 2	0.64
t Heavy Veh, % eh/h	714	2973	46	608	2794	198	155	231	176	120	87	10
Green	0.79	0.79	40	1.00	1.00	1.00	0.03	0.12	0.12	0.05	0.05	0.05
veh/h	829	3770	58	736	3543	251	1688	1969	1502	1200	1741	193
me(v), veh/h	21	321	336	53	260	268	36	35	89	28	0	30
Flow(s), veh/h/ln	829	1870	1958	736	1870	1924	1688	1969	1502	1200	0	1934
e(g_s), s	02.5	5.3	5.3	0.5	0.0	0.0	2.4	1.9	6.7	2.7	0.0	1.8
Q Clear(g_c), s	0.7	5.3	5.3	5.8	0.0	0.0	2.4	1.9	6.7	2.7	0.0	1.8
ane	1.00	0.0	0.03	1.00	5.0	0.13	1.00		1.00	1.00	2.0	0.10
o Cap(c), veh/h	714	1475	1544	608	1475	1517	155	231	176	120	0	96
o(X)	0.03	0.22	0.22	0.09	0.18	0.18	0.23	0.15	0.51	0.23	0.00	0.31
Cap(c_a), veh/h	714	1475	1544	608	1475	1517	378	633	483	206	0	235
atoon Ratio	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00
am Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00
m Delay (d), s/veh	2.8	3.2	3.2	0.2	0.0	0.0	50.2	47.6	49.7	55.5	0.0	55.0
elay (d2), s/veh	0.0	0.0	0.0	0.3	0.3	0.3	0.3	0.1	0.8	0.4	0.0	0.7
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
ckOfQ(50%),veh/In	0.1	1.6	1.7	0.0	0.1	0.1	1.0	1.0	2.6	0.8	0.0	0.9
Movement Delay, s/veh												
Delay(d),s/veh	2.8	3.3	3.3	0.4	0.3	0.3	50.5	47.7	50.5	55.8	0.0	55.7
S	A	A	A	A	A	A	D	D	D	E	A	E
h Vol, veh/h		678			581			160			58	
ch Delay, s/veh ch LOS		3.3 A			0.3 A			49.9 D			55.8 E	_
111105		A			A			U			E	
Assigned Phs		2		4		6	7	8				
ration (G+Y+Rc), s		100.5		19.5		100.5	8.1	11.4				
e Period (Y+Rc), s		* 5.9		* 5.4		* 5.9	* 4.6	* 5.4				
n Setting (Gmax), s		* 70		* 39		* 70	* 19	* 15				
Clear Time (g_c+l1), s		7.8		8.7		7.3	4.4	4.7				
xt Time (p_c), s		1.3		0.2		1.5	0.0	0.1				
tion Summary												
Sth Ctrl Delay			9.2									
th LOS			A									
												_
oproved pedestrian inte 6th computational engi						ses cross	ing the ba	arrier.				
019										Sy	nchro 10	Report
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Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations	۲	^	1	٦	≜ †₽	1	f,	٦	ĥ	
Traffic Volume (vph)	18	629	32	121	606	25	2	28	0	
Future Volume (vph)	18	629	32	121	606	25	2	28	0	
Turn Type	Perm	NA	Perm	pm+pt	NA	Perm	NA	Perm	NA	
Protected Phases		2		1	6		8		4	
Permitted Phases	2		2	6		8		4		
Detector Phase	2	2	2	1	6	8	8	4	4	
Switch Phase										
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	23.9	23.9	23.9	9.5	23.9	23.4	23.4	23.4	23.4	
Total Split (s)	67.0	67.0	67.0	26.0	93.0	27.0	27.0	27.0	27.0	
Total Split (%)	55.8%	55.8%	55.8%	21.7%	77.5%	22.5%	22.5%	22.5%	22.5%	
Yellow Time (s)	4.7	4.7	4.7	3.5	4.7	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.2	1.2	1.2	1.0	1.2	1.8	1.8	1.8	1.8	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.9	5.9	5.9	4.5	5.9	5.4	5.4	5.4	5.4	
Lead/Lag	Lag	Lag	Lag	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes						
Recall Mode	C-Max	C-Max	C-Max	None	C-Max	None	None	None	None	
Act Effct Green (s)	90.8	90.8	90.8	103.7	103.5	8.5	8.5	8.5	8.5	
Actuated g/C Ratio	0.76	0.76	0.76	0.86	0.86	0.07	0.07	0.07	0.07	
v/c Ratio	0.04	0.25	0.03	0.22	0.24	0.30	0.39	0.35	0.03	
Control Delay	5.1	4.9	0.3	2.5	2.1	60.0	18.9	62.8	0.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	5.1	4.9	0.3	2.5	2.1	60.0	18.9	62.8	0.2	
LOS	A	A	A	A	A	E	B	E	A	
Approach Delay		4.7			2.2	_	30.4	_	43.3	
Approach LOS		A			A		C		D	
••		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		0		U	
Intersection Summary							_			
Cycle Length: 120										
Actuated Cycle Length: 120										
Offset: 0 (0%), Referenced to	o phase 2	EBIL an	d 6:WB1	L, Start o	t Green					
Natural Cycle: 60										
Control Type: Actuated-Cool	rdinated									
Maximum v/c Ratio: 0.39										
Intersection Signal Delay: 5.					ntersectio					
Intersection Capacity Utilizat	ion 45.1%			1	CU Level	ot Servic	e A			
Analysis Period (min) 15										
Splits and Phases: 3: 84th	Street P	Havdon	Pood							
opino anu Priases. 3: 84tr	Street &	nayuen F	UBU							
Ø1	🖕 🔶 👳	2 (R)							- I 🖓	14
26 s	67 s						_		27 s	
Ø6 (R)									_ I ™ø	

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SE
Lane Configurations	- N	^	1	<u>۲</u>	↑ 1≽		٦	ef 🗧		<u>٦</u>	¢Î	
Traffic Volume (veh/h)	18	629	32	121	606	75	25	2	63	28	0	
Future Volume (veh/h)	18	629	32	121	606	75	25	2	63	28	0	
Initial Q (Qb), veh	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.
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.
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	17
Adj Flow Rate, veh/h	20	699	19	134	673	50	28	2	31	31	0	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	593	2881	1156	628	2996	222	132	6	90	110	0	
Arrive On Green	0.77	0.77	0.77	0.04	0.85	0.85	0.06	0.06	0.06	0.06	0.00	0.
Sat Flow, veh/h	692	3741	1502	1688	3530	262	1337	102	1582	1303	0	16
Grp Volume(v), veh/h	20	699	19	134	356	367	28	0	33	31	0	
Grp Sat Flow(s),veh/h/ln	692	1870	1502	1688	1870	1922	1337	0	1684	1303	0	16
Q Serve(g_s), s	0.8	6.3	0.4	1.8	4.3	4.3	2.4	0.0	2.3	2.8	0.0	(
Cycle Q Clear(g_c), s	0.8	6.3	0.4	1.8	4.3	4.3	2.8	0.0	2.3	5.1	0.0	(
Prop In Lane	1.00		1.00	1.00		0.14	1.00		0.94	1.00		1.
Lane Grp Cap(c), veh/h	593	2881	1156	628	1588	1631	132	0	96	110	0	
V/C Ratio(X)	0.03	0.24	0.02	0.21	0.22	0.22	0.21	0.00	0.34	0.28	0.00	0.
Avail Cap(c_a), veh/h	593	2881	1156	861	1588	1631	297	0	303	270	0	3
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.
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.
Uniform Delay (d), s/veh	3.3	3.9	3.2	2.3	1.7	1.7	54.8	0.0	54.4	56.9	0.0	5
Incr Delay (d2), s/veh	0.1	0.2	0.0	0.2	0.3	0.3	0.8	0.0	2.1	1.4	0.0	(
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	(
%ile BackOfQ(50%),veh/In	0.1	1.8	0.1	0.3	0.8	0.8	0.8	0.0	1.0	1.0	0.0	(
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	3.4	4.1	3.2	2.5	2.0	2.0	55.6	0.0	56.5	58.2	0.0	5
LnGrp LOS	А	А	А	А	А	А	E	А	E	E	А	
Approach Vol, veh/h		738			857			61			36	
Approach Delay, s/veh		4.1			2.1			56.1			57.6	
Approach LOS		А			А			E			E	
Timer - Assigned Phs	1	2		4		6		8				
Phs Duration (G+Y+Rc), s	9.4	98.3		12.2		107.8		12.2				
Change Period (Y+Rc), s	4.5	* 5.9		* 5.4		* 5.9		* 5.4				
Max Green Setting (Gmax), s	21.5	* 61		* 22		* 87		* 22				
Max Q Clear Time (g_c+l1), s	3.8	8.3		7.1		6.3		4.8				
Green Ext Time (p_c), s	0.3	5.3		0.1		4.5		0.2				
Intersection Summary												
HCM 6th Ctrl Delay			6.1									
HCM 6th LOS			А									

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

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Hayden One Total AM Mitigated

4: Northeast Access & Hayden Road HCM 6th TWSC

Intersection	_						
Int Delay, s/veh	0.1						
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	- 11	1		- 11		1	
Fraffic Vol, veh/h	707	20	0	803	0	15	
uture Vol, veh/h	707	20	0	803	0	15	
Conflicting Peds, #/hr	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Free	Stop	Stop	
T Channelized	-	None	-	None	-	None	
Storage Length	-	135	-	-	-	0	
/eh in Median Storage	e,#0	-	-	0	0	-	
Grade, %	. 0	-		0	0	-	
Peak Hour Factor	92	92	93	93	90	90	
leavy Vehicles, %	2	2	2	2	2	2	
/vmt Flow	768	22	0	863	0	17	
/lajor/Minor	Major1		Major2	I	/linor1	_	
onflicting Flow All	0	0	-	-	-	384	
Stage 1	-		-	-	-	-	
Stage 2							
Critical Hdwy	-	-	-	-	-	6.94	
Critical Hdwy Stg 1						- 0.04	
Critical Hdwy Stg 2	-		-	-	-	_	
Follow-up Hdwy	-		-	-	-	3.32	
Pot Cap-1 Maneuver	-		0	-	0	*789	
Stage 1	-		0	-	0	- 105	
Stage 2			0	-	0		
Platoon blocked, %			0		- 0	1	
Mov Cap-1 Maneuver			-		-	*789	
Nov Cap-1 Maneuver						109	
Stage 1							
Stage 2				-	-	-	
Slaye z				-			
			14/12		NE		
pproach	EB		WB	_	NB	_	
ICM Control Delay, s	0		0		9.7		
HCM LOS					A		
Alexand and (0.4 alexand 4.4			EDT	EDE	MOT		
Minor Lane/Major Mvm	It	NBLn1	EBT	EBR	WBT		
Capacity (veh/h)		789		-	-		
		0.021		-	-		
ICM Lane V/C Ratio		9.7	-	-	-		
ICM Lane V/C Ratio ICM Control Delay (s)							
ICM Lane V/C Ratio ICM Control Delay (s) ICM Lane LOS		A	-	-	-		
ICM Lane V/C Ratio ICM Control Delay (s) ICM Lane LOS			-	-			
ICM Lane V/C Ratio ICM Control Delay (s)		A	-	-			

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Hayden One Total AM Mitigated

5: Burger King Drwy & Hayden Road HCM 6th TWSC

lovement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
ane Configurations	<u> </u>	^	1	<u> </u>	^	1		4			4		
affic Vol, veh/h	4	669	45	44	769	12	13	0	15	3	0	2	
uture Vol, veh/h	4	669	45	44	769	12	13	0	15	3	0	2	
onflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
gn Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
T Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
torage Length	100	-	75	90	-	100	-	-	-	-	-	-	
eh in Median Storage,	# -	0	-	-	0	-	-	1	-	-	0	-	
rade, %	-	0	-	-	0	-		0	-	-	0		
eak Hour Factor	93	93	93	96	96	96	78	78	78	63	63	63	
eavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
lvmt Flow	4	719	48	46	801	13	17	0	19	5	0	3	
ajor/Minor N	lajor1		I	Major2		I	/linor1		Ν	/linor2			
onflicting Flow All	814	0	0	767	0	0	1220	1633	360	1261	1668	401	
Stage 1	-	-	-	-	-	-	727	727	-	893	893	-	
Stage 2	-	-	-	-	-	-	493	906	-	368	775	-	
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94	
Critical Hdwy Stg 1	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	6.54	5.54	-	6.54	5.54	-	
ollow-up Hdwy	2.22	-	-	2.22	-	-	3.52	4.02	3.32	3.52	4.02	3.32	
ot Cap-1 Maneuver	809	-	-	1187	-	-	*273	*141	*815	*250	132	599	
Stage 1	-	-	-	-	-	-	*768	*673	-	*303	358	-	
Stage 2	-	-	-	-	-	-	*526	*353	-	*768	646	-	
latoon blocked, %		-	-	1	-	-	1	1	1	1	1		
lov Cap-1 Maneuver	809	-	-	1187	-	-	*263	*135	*815	*236	127	599	
lov Cap-2 Maneuver		-	-	-		-	*387	*256	-	*236	127		
Stage 1		-	-	-		-	*764	*670		*301	344	-	
Stage 2	-	-	-	-	-	-	*503	*339	-	*746	642		
oproach	EB			WB			NB			SB			
ICM Control Delay, s	0.1			0.4			12.2			16.8			
ICM LOS							В			С			
linor Lane/Major Mvm	-	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBI n1				
Capacity (veh/h)		538	809	LDT	LOR	1187	1401	1101	312		_	_	
CM Lane V/C Ratio		0.067	0.005		-	0.039		-	0.025				
CM Control Delay (s)		12.2	9.5	-		8.2			16.8				
CM Lane LOS		12.2 B	3.5 A			A			10.0 C				
ICM 95th %tile Q(veh)		0.2	0	-	-	0.1	-	-	0.1				
, ,		0.2	5			0.1			0.1				
otes						_							
: Volume exceeds cap	acity	\$: De	elay exc	eeds 3	UOs	+: Com	putatio	n Not D	efined	*: All	major	volume i	n platoor

Hayden One Total AM Mitigated

6: Northsight Boulevard & Hayden Road HCM 6th Roundabout

Intersection								
Intersection Delay, s/veh	8.1							
Intersection LOS	А							
Approach		EB		WB		NB		SB
Entry Lanes		2		2		2		1
Conflicting Circle Lanes		2		2		2		2
Adj Approach Flow, veh/h		584		718		384		365
Demand Flow Rate, veh/h		596		732		391		372
Vehicles Circulating, veh/h		270		384		520		820
Vehicles Exiting, veh/h		922		527		346		296
Ped Vol Crossing Leg, #/h		0		0		0		0
Ped Cap Adj		1.000		1.000		1.000		1.000
Approach Delay, s/veh		6.0		7.8		6.7		13.4
Approach LOS		А		А		А		В
Lane	Left	Right	Left	Right	Left	Right	Left	
Designated Moves	LT	TR	LT	TR	LT	R	LTR	
Assumed Moves	LT	TR	LT	TR	LT	R	LTR	
RT Channelized								
Lane Util	0.470	0.530	0.470	0.530	0.570	0.430	1.000	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328	
Entry Flow, veh/h	280	316	344	388	223	168	372	
Cap Entry Lane, veh/h	1053	1129	948	1025	837	913	707	
Entry HV Adj Factor	0.980	0.980	0.981	0.981	0.981	0.982	0.981	
Flow Entry, veh/h	275	310	337	381	219	165	365	
Cap Entry, veh/h	1032	1106	930	1005	820	896	694	
V/C Ratio	0.266	0.280	0.363	0.379	0.267	0.184	0.526	
Control Delay, s/veh	6.1	5.9	7.9	7.6	7.3	5.8	13.4	
LOS	А	Α	А	Α	А	А	В	
95th %tile Queue, veh	1	1	2	2	1	1	3	

	۶	-	\mathbf{r}	4	-	•	1	1	1	1	Ŧ	
ane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
ane Configurations	1	<u></u>	1	ሻሻ	1	1	۲.	ę	1	٦	ĥ	
Fraffic Volume (vph)	4	1100	206	428	1321	29	214	12	283	12	8	
Future Volume (vph)	4	1100	206	428	1321	29	214	12	283	12	8	
Furn Type	Prot	NA	pm+ov	Prot	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2	8	1	6		8	8	1	4	4	
Permitted Phases			2			6			8			
Detector Phase	5	2	8	1	6	6	8	8	1	4	4	
Switch Phase		10.0				(0.0						
Vinimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	5.0	5.0	6.0	6.0	
Minimum Split (s)	11.0	38.7	47.0	11.0	25.7	25.7	47.0	47.0	11.0	44.3	44.3	
Fotal Split (s)	11.0 9.2%	37.0 30.8%	33.0 27.5%	38.0 31.7%	64.0 53.3%	64.0 53.3%	33.0 27.5%	33.0 27.5%	38.0 31.7%	12.0 10.0%	12.0 10.0%	
Fotal Split (%) Yellow Time (s)	9.2%	30.8%	27.5%	31.7% 4.0	53.3% 4.7	53.3% 4.7	27.5%	27.5%	31.7% 4.0	10.0%	10.0%	
All-Red Time (s)	4.0	4.7	4.0	4.0	4.7	4.7	4.0	4.0	4.0	3.3 2.0	3.3 2.0	
Lost Time Adjust (s)	2.0	0.0	2.0	2.0	0.0	0.0	0.0	2.0	2.0	0.0	2.0	
Fotal Lost Time (s)	6.0	5.7	6.0	6.0	5.7	5.7	6.0	6.0	6.0	5.3	5.3	
_ead/Lag	Lag	Lead	0.0	Lag	Lead	Lead	0.0	0.0	Lag	0.0	0.0	
_ead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	None	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	5.0	59.1	77.4	23.7	86.6	86.6	12.6	12.6	38.7	6.1	6.1	
Actuated g/C Ratio	0.04	0.49	0.64	0.20	0.72	0.72	0.10	0.10	0.32	0.05	0.05	
//c Ratio	0.07	0.49	0.23	0.74	0.38	0.03	0.72	0.64	0.52	0.18	0.14	
Control Delay	57.5	23.5	2.1	52.5	8.4	0.0	74.9	66.3	15.3	59.5	47.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Fotal Delay	57.5	23.5	2.1	52.5	8.4	0.0	74.9	66.3	15.3	59.5	47.7	
_OS	E	С	А	D	A	А	E	E	В	E	D	
Approach Delay		20.3			18.9			39.9			53.8	
Approach LOS		С			В			D			D	
ntersection Summary												
Cycle Length: 120												_
Actuated Cycle Length: 120												
Offset: 103 (86%), Reference	d to phas	e 2:EBT	and 6:WE	BT, Start	of Green							
Vatural Cycle: 145												
Control Type: Actuated-Coord	dinated											
Maximum v/c Ratio: 0.74												
ntersection Signal Delay: 22.					ntersectio							
ntersection Capacity Utilizati	on 60.8%)		10	CU Level	of Service	θB					
Analysis Period (min) 15												
	_											
Splits and Phases: 7: Hayo	len Road	& Frank	Lloyd Wri	ght Boule	evard							
			Ø1					4	N _{Ø8}			
37 s		38 s			_		12 s	33	3 s	_		
*						<u>♦</u> ۵5						
Ø6 (R)						Ø5						

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
ane Configurations	٦	^	1	ኘኘ	^	1	۲	ર્સ	1	٦	4Î	
Traffic Volume (veh/h)	4	1100	206	428	1321	29	214	12	283	12	8	3
Future Volume (veh/h)	4	1100	206	428	1321	29	214	12	283	12	8	3
lnitial 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
Nork Zone On Approach	4770	No	4770	4770	No	4770	4770	No	4770	4770	No	4770
Adj Sat Flow, veh/h/ln	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
Adj Flow Rate, veh/h	5	1294	154	476	1468	21	237	0	195	15	10	2
Peak Hour Factor	0.85 2	0.85 2	0.85 2	0.90 2	0.90 2	0.90 2	0.94 2	0.94 2	0.94 2	0.82 2	0.82 2	0.82
Percent Heavy Veh, %	346	1402	524	1408	2611	730	296	2	778	50	47	9
Cap, veh/h Arrive On Green	0.20	0.26	0.26	0.43	0.49	0.49	0.09	0.00	0.09	0.03	0.03	0.03
Sat Flow, veh/h	1688	5375	1502	0.43 3274	0.49 5375	1502	3375	0.00	1502	1688	1593	319
Grp Volume(v), veh/h	5	1294	1502	476	1468	21	237	0	195	1000	0	12
Grp Sat Flow(s), veh/h/ln	1688	1792	1502	1637	1792	1502	1688	0	1502	1688	0	1911
Q Serve(q s), s	0.3	28.1	8.9	11.6	23.2	0.9	8.3	0.0	0.0	1.0	0.0	0.7
Cycle Q Clear(g_c), s	0.3	28.1	8.9	11.6	23.2	0.9	8.3	0.0	0.0	1.0	0.0	0.7
Prop In Lane	1.00	20.1	1.00	1.00	20.2	1.00	1.00	0.0	1.00	1.00	0.0	0.17
Lane Grp Cap(c), veh/h	346	1402	524	1408	2611	730	296	0	778	50	0	57
//C Ratio(X)	0.01	0.92	0.29	0.34	0.56	0.03	0.80	0.00	0.25	0.30	0.00	0.21
Avail Cap(c a), veh/h	346	1402	524	1408	2611	730	759	0.00	984	94	0.00	107
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
Jpstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	38.0	43.2	28.4	22.8	21.8	16.1	53.7	0.0	16.0	57.0	0.0	56.8
Incr Delay (d2), s/veh	0.0	11.5	1.4	0.1	0.9	0.1	1.9	0.0	0.1	1.2	0.0	0.7
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/In	0.1	13.9	3.9	4.5	9.8	0.3	3.6	0.0	3.0	0.5	0.0	0.4
Unsig. Movement Delay, s/veh												
_nGrp Delay(d),s/veh	38.0	54.7	29.8	22.9	22.7	16.2	55.6	0.0	16.1	58.2	0.0	57.5
_nGrp LOS	D	D	С	С	С	В	E	Α	В	E	Α	E
Approach Vol, veh/h		1453			1965			432			27	
Approach Delay, s/veh		52.0			22.7			37.8			57.9	
Approach LOS		D			С			D			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	57.6	37.0		8.9	30.6	64.0		16.5				
Change Period (Y+Rc), s	6.0	5.7		* 5.3	6.0	5.7		6.0				
Max Green Setting (Gmax), s	32.0	31.3		* 6.7	5.0	58.3		27.0				
Max Q Clear Time (g_c+I1), s	13.6	30.1		3.0	2.3	25.2		10.3				
Green Ext Time (p_c), s	0.3	0.6		0.0	0.0	5.1		0.3				
Intersection Summary			35.6									
HCM 6th Ctrl Delay HCM 6th LOS			35.0 D									
			D									
Votes												
User approved pedestrian inter												
User approved volume balanci	ng amor	ig the lan	es for turr	ning move	ement.							
* HCM 6th computational engir	ne requir	es equal	clearance	e times fo	r the pha	ses crossi	ng the ba	irrier.				

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_ane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	
ane Configurations	<u> </u>	≜ †}	5	A	<u> </u>	1	7	۲	ĥ	
Traffic Volume (vph)	13	862	86	559	148	12	153	92	24	
Future Volume (vph)	13	862	86	559	148	12	153	92	24	
Turn Type	Perm	NA	Perm	NA	pm+pt	NA	Perm	Perm	NA	
Protected Phases		6		2	7	4			8	
Permitted Phases	6		2		4		4	8		
Detector Phase	6	6	2	2	7	4	4	8	8	
Switch Phase										
Vinimum Initial (s)	10.0	10.0	10.0	10.0	5.0	7.0	7.0	7.0	7.0	
Vinimum Split (s)	26.9	26.9	26.9	26.9	9.6	32.4	32.4	32.4	32.4	
Total Split (s)	74.0	74.0	74.0	74.0	26.0	46.0	46.0	20.0	20.0	
Total Split (%)	61.7%	61.7%	61.7%	61.7%	21.7%	38.3%	38.3%	16.7%	16.7%	
Yellow Time (s)	4.7	4.7	4.7	4.7	3.0	3.6	3.6	3.6	3.6	
All-Red Time (s)	1.2	1.2	1.2	1.2	1.6	1.8	1.8	1.8	1.8	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	5.9	5.9	5.9	5.9	4.6	5.4	5.4	5.4	5.4	
_ead/Lag					Lead			Lag	Lag	
_ead-Lag Optimize?					Yes			Yes	Yes	
Recall Mode	None	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	74.2	74.2	74.2	74.2	35.3	34.5	34.5	12.4	12.4	
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.29	0.29	0.29	0.10	0.10	
//c Ratio	0.03	0.45	0.37	0.26	0.50	0.03	0.39	0.75	0.24	
Control Delay	11.5	13.6	18.7	11.6	37.2	27.5	14.7	83.6	32.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	11.5	13.6	18.7	11.6	37.2	27.5	14.7	83.6	32.5	
LOS	В	B	В	B	D	C	В	F	С	
Approach Delay		13.6		12.5		25.8			66.6	
Approach LOS		В		В		С			E	
ntersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 12				_						
Offset: 72 (60%), Reference	ced to phase	2:WBIL	, Start of	Green						
Natural Cycle: 80	P (1									
Control Type: Actuated-Co	ordinated									
Maximum v/c Ratio: 0.75	10.0			- L.	atorooot'-	~ I OC. D				
ntersection Signal Delay:					ntersectio CU Level		P			
ntersection Capacity Utiliz	au011 02.7%			IC	50 Level	UI SEIVICE	50			
Analysis Period (min) 15										
Splits and Phases: 1:83	Brd Place & I	Havden F	Road							
+										
🖗 Ø2 (R)							10	1		
74 s							46 s			
- 元							1			↓ Ø8
- 06										

05/30/2019	
CivTech BR	

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
Lane Configurations	1	≜ 1₽		۲	≜ †⊅		٦	1	1	٦	4Î	
Traffic Volume (veh/h)	13	862	69	86	559	17	148	12	153	92	24	
Future Volume (veh/h)	13	862	69	86	559	17	148	12	153	92	24	
Initial Q (Qb), veh	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		
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	
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	
Adj Flow Rate, veh/h	14	947	49	91	588	7	192	16	89	102	27	
Peak Hour Factor	0.91	0.91	0.91	0.95	0.95	0.95	0.77	0.77	0.77	0.90	0.90	
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	
Cap, veh/h	519	2362	122	344	2471	29	363	498	380	180	148	
Arrive On Green	0.65	0.65	0.65	0.65	0.65	0.65	0.12	0.25	0.25	0.10	0.10	
Sat Flow, veh/h	779	3618	187	536	3786	45	1688	1969	1502	1221	1508	
Grp Volume(v), veh/h	14	490	506	91	290	305	192	16	89	102	0	
Grp Sat Flow(s),veh/h/ln	779	1870	1935	536	1870	1961	1688	1969	1502	1221	0	
Q Serve(g_s), s	0.9	14.8	14.8	11.6	7.7	7.7	11.8	0.7	5.6	9.9	0.0	
Cycle Q Clear(g_c), s	8.6	14.8	14.8	26.3	7.7	7.7	11.8	0.7	5.6	9.9	0.0	
Prop In Lane	1.00		0.10	1.00		0.02	1.00		1.00	1.00		
Lane Grp Cap(c), veh/h	519	1221	1263	344	1221	1280	363	498	380	180	0	
V/C Ratio(X)	0.03	0.40	0.40	0.26	0.24	0.24	0.53	0.03	0.23	0.57	0.00	
Avail Cap(c_a), veh/h	519	1221	1263	344	1221	1280	468	666	508	209	0	
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	
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	
Uniform Delay (d), s/veh	10.3	9.8	9.8	16.0	8.6	8.6	40.1	33.7	35.6	53.2	0.0	
Incr Delay (d2), s/veh	0.0	0.1	0.1	1.9	0.5	0.4	0.4	0.0	0.1	1.0	0.0	
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	
%ile BackOfQ(50%),veh/In	0.2	5.8	6.0	1.6	3.1	3.3	5.0	0.4	2.1	3.1	0.0	
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.3	9.9	9.9	17.9	9.0	9.0	40.5	33.8	35.7	54.3	0.0	
LnGrp LOS	В	A	A	В	A	A	D	С	D	D	A	
Approach Vol, veh/h		1010			686			297			136	
Approach Delay, s/veh		9.9			10.2			38.7			53.2	
Approach LOS		A			В			D			D	
Timer - Assigned Phs		2		4		6	7	8				
Phs Duration (G+Y+Rc), s		84.2		35.8		84.2	18.6	17.2				
Change Period (Y+Rc), s		* 5.9		* 5.4		* 5.9	* 4.6	* 5.4				
Max Green Setting (Gmax), s		* 68		* 41		* 68	* 21	* 15				
Max Q Clear Time (q c+l1), s		28.3		7.6		16.8	13.8	11.9				
Green Ext Time (p c), s		1.9		0.2		2.4	0.2	0.1				
u = 7:				0.2		2	0.2	0.1				
Intersection Summary												
HCM 6th Ctrl Delay			16.8									
HCM 6th LOS			В									
Notes												
User approved pedestrian inter	rval to be	e less tha	n phase r	nax greer	۱.							
* HCM 6th computational engin						ses cross	ing the ba	rrier				

ntersection													
ntersection nt Delay, s/veh	4.8												
3.	-		500	11/51	11/5 7					0.01			
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
ane Configurations	<u></u>		1	<u></u>	_ ≜ ⊅	-			1		4		
Traffic Vol, veh/h	20	1033	58	268	582	5	0	0	242	4	2	89	
Future Vol, veh/h	20	1033	58	268	582	5	0	0	242	4	2	89	
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	135	-	135	175	-	-	-	-	0	-	-	-	
/eh in Median Storage,	# -	0	-	-	0		-	0	-		1		
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	92	92	92	96	96	96	90	90	90	66	66	66	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Vvmt Flow	22	1123	63	279	606	5	0	0	269	6	3	135	
Major/Minor N	lajor1		Ν	Major2		1	/linor1		I	Minor2			
Conflicting Flow All	611	0	0	1186	0	0	-	-	562	1773	2397	306	
Stage 1	-	-	-	-	-	-	-	-	-	1167	1167	-	
Stage 2	-	-	-	-	-	-	-	-	-	606	1230	-	
Critical Hdwy	4.14	-	-	4.14	-	-	-	-	6.94	7.54	6.54	6.94	
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	6.54	5.54	-	
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	6.54	5.54	-	
Follow-up Hdwy	2.22	-	-	2.22	-	-	-	-	3.32	3.52	4.02	3.32	
Pot Cap-1 Maneuver	964	-	-	585	-	-	0	0	470	53	33	690	
Stage 1	-	-	-	-	-	-	0	0	-	206	266	-	
Stage 2	-	-	-	-	-	-	0	0	-	451	248	-	
Platoon blocked, %		-	-		-	-							
Nov Cap-1 Maneuver	964	-	-	585	-	-	-	-	470	14	17	690	
Nov Cap-2 Maneuver	-	-	-	-	-	-	-	-		~ -201	~ -73	-	
Stage 1	-	-	-	-	-	-	-	-	-	201	139	-	
Stage 2	-		-	-			-			189	242	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0.2			5.2			22.4			8.5			
HCM LOS	0.2			J.Z			22.4 C			0.5 A			
							U			A			
			EDI	EDT	-		MIDT		201 (
Minor Lane/Major Mvmt		NBLn1	EBL	EBT	EBR	WBL	WBT	WBR					
Capacity (veh/h)		470	964	-	-	585	-	-	1163				
HCM Lane V/C Ratio			0.023	-	-	0.477	-	-	0.124				
HCM Control Delay (s)		22.4	8.8	-	-	16.6	-	-	8.5				
HCM Lane LOS		С	A	-	-	С	-	-	A				
HCM 95th %tile Q(veh)		3.5	0.1	-	-	2.6	-	-	0.4				

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Hayden One Total PM

3: 84th Street & Hayden Road HCM 6th TWSC

Lane Configurations *	NBR SBL 128 70 128 70 0 0 Stop Stop None - - - 46 63 2 2 278 111 Minor2 619 1787 619 1787 647 - 647 6.54 - 6.54 - 6.54 - 3.22 3.52 -	SBT 1 1 0 Stop - - 1 0 63 2 2 2 2 2 4 6 5 4 5.54	SBR 52 52 0 Stop None - - - - - - - - - - 383 2 83 - - - - - - - - - - - - - - - - - -
Image: Constraint of the second sec	128 70 0 0 Stop Stop None - 	1 1 0 Stop - - 1 0 63 2 2 2 2 2 2 4 4 1140 1324 6.54 5.54	52 0 Stop - - - 63 2 83 2 83 - - - 6.94
Future Vol, veh/h 13 1176 55 176 700 16 74 0 Conflicting Peds, #/hr 0 126 0 0 12 2	128 70 0 0 Stop Stop None - 	1 Stop - - 1 0 63 2 2 2 2 2 4 1 1 4 5.54	52 0 Stop - - - 63 2 83 2 83 - - - 6.94
Conflicting Peds, #/hr 0 1 0	0 0 Stop Stop None - - - - - - - - - - - - - -	0 Stop - - 1 0 63 2 2 2 2 2 4 4 1140 1324 6.54 5.54	0 Stop None - - - - - - - - - - - - - - - - - - -
Sign Control Free	Stop Stop None - - -	Stop - 1 0 63 2 2 2 4 6 4 1140 1324 6.54 5.54	Stop None - - - - - - - - - - - - - - - - - - -
RT Channelized - None	None - 46 63 2 2 278 111 <u>Minor2</u> 619 1787 - 1140 - 647 6.94 7.54 - 6.54 - 6.54	- 1 0 63 2 2 2 2 464 1140 1324 6.54 5.54	None - - 63 2 83 - - - - - - - - - - - - - - -
Storage Length 135 - 100 145 - - 0 - Veh in Median Storage, # - 0 - - 0 - - 1 Grade, % - 0 - - 0 - - 0 Peak Hour Factor 95 95 93 93 93 46 46 Heavy Vehicles, % 2 <td< td=""><td> 46 63 2 2 278 111 <u>Minor2</u> 619 1787 - 1140 - 647 6.94 7.54 - 6.54</td><td>- 1 0 63 2 2 2 2 4 64 1140 1324 6.54</td><td>- 63 2 83 385 - 6.94</td></td<>	 46 63 2 2 278 111 <u>Minor2</u> 619 1787 - 1140 - 647 6.94 7.54 - 6.54	- 1 0 63 2 2 2 2 4 64 1140 1324 6.54	- 63 2 83 385 - 6.94
Weh in Median Storage, # 0 - 0 - 1 Grade, % - 0 - - 0 - - 1 Grade, % - 0 - - 0 - - 0 Peak Hour Factor 95 95 93 93 93 46 46 Heavy Vehicles, % 2	46 63 2 2 278 111 <u>Minor2</u> 619 1787 - 1140 - 647 6.94 7.54 - 6.54 - 6.54	0 63 2 2 2 2 2 4 6 4 1140 1324 6.54 5.54	- 63 2 83 385 - 6.94
Grade, % - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 0 2 0 2 0 2<	46 63 2 2 278 111 <u>Minor2</u> 619 1787 - 1140 - 647 6.94 7.54 - 6.54	0 63 2 2 2 2 2 4 6 4 1140 1324 6.54 5.54	63 2 83 385 - 6.94
Peak Hour Factor 95 95 93 93 93 46 46 Heavy Vehicles, % 2 4 3 3 3 3 3 3 3 3 3 3 3 3 3	46 63 2 2 278 111 Minor2 619 619 1787 - 1140 - 647 6.94 7.54 - 6.54 - 6.54	63 2 2 2 2464 1140 1324 6.54 5.54	63 2 83 385 - 6.94
Heavy Vehicles, % 2 17 161 0 Major/Minor Major Major Major Major Major Minor Major Minor Major Minor Major Minor Major Minor Major Major Minor Major Major Minor Major Major Minor Major Major Minor Major Minor Minor Minor Minor Major Major Minor Major Major Minor Major Major Minor Major Major Minor Minor </td <td>2 2 278 111 619 1787 - 1140 - 647 6.94 7.54 - 6.54 - 6.54</td> <td>2 2464 1140 1324 6.54 5.54</td> <td>2 83 385 - 6.94</td>	2 2 278 111 619 1787 - 1140 - 647 6.94 7.54 - 6.54 - 6.54	2 2464 1140 1324 6.54 5.54	2 83 385 - 6.94
Mvmt Flow 14 1238 58 189 753 17 161 0 Major/Minor Major1 Major2 Minor1 Conflicting Flow All 770 0 0 1296 0 0 2022 2414 Stage 1 - - - - 1266 <td>278 111 Minor2 619 1787 - 1140 - 647 6.94 7.54 - 6.54 - 6.54</td> <td>2 2464 1140 1324 6.54 5.54</td> <td>83 385 - 6.94</td>	278 111 Minor2 619 1787 - 1140 - 647 6.94 7.54 - 6.54 - 6.54	2 2464 1140 1324 6.54 5.54	83 385 - 6.94
Major/Minor Major1 Major2 Minor1 Conflicting Flow All 770 0 0 1296 0 0 2022 2414 Stage 1 - - - - - 1266 1266 Stage 2 - - - - 756 1148 Critical Hdwy 4.14 - 4.14 - 7.54 6.54 Critical Hdwy Stg 1 - - - - 6.54 5.54 Critical Hdwy Stg 2 - - - - 6.54 5.54 Follow-up Hdwy 2.22 - 2.22 - 3.52 4.02	Minor2 619 1787 - 1140 - 647 6.94 7.54 - 6.54 - 6.54	2464 1140 1324 6.54 5.54	385 - 6.94
Conflicting Flow All 770 0 0 1296 0 0 2022 2414 Stage 1 - - - - - 1266 1266 Stage 2 - - - - - 756 1148 Critical Hdwy 4.14 - - 4.14 - 7.54 6.54 Critical Hdwy Stg 1 - - - 6.54 5.54 Critical Hdwy Stg 2 - - - 6.54 5.54 Follow-up Hdwy 2.22 - 2.22 - 3.52 4.02	619 1787 - 1140 - 647 6.94 7.54 - 6.54 - 6.54	1140 1324 6.54 5.54	6.94
Conflicting Flow All 770 0 0 1296 0 0 2022 2414 Stage 1 - - - - - 1266 1266 Stage 2 - - - - - 756 1148 Critical Hdwy 4.14 - - 4.14 - 7.54 6.54 Critical Hdwy Stg 1 - - - 6.54 5.54 Critical Hdwy Stg 2 - - - 6.54 5.54 Follow-up Hdwy 2.22 - 2.22 - 3.52 4.02	619 1787 - 1140 - 647 6.94 7.54 - 6.54 - 6.54	1140 1324 6.54 5.54	6.94
Stage 1 - - - - 1266 1266 Stage 2 - - - - 756 1148 Critical Hdwy 4.14 - 4.14 - 7.54 6.54 Critical Hdwy Stg 1 - - - 6.54 5.54 Critical Hdwy Stg 2 - - - 6.54 5.54 Follow-up Hdwy 2.22 - 2.22 - 3.52 4.02	- 1140 - 647 6.94 7.54 - 6.54 - 6.54	1140 1324 6.54 5.54	6.94
Stage 2 - - - - 756 1148 Critical Hdwy 4.14 - 4.14 - 7.54 6.54 Critical Hdwy Stg 1 - - - - 6.54 5.54 Critical Hdwy Stg 2 - - - 6.54 5.54 Follow-up Hdwy 2.22 - 2.22 - 3.52 4.02	- 647 6.94 7.54 - 6.54 - 6.54	1324 6.54 5.54	- 6.94
Critical Hdwy 4.14 - 4.14 - 7.54 6.54 Critical Hdwy Stg 1 - - - - 6.54 5.54 Critical Hdwy Stg 2 - - - 6.54 5.54 Critical Hdwy Stg 2 - - - 6.54 5.54 Follow-up Hdwy 2.22 - 2.22 - 3.52 4.02	6.94 7.54 - 6.54 - 6.54	6.54 5.54	6.94
Critical Hdwý Stg 1 - - - 6.54 5.54 Critical Hdwy Stg 2 - - - 6.54 5.54 Follow-up Hdwy 2.22 - 2.22 - 3.52 4.02	- 6.54 - 6.54	5.54	
Critical Hdwy Stg 2 - - - - 6.54 5.54 Follow-up Hdwy 2.22 - - 2.22 - 3.52 4.02	- 6.54		
Follow-up Hdwy 2.22 2.22 3.52 4.02		5 54	-
	3 32 3 52		-
Pot Cap-1 Maneuver 840 531 ~ 34 32		4.02	3.32
	432 ~ 51	30	613
Stage 1 179 238	- 214	274	-
Stage 2 366 272	- 426	224	-
Platoon blocked, %			
Mov Cap-1 Maneuver 840 531 ~ 20 20	432 ~ 13	19	613
Mov Cap-2 Maneuver 92 96	- ~-54	28	-
Stage 1 176 234	- 210	176	-
Stage 2 202 175	- 149	220	-
	00		
Approach EB WB NB	SB		
HCM Control Delay, s 0.1 3.1 184.2			
HCM LOS F	-		
Minor Lane/Major Mvmt NBLn1 NBLn2 EBL EBT EBR WBL WBT \	WBR SBLn1		_
Capacity (veh/h) 92 432 840 531 -	- +		
HCM Lane V/C Ratio 1.749 0.644 0.016 0.356 -			
HCM Control Delay (s) \$455.8 27.2 9.4 15.5 -			
HCM Lane LOS F D A C -			
HCM 95th %tile Q(veh) 13.2 4.4 0.1 1.6 -			
Notes			
~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Def	fined *: All	major vo	olume

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Hayden One Total PM

4: Northeast Access & Hayden Road HCM 6th TWSC

Intersection						
Int Delay, s/veh	0.6					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1	1		1		1
	1350	28	0	892	0	74
	1350	28	0	892	0	74
Conflicting Peds, #/hr	0	0	0	0.02	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-		-	None
Storage Length		135	-	-		0
Veh in Median Storage,		-	-	0	0	-
Grade, %	,# 0 0			0	0	
	92	- 92	93	93	90	- 90
Peak Hour Factor						
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1467	30	0	959	0	82
Major/Minor M	lajor1	Ν	Major2	I	Ainor1	_
Conflicting Flow All	0	0	-	-	-	734
Stage 1	-	-	-	-	-	- 104
Stage 2	-		-	-		-
		-		-		6.94
Critical Hdwy			-		-	
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2		-	-	-		-
Follow-up Hdwy	-	-	-	-	-	3.32
Pot Cap-1 Maneuver		-	0	-	0	363
Stage 1	-	-	0	-	0	-
Stage 2	-	-	0	-	0	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	-	-	-	363
Mov Cap-2 Maneuver			-	-	-	
Stage 1		-	-	-	-	-
Stage 2			-			
Oldyo 2						
Approach	EB		WB		NB	
HCM Control Delay, s	0		0		17.8	
HCM LOS					С	
Minor Long/Major Mumt		VBLn1	EBT	EBR	WBT	
Minor Lane/Major Mvmt	. r			EDR	VVDI	
Capacity (veh/h) HCM Lane V/C Ratio		363				
		0.227	-	-	-	

minor Lanormajor minit					
Capacity (veh/h)	363	-	-	-	
HCM Lane V/C Ratio	0.227	-	-	-	
HCM Control Delay (s)	17.8	-	-	-	
HCM Lane LOS	С	-	-	-	
HCM 95th %tile Q(veh)	0.9	-	-	-	

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Hayden One Total PM

5: Burger King Drwy & Hayden Road HCM 6th TWSC

Intersection Int Delay, s/veh	0.9												
int Delay, s/ven													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	<u> </u>	<u>^</u>	1	<u> </u>	_ † †	1		4			- 4 >		
Traffic Vol, veh/h	7	1399	43	22	874	19	11	0	19	12	0	18	
Future Vol, veh/h	7	1399	43	22	874	19	11	0	19	12	0	18	
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	-	75	90	-	100	-	-	-	-	-	-	
Veh in Median Storage,	# -	0	-	-	0	-	-	1	-	-	1	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	90	90	90	96	96	96	75	75	75	75	75	75	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	8	1554	48	23	910	20	15	0	25	16	0	24	
Major/Minor N	lajor1	_	1	Aajor2	_	1	Minor1	_	N	Minor2	_	_	
Conflicting Flow All	930	0	0	1602	0	0	2071	2546	777	1749	2574	455	
Stage 1		-	-	-	-	-	1570	1570	-	956	956	-	
Stage 2				-			501	976		793	1618		
Critical Hdwy	4.14			4.14			7.54	6.54	6.94	7.54	6.54	6.94	
Critical Hdwy Stg 1	4.14	-	-	4.14			6.54	5.54	0.94	6.54	5.54	0.94	
Critical Hdwy Stg 1		-		-			6.54	5.54	-	6.54	5.54		
Follow-up Hdwy	2.22	-		2.22			0.54 3.52	5.54 4.02	3.32	0.54 3.52	5.54 4.02	3.32	
	731	-		404			3.52	4.02	340	55	4.02	552	
Pot Cap-1 Maneuver			-	404									
Stage 1	-	-	-	-	-	-	116	170	-	277	335	-	
Stage 2		-		-			521	327	-	348	161	-	
Platoon blocked, %	=0.4	-				-			0.40	10			
Mov Cap-1 Maneuver	731	-	-	404	-	-	28	24	340	48	23	552	
Mov Cap-2 Maneuver	-	-	-	-	-	-	92	108	-	152	95	-	
Stage 1	-	-	-	-			115	168	-	274	316	-	
Stage 2	-	-	-	-	-	-	470	308	-	319	159	-	
Approach	EB			WB			NB			SB			
HCM Control Delay, s	0			0.3			32.4			20.7			
HCM LOS							D			С			
Vinor Lane/Major Mvmt	<u> </u>	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1				
Capacity (veh/h)		171	731	-	-	404	-	-	269				
HCM Lane V/C Ratio		0.234	0.011	-	-	0.057	-	-	0.149				
HOW LANE V/C Ralio		32.4	10	-	-	14.4	-	-	20.7				
HCM Control Delay (s)		D	А	-	-	В	-	-	С				
						0.2			0.5				

Hayden One Total PM

6: Northsight Boulevard & Hayden Road HCM 6th Roundabout

Intersection								
Intersection Delay, s/veh	20.3							
Intersection LOS	С							
Approach		EB		WB		NB		SB
Entry Lanes		2		2		2		1
Conflicting Circle Lanes		2		2		2		2
Adj Approach Flow, veh/h		1470		691		685		457
Demand Flow Rate, veh/h		1500		705		699		466
Vehicles Circulating, veh/h		298		638		1333		787
Vehicles Exiting, veh/h		955		1394		465		556
Ped Vol Crossing Leg, #/h		0		0		0		0
Ped Cap Adj		1.000		1.000		1.000		1.000
Approach Delay, s/veh		14.8		10.6		44.1		16.8
Approach LOS		В		В		E		С
Lane	Left	Right	Left	Right	Left	Right	Left	
Designated Moves	LT	TR	LT	TR	LT	R	LTR	
Assumed Moves	LT	TR	LT	TR	LT	R	LTR	
RT Channelized								
Lane Util	0.470	0.530	0.470	0.530	0.506	0.494	1.000	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328	
Entry Flow, veh/h	705	795	331	374	354	345	466	
Cap Entry Lane, veh/h	1026	1102	751	826	396	457	727	
Entry HV Adj Factor	0.980	0.980	0.981	0.979	0.981	0.980	0.981	
Flow Entry, veh/h	691	779	325	366	347	338	457	
Cap Entry, veh/h	1006	1080	736	808	389	448	714	
V/C Ratio	0.687	0.721	0.441	0.453	0.894	0.754	0.641	
Control Delay, s/veh	14.5	15.0	10.9	10.4	55.4	32.6	16.8	
LOS	В	С	В	В	F	D	С	
95th %tile Queue, veh	6	7	2	2	9	6	5	

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Hayden One 7: Hayden Road & Frank Lloyd Wright Boulevard Total PM Timings ⊁ . * Lane Group EBL EBT EBR WBL WBT SBT NBL NBT **†††** 1709 **†††** 1350 Lane Configurations × **11** 334 đ 1. Traffic Volume (vph) 244 435 13 29 5 Future Volume (vph) 5 1709 244 334 1350 13 435 8 780 23 29 NA pm+ov NA Turn Type Prot NA pm+ov Prot NA Perm Split Split Protected Phases 5 2 8 6 8 8 4 4 1 1 Permitted Phases 2 Detector Phase 5 2 8 8 4 4 8 1 6 6 1 Switch Phase Minimum Initial (s) 5.0 10.0 5.0 5.0 10.0 10.0 5.0 5.0 5.0 6.0 6.0 Minimum Split (s) 11.0 38.7 47.0 11.0 25.7 25.7 47.0 47.0 11.0 44.3 44.3 14.0 Total Split (s) 11.0 50.0 27.0 29.0 68.0 68.0 27.0 27.0 29.0 14.0 11.7% Total Split (%) 9.2% 41.7% 22.5% 24.2% 56.7% 56.7% 22.5% 22.5% 24.2% 1.7% 3.3 Yellow Time (s) 4.0 4.7 4.0 4.0 4.7 4.7 4.0 4.0 4.0 3.3 All-Red Time (s) 2.0 1.0 2.0 2.0 1.0 1.0 2.0 2.0 2.0 2.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Lost Time Adjust (s) 0.0 0.0 0.0 0.0 Total Lost Time (s) 6.0 6.0 5.7 5.7 6.0 6.0 6.0 5.3 5.3 5.7 6.0 Lead/Lag Lag Lead Lag Lead Lead Lag Lead-Lag Optimize? Yes Yes Yes Yes Yes Yes Recall Mode None C-Max None None C-Max C-Max None None None None None Act Effct Green (s) 5.0 49.3 74.9 23.0 76.1 19.9 19.9 44.1 7.0 7.0 76.1 Actuated g/C Ratio 0.04 0.41 0.62 0.19 0.63 0.63 0.17 0.17 0.37 0.06 0.06 v/c Ratio 0.09 0.89 0.27 0.55 0.41 0.01 0.89 0.80 1.35 0.35 0.51 57.8 Control Delay 58.2 40.5 2.9 47.7 12.7 0.0 82.6 68.2 195.0 63.7 Queue Delay 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 82.6 57.8 Total Delay 58.2 40.5 47.7 12.7 68.2 195.0 63.7 2.9 0.0 LOS Е D D В E Е Α А 59.9 Approach Delay 35.8 19.5 151.7 Approach LOS D В Е Intersection Summary Cycle Length: 120 Actuated Cycle Length: 120 Offset: 72 (60%), Referenced to phase 2:EBT and 6:WBT, Start of Green Natural Cycle: 145 Control Type: Actuated-Coordinate Maximum v/c Ratio: 1.35 Intersection LOS: E Intersection Signal Delay: 58.9 Intersection Capacity Utilization 101.5% ICU Level of Service G Analysis Period (min) 15 Splits and Phases: 7: Hayden Road & Frank Lloyd Wright Boulevard 1 1 Ø8 101 ₩ø4 ₩⁰Ø2 (R) 0 <u> Ø6 (R)</u> 11 s 05/30/2019 Synchro 10 Report CivTech BR Page 8

	۶	-	\mathbf{r}	4	+	•	1	Ť	1	1	۰.	1		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		Lane Group
Lane Configurations	7	††† 1709	1	ካካ 334	††† 1350	1	3	با	1	<u> </u>	4Î			Lane Configuration
Traffic Volume (veh/h)	5	1709	244	334	1350	13	435	8	780	23	29	13		Traffic Volume (v
Future Volume (veh/h)	5	1709	244	334	1350	13	435	8	780	23	29	13		Future Volume (
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0		Turn Type
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00		Protected Phase
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		Permitted Phase
Work Zone On Approach		No			No			No			No			Detector Phase
Adj Sat Flow, veh/h/ln	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772		Switch Phase
Adj Flow Rate, veh/h	6	1964	148	344	1392	5	469	0	617	34	43	4		Minimum Initial (
Peak Hour Factor	0.87	0.87	0.87	0.97	0.97	0.97	0.94	0.94	0.94	0.67	0.67	0.67		Minimum Split (s
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2		Total Split (s)
Cap, veh/h	114	1984	817	712	2790	780	591	0	589	79	83	8		Total Split (%)
Arrive On Green	0.07	0.37	0.37	0.22	0.52	0.52	0.17	0.00	0.17	0.05	0.05	0.05		Yellow Time (s)
Sat Flow, veh/h	1688	5375	1502	3274	5375	1502	3375	0	1502	1688	1774	165		All-Red Time (s)
Grp Volume(v), veh/h	6	1964	148	344	1392	5	469	0	617	34	0	47		Lost Time Adjus
Grp Sat Flow(s),veh/h/ln	1688	1792	1502	1637	1792	1502	1688	0	1502	1688	0	1939		Total Lost Time
Q Serve(g_s), s	0.4	43.6	6.0	11.0	20.2	0.2	16.0	0.0	21.0	2.4	0.0	2.8		Lead/Lag
Cycle Q Clear(g_c), s	0.4	43.6	6.0	11.0	20.2	0.2	16.0	0.0	21.0	2.4	0.0	2.8		Lead-Lag Optim
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.09		Recall Mode
Lane Grp Cap(c), veh/h	114	1984	817	712	2790	780	591	0	589	79	0	90		Act Effct Green
V/C Ratio(X)	0.05	0.99	0.18	0.48	0.50	0.01	0.79	0.00	1.05	0.43	0.00	0.52		Actuated g/C Ra
Avail Cap(c_a), veh/h	114	1984	817	712	2790	780	591	0	589	122	0	141		v/c Ratio
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		Control Delay
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00		Queue Delay
Uniform Delay (d), s/veh	52.4	37.6	13.8	41.0	18.7	13.9	47.4	0.0	36.4	55.7	0.0	55.9		Total Delay
Incr Delay (d2), s/veh	0.1	17.9	0.5	0.2	0.6	0.0	6.8	0.0	49.9	1.4	0.0	1.7		LOS
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		Approach Delay
%ile BackOfQ(50%),veh/In	0.2	22.0	3.1	4.5	8.4	0.1	7.3	0.0	14.1	1.0	0.0	1.4		Approach LOS
Unsig. Movement Delay, s/veh		55.0	44.0	44.0	40.4	40.0	54.0	0.0	00.0	57.0	0.0	57.0		Intersection Sun
LnGrp Delay(d),s/veh	52.4	55.6	14.3	41.2	19.4	13.9	54.2	0.0	86.3	57.0	0.0	57.6		Cycle Length: 12
LnGrp LOS	D	E	В	D	B	В	D	A	F	E	A	E		Actuated Cycle
Approach Vol, veh/h		2118			1741			1086			81			Offset: 72 (60%)
Approach Delay, s/veh		52.7 D			23.7 C			72.5 E			57.4			Natural Cycle: 8
Approach LOS		D			U			E			E			Control Type: Ad
Timer - Assigned Phs	1	2		4	5	6		8						Maximum v/c Ra
Phs Duration (G+Y+Rc), s	32.1	50.0		10.9	14.1	68.0		27.0						Intersection Sigr
Change Period (Y+Rc), s	6.0	5.7		* 5.3	6.0	5.7		6.0						Intersection Cap
Max Green Setting (Gmax), s	23.0	44.3		* 8.7	5.0	62.3		21.0						Analysis Period
Max Q Clear Time (g_c+I1), s	13.0	45.6		4.8	2.4	22.2		23.0						
Green Ext Time (p_c), s	0.2	0.0		0.0	0.0	4.8		0.0						Splits and Phase
Intersection Summary														Ø2 (R)
HCM 6th Ctrl Delay			47.0	_	_		_							74 s
HCM 6th LOS			47.0 D											
			0											
Notes														74 s
User approved pedestrian inter User approved volume balanci * HCM 6th computational engin	ng amor	ng the lane	es for turr	ning mov	ement.		ing the ba	urrior						
now our computational engli	ie ieyuli	es equal	CiediailCe	i ul lies 10	i ule pila	3C3 UUSSI	ing the ba	IIIIEI.						
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Iraffic Volume (vph) Future Volume (vph) Furn Type Protected Phases Permitted Phases Switch Phase Switch Phase Winimum Initial (s) Vinimum Split (s) Total Split (s) Fotal Split (s) Fotal Split (%) Collow Time (s) Lost Time (s) Lost Time Adjust (s) Fotal Lost Time (s) Lead/Lag Lead-Lag Optimize?	EBL 13 13 Perm 6 6 6 10.0 26.9 74.0 61.7% 4.7	EBT ************************************	WBL 86 86 Perm 2 2 2	WBT 559 559 NA 2 2	NBL 148 148 pm+pt 7 4	NBT 12 12 NA	NBR 153 153 Perm	SBL 92 92	SBT 24 24		
ane Configurations fraffic Volume (vph) Future Volume (vph) Future Volume (vph) Trotected Phases Permitted Phases Detector Phase Switch Phase Minimum Initial (s) Winimum Split (s) Total Split (s) Fotal Split (s) Fotal Split (s) Level Time (s) Lost Time (s) Lead/Lag Lead-Lag Optimize?	13 13 Perm 6 6 6 10.0 26.9 74.0 61.7% 4.7	★↑> 862 862 NA 6	* 86 86 Perm 2 2	↑ 559 559 NA 2	148 148 pm+pt 7	12 12 12 NA	7 153 153	92 92	1₀ 24		
Iraffic Volume (vph) Future Volume (vph) Furn Type Protected Phases Permitted Phases Switch Phase Switch Phase Winimum Initial (s) Vinimum Split (s) Total Split (s) Fotal Split (s) Fotal Split (%) Collow Time (s) Lost	13 Perm 6 6 10.0 26.9 74.0 61.7% 4.7	862 862 NA 6 10.0 26.9	86 86 Perm 2 2	559 559 NA 2	148 148 pm+pt 7	12 12 NA	153 153	92 92	24		
Fum Type Protected Phases Permitted Phases Detector Phase Switch Phase Minimum Split (s) Total Split (s) Total Split (s) Folal Split (s) Colal Split (s) Colal Split (s) Cotal Split (s) Cotal Split (s) Cotal Time (s) JuR-Red Time (s) Lost Time (s) Lead/Lag Lead-Lag Optimize?	Perm 6 6 10.0 26.9 74.0 61.7% 4.7	NA 6 10.0 26.9	Perm 2 2	NA 2	pm+pt 7	NA			24		
Switch Phase Minimum Initial (s) Vinimum Split (s) Total Split (s) Total Split (%) (s) All-Red Time (s) Lost Time (s) Lead/Lag Lead-Lag Optimize?	6 6 10.0 26.9 74.0 61.7% 4.7	6 6 10.0 26.9	2 2	2	7		Perm				
Permitted Phases Detector Phase Switch Phase Winimum Initial (s) Minimum Split (s) Total Split (s) Total Split (%) Vellow Time (s) All-Red Time (s) _ost Time Adjust (s) Total Split (s) Cotal Time (s) _ead/Lag _ead-Lag Optimize?	6 10.0 26.9 74.0 61.7% 4.7	6 10.0 26.9	2					Perm	NA		
Detector Phase Switch Phase Vinimum Initial (s) Vinimum Split (s) Total Split (s) Total Split (s) Total Split (%) Vellow Time (s) All-Red Time (s) Lost Time Adjust (s) Total Split (s) Cotal Time (s) Lead/Lag Lead-Lag Optimize?	6 10.0 26.9 74.0 61.7% 4.7	10.0 26.9	2	2	4	4			8		
Yellow Time (s) All-Red Time (s) Lost Time Adjust (s) Total Lost Time (s) Lead/Lag Lead-Lag Optimize?	10.0 26.9 74.0 61.7% 4.7	10.0 26.9		2	4		4	8			
Vinimum Initial (s) Vinimum Split (s) Total Split (s) Total Split (%) (ellow Time (s) All-Red Time (s) _ost Time Adjust (s) Total Lost Time (s) _ead/Lag _ead-Lag Optimize?	26.9 74.0 61.7% 4.7	26.9	10.0	2	7	4	4	8	8		
Vinimum Split (s) Total Split (s) Total Split (%) Vellow Time (s) All-Red Time (s) _ost Time Adjust (s) Total Lost Time (s) _ead/Lag _ead-Lag Optimize?	26.9 74.0 61.7% 4.7	26.9	100								
Total Split (s) (f) Total Split (%) (f) Yellow Time (s) (f) Lost Time (s) (f) Lost Time (s) (f) Lead/Lag (f) Lead/Lag (f)	74.0 61.7% 4.7		10.0	10.0	5.0	7.0	7.0	7.0	7.0		
Total Split (%) 6 Yellow Time (s) 9 All-Red Time (s) 0 Lost Time (s) 0 Loat Time (s) 0 Lead/Lag 0	61.7% 4.7	740	26.9	26.9	9.6	32.4	32.4	32.4	32.4		
Yellow Time (s) All-Red Time (s) Lost Time Adjust (s) Total Lost Time (s) Lead/Lag Lead-Lag Optimize?	4.7		74.0	74.0	26.0	46.0	46.0	20.0	20.0		
All-Red Time (s) Lost Time Adjust (s) Total Lost Time (s) Lead/Lag Lead-Lag Optimize?		61.7%	61.7%	61.7%	21.7%	38.3%	38.3%	16.7%	16.7%		
Lost Time Adjust (s) Total Lost Time (s) Lead/Lag Lead-Lag Optimize?		4.7	4.7	4.7	3.0	3.6	3.6	3.6	3.6		
Total Lost Time (s) Lead/Lag Lead-Lag Optimize?	1.2	1.2	1.2	1.2	1.6	1.8	1.8	1.8	1.8		
Lead/Lag Lead-Lag Optimize?	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Lead-Lag Optimize?	5.9	5.9	5.9	5.9	4.6	5.4	5.4	5.4	5.4		
					Lead			Lag	Lag		
	Mana	New	0.14-	0.14-	Yes	New	New	Yes	Yes		
Recall Mode	None 74.2	None	C-Max	C-Max 74.2	None 35.3	None	None 34.5	None 12.4	None 12.4		
Act Effct Green (s)	74.2 0.62	74.2 0.62	74.2 0.62	74.2 0.62	35.3 0.29	34.5 0.29	34.5 0.29	12.4 0.10	12.4 0.10		
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.29	0.29	0.29	0.10	0.10		
v/c Ratio Control Delay	11.5	13.6	23.1	15.3	37.2	27.5	14.7	0.75 83.6	0.24 32.5		
Queue Delay	0.0	0.0	23.1	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	11.5	13.6	23.1	15.3	37.2	27.5	14.7	83.6	32.5		
LOS	B	13.0 B	23.1 C	15.5 B	57.2 D	27.5 C	14.7 B	63.0 F	32.5 C		
Approach Delay	U	13.6	0	16.3	U	25.8	U		66.6		
Approach LOS		B		B		20.0 C			E		
		U		U		Ŭ			-		
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 120											
Offset: 72 (60%), Referenced to	o phase	2:WBTL	, Start of	Green							
Natural Cycle: 80											
Control Type: Actuated-Coordin	nated										
Maximum v/c Ratio: 0.75						100.0					
Intersection Signal Delay: 20.1	- CO 70/				ntersectio		B				
Intersection Capacity Utilization	162.7%			IC	CU Level	of Service	ЭВ				
Analysis Period (min) 15											
Splits and Phases: 1: 83rd P	lace & L	lavdon 🗆	heol								
		ayueii N	lodu								
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706							07	·		♦ Ø8	
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ne Configurations Y 4 b Y 4 b Y 4 c 7 y b affic Volume (veh)h) 13 862 69 86 559 17 148 12 153 92 24 22 true Volume (veh)h) 13 862 69 86 559 17 148 12 153 92 24 22 true Volume (veh)h 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	layden One otal PM Mitigated											ayden I section Su	
ane Configurations Y 4 , b Y 4 , b Y 4 , f Y 7 , b F F Y 7 , c F F F F F F F F F F		۶	-	$\mathbf{\hat{z}}$	4	+	•	•	1	۲	1	Ŧ	1
Traffic Valume (veh/h) 13 862 69 86 559 17 148 12 153 92 24 22 Future Volume (veh/h) 13 862 69 86 559 17 148 12 153 92 24 22 Future Volume (veh/h) 13 862 69 86 559 17 148 12 153 92 24 22 Parking Bus, Adj 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.0	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Future Volume (velvh) 13 862 69 86 559 17 148 12 153 92 24 22 initial Q (Qb), veh 0 <td>Lane Configurations</td> <td>۳.</td> <td></td> <td></td> <td>٦</td> <td>↑ĵa</td> <td></td> <td>1</td> <td>†</td> <td>1</td> <td>1</td> <td></td> <td></td>	Lane Configurations	۳.			٦	↑ ĵa		1	†	1	1		
Initial Q (Db), veh 0													
Ped-Bike Adj(A_pbT) 100 100 100 100 100 100 100 100 100 10	Future Volume (veh/h)							148					
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Work Zone On Approach No No </td <td></td>													
Adj Sat Flow, ve/nhln 1772 1772 1969 1772 1772 1969 1772 1772 1772 Adj Flow, Rate, ve/nh 14 947 49 91 588 7 192 16 89 102 27 7 Add Flow, Rate, ve/nh 14 947 49 91 588 7 192 16 89 102 27 7 Peak Hour Factor 0.91 0.91 0.91 0.95 0.95 0.77 0.77 0.77 0.90 0.90 0.90 Percent Heavy Veh, % 2		1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Agi Filow Rate, veh/h 14 947 49 91 588 7 192 16 89 102 27 7 Peak Hour Factor 0.91 0.91 0.91 0.95 0.95 0.95 0.77 0.77 0.77 0.90 0.90 0.90 0.90 Peak Hour Factor 0.91 0.91 0.91 0.95 0.95 0.77 0.77 0.77 0.90 0.90 0.90 0.90 Cap, veh/h 519 2.62 2 </td <td></td> <td>1770</td> <td></td> <td>1770</td> <td>1770</td> <td></td> <td>1770</td> <td>1770</td> <td></td> <td>1770</td> <td>1770</td> <td></td> <td>1770</td>		1770		1770	1770		1770	1770		1770	1770		1770
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ve On Green 0.65 0.65 0.65 0.65 0.65 0.65 0.12 0.25 0.25 0.10 0.10 0.10 0.10 Flow, veh/n 779 3618 187 536 3766 45 1688 1969 1502 1221 1508 391 Volume(v), veh/n 14 490 506 91 220 305 192 16 89 102 0 34 Sat Flow(s), veh/n 179 1870 1935 536 1870 1961 1688 1969 1502 1221 0 1898 erve(g.s), s 0.9 4.8 14.8 116 7.7 7.7 118 0.7 56 9.9 0.0 2.0 be Q Clear(g.c), s 8.6 14.8 14.8 16.8 7.7 7.7 118 0.7 56 9.9 0.0 2.0 be Q Clear(g.c), veh/n 519 1221 1224 344 121 1280 363 498 380 180 0 187 Conflicting Flow All Sat Flow(s), veh/n 519 1221 1224 344 421 121 1280 436 496 566 20.9 0.0 187 (Cap(c.a), veh/n 519 1221 1226 344 1221 1280 468 566 508 2.09 0.0 2.0 be Q Clear(g.c), veh/n 519 1221 1226 344 1221 1280 468 566 508 2.09 0.0 1.00 M Platon Ratio 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00			2362			2471	29	363	498	380	180	148	38
If Dow, weh/h 779 3618 187 536 3766 45 1688 1969 1502 1221 1508 391 p Volume(v), weh/h 14 490 506 91 290 305 192 16 89 102 0 34 p Volume(v), weh/h 14 490 506 91 290 305 192 16 89 102 0 34 p Volume(v), weh/h 14 448 16.8 1681 1969 102 102 1808 34 p Polane 100 0.01 100 100 100 100 100 100 136 1836 180 10													
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ntersection Signal Delay: 21.1 Intersection LOS: C ntersection Capacity Utilization 70.5% ICU Level of Service C nalysis Period (min) 15 Splits and Phases: 3: Hayden Road	ntersection LOS: C ntersection Capacity Utilization 70.5% ICU Level of Service C Analysis Period (min) 15 Splits and Phases: 3: Hayden Road ✓ Ø1 ↓ ↓ Ø2 (R) 22s ↓ 71s ↓ Ø4 22s ↓ 71s ↓ Ø4 27s ↓ Ø8 33s ↓ Ø2 (R) ↓ Ø4		rdinated										
ICU Level of Service C Analysis Period (min) 15 Splits and Phases: 3: Hayden Road	ICU Level of Service C Analysis Period (min) 15 Splits and Phases: 3: Hayden Road ✓ 01 ↓ → 02 (R) 22 5 ↓ 71 5 ↓ 04 22 5 ↓ 71 5 ↓ 04 27 5		1				atorooot'-						
Analysis Period (min) 15 Splits and Phases: 3: Hayden Road	Analysis Period (min) 15 Splits and Phases: 3: Hayden Road												
Splits and Phases: 3: Hayden Road ✓ Ø1	Splits and Phases: 3: Hayden Road ✓ Ø1		1011 7 0.5%)		I.	JU Level	of Service					
✓ Ø1 → Ø2 (R) 22s 71s 27s	✓ 01 ↓ 02 (R) 225 ↓ 71 s ↓ 04 ✓ 06 (R) ↓ 03 335 ↓ 27 s ↓ 03 27 s ↓ 03	Analysis Fendu (min) 15											
Ø1 02 (R) 22s 71s 27s 4	✓ 01 ↓ 02 (R) 225 ↓ 71 s ↓ 04 ✓ 06 (R) ↓ 03 335 ↓ 27 s ↓ 03 27 s ↓ 03	Solite and Phases: 3. Hav	den Road										
22s 71s 27s 27s	22 s 71 s 27 s 27 s 27 s 27 s 27 s 27 s	·									1.1		
4 −	▼ 06 (R) 33s 27s 27s	🔰 🖉 🔰	🗝Ø2 (R)								- + Y	Ø4	
✓ Ø6 (R) 33s 27 s	27 s	22 s 71	S								27 s		
27 s	27 s	+											
	18/02/2019 Synchro 10 Report 08/02/2019	V Ø5 (R)									27.6	2/8	
	18/02/2019 Synchro 10 Report 08/02/2019	003									2/ S		
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02/2019 Synchro 10 Report 08/02/2019 Tech BR Page 4 CivTech BR													

3: Hayden Road HCM 6th Signalized Intersection Summary

hase 1).

Synchro 10 Report Page 5

Hayden One Total PM Mitigated

4: Northeast Access & Hayden Road HCM 6th TWSC

Intersection	0.4						
nt Delay, s/veh	0.4						
Novement	EBT	EBR	WBL	WBT	NBL	NBR	
ane Configurations	- 11	1		- 11		1	
raffic Vol, veh/h	1350	28	0	892	0	74	
uture Vol, veh/h	1350	28	0	892	0	74	
onflicting Peds, #/hr	0	0	0	0	0	0	
ign Control	Free	Free	Free	Free	Stop	Stop	
T Channelized	-	None	-	None	-	None	
torage Length	-	135	-	-	-	0	
eh in Median Storage	,# 0	-	-	0	0	-	
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	92	92	93	93	90	90	
leavy Vehicles, %	2	2	2	2	2	2	
Avmt Flow	1467	30	0	959	0	82	
		00	5		5		
ajor/Minor I	Major1	I	Major2	Ν	/linor1		
onflicting Flow All	0	0	-		-	734	
Stage 1	-	-	-	-	-		
Stage 2							
critical Hdwy				-		6.94	
ritical Hdwy Stg 1	-	-	-			0.94	
ritical Hdwy Stg 2	-		-	-	-		
ollow-up Hdwy	-	-	-	-	-	3.32	
ot Cap-1 Maneuver	-		0	-	0	*502	
Stage 1	-	-	0		0	502	
Stage 2		-	0	-	0	-	
latoon blocked. %	-	-	0	-	0	- 1	
lov Cap-1 Maneuver	-	-			-	*502	
Nov Cap-1 Maneuver Nov Cap-2 Maneuver	-	-			-	^502	
	-	-			-		
					-	-	
Stage 1	-	-					
	-	-	-	-	•	-	
Stage 1	-	-	-	-	-	-	
Stage 1 Stage 2	- EB	-	- WB		NB		
Stage 1 Stage 2	-	-		-		-	
Stage 1 Stage 2 pproach CM Control Delay, s	- EB	-	WB	-	NB	-	
Stage 1 Stage 2 pproach ICM Control Delay, s	- EB	-	WB	-	NB 13.6	-	
Stage 1 Stage 2 Approach HCM Control Delay, s HCM LOS	- EB 0		<u>WB</u> 0		NB 13.6 B	-	
Stage 1 Stage 2 Approach ICM Control Delay, s ICM LOS Minor Lane/Major Mvm	- EB 0	NBLn1	WB 0 EBT	EBR	NB 13.6 B WBT	-	
Stage 1 Stage 2 pproach CM Control Delay, s CM LOS inor Lane/Major Mvm apacity (veh/h)	- EB 0	<u>NBLn1</u> 502	WB 0 EBT		NB 13.6 B WBT	-	
Stage 1 Stage 2 pproach CM Control Delay, s CM LOS linor Lane/Major Mvrr apacity (veh/h) CM Lane V/C Ratio	- EB 0	NBLn1 502 0.164	WB 0 EBT		NB 13.6 B WBT		
Stage 1 Stage 2 pproach ICM Control Delay, s ICM LOS Itinor Lane/Major Mvm Capacity (veh/h) ICM Lane V/C Ratio ICM Control Delay (s)	- EB 0	NBLn1 502 0.164 13.6	WB 0 EBT - -	EBR - -	NB 13.6 B WBT - -		
Stage 1 Stage 2 ICM Control Delay, s ICM LOS Itinor Lane/Major Mvm apacity (veh/h) ICM Lane V/C Ratio ICM Control Delay (s) ICM Lane LOS	- EB 0	NBLn1 502 0.164 13.6 B	<u>WB</u> 0 EBT - - -		NB 13.6 B WBT		
Stage 1 Stage 2 pproach CM Control Delay, s CM LOS inor Lane/Major Mvm apacity (veh/h) CM Lane V/C Ratio CM Control Delay (s)	- EB 0	NBLn1 502 0.164 13.6	WB 0 EBT - -	EBR - -	NB 13.6 B WBT - -		

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Hayden One Total PM Mitigated

5: Burger King Drwy & Hayden Road HCM 6th TWSC

nt Delay, s/veh	0.6													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
ane Configurations	<u>۲</u>	- 11	7	<u>۲</u>	- 11	7		4			4			
Fraffic Vol, veh/h	7	1399	43	22	874	19	11	0	19	12	0	18		
Future Vol, veh/h	7	1399	43	22	874	19	11	0	19	12	0	18		
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0		
ign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop		
T Channelized	-	-	None	-	-	None	-	-	None	-	-	None		
Storage Length	100	-	75	90	-	100	-	-	-	-	-	-		
/eh in Median Storage,	# -	0	-	-	0	-	-	1	-	-	1	-		
Grade, %	-	0	-	-	0	-		0	-	-	0	-		
Peak Hour Factor	90	90	90	96	96	96	75	75	75	75	75	75		
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2		
Avmt Flow	8	1554	48	23	910	20	15	0	25	16	0	24		
Major/Minor N	lajor1		1	Major2	_	1	Minor1		Ν	Minor2	_			
Conflicting Flow All	930	0	0	1602	0	0	2071	2546	777	1749	2574	455		
Stage 1	-	-	-	-	-	-	1570	1570	-	956	956	-		
Stage 2				-	-		501	976	-	793	1618			
Critical Hdwy	4.14	-	-	4.14	-	-	7.54	6.54	6.94	7.54	6.54	6.94		
Critical Hdwy Stg 1	-			-			6.54	5.54	- 0.04	6.54	5.54	- 0.04		
Critical Hdwy Stg 2	-			-	-		6.54	5.54	-	6.54	5.54	-		
Follow-up Hdwy	2.22			2.22			3.52	4.02	3.32	3.52	4.02	3.32		
Pot Cap-1 Maneuver	731	-	-	*751	-	-	*92	*26	*502	*291	25	552		
Stage 1	-			-			*474	*415	- 002	*277	335	- 002		
Stage 2	- 1			-			*521	*327	-	*474	407			
Platoon blocked, %				1	-		1	1	1	1	1 1			
Nov Cap-1 Maneuver	731		_	*751	-	-	*85	*25	*502	*268	24	552		
Nov Cap-2 Maneuver	-			-			*254	*172	-	*250	171	-		
Stage 1	-	-	_	-	-	_	*468	*411	-	*274	325	_		
Stage 2				-	_		*483	*317	-	*445	403	-		
Oldge 2							400	517		440	400			
Approach	EB			WB			NB			SB				
HCM Control Delay, s	0	_	_	0.2	_	_	15.9		_	15.8	_			
HCM LOS	0			0.2			15.9 C			15.0 C				
							U			U				
lines ene/ht-i ht			EDI	EPT	EDE		MOT							
/linor Lane/Major Mvmt		NBLn1	EBL	EBT	EBR	WBL	WBT	WBR :	-					
Capacity (veh/h)		370	731	-	-	* 751		-	372					
HCM Lane V/C Ratio		0.108		-	-	0.031	-	-						
ICM Control Delay (s)		15.9	10	-	-	9.9	-	-	15.8					
ICM Lane LOS		C	A	-	-	A	-	-	C					
HCM 95th %tile Q(veh)		0.4	0	-	-	0.1	-	-	0.4					
Notes														
-: Volume exceeds cap	acity	\$: De	elay exc	eeds 3	00s	+: Com	putatio	n Not D	efined	*: All	major	volume ir	platoon	

Hayden One Total PM Mitigated

6: Northsight Boulevard & Hayden Road HCM 6th Roundabout

Intersection								
Intersection Delay, s/veh	20.3							
Intersection LOS	С							
Approach		EB		WB		NB		SB
Entry Lanes		2		2		2		1
Conflicting Circle Lanes		2		2		2		2
Adj Approach Flow, veh/h		1470		691		685		457
Demand Flow Rate, veh/h		1500		705		699		466
Vehicles Circulating, veh/h		298		638		1333		787
Vehicles Exiting, veh/h		955		1394		465		556
Ped Vol Crossing Leg, #/h		0		0		0		0
Ped Cap Adj		1.000		1.000		1.000	1.	000
Approach Delay, s/veh		14.8		10.6		44.1	1	6.8
Approach LOS		В		В		E		С
Lane	Left	Right	Left	Right	Left	Right	Left	
Designated Moves	LT	TR	LT	TR	LT	R	LTR	
Assumed Moves	LT	TR	LT	TR	LT	R	LTR	
RT Channelized								
Lane Util	0.470	0.530	0.470	0.530	0.506	0.494	1.000	
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.535	
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.328	
Entry Flow, veh/h	705	795	331	374	354	345	466	
Cap Entry Lane, veh/h	1026	1102	751	826	396	457	727	
Entry HV Adj Factor	0.980	0.980	0.981	0.979	0.981	0.980	0.981	
Flow Entry, veh/h	691	779	325	366	347	338	457	
Cap Entry, veh/h	1006	1080	736	808	389	448	714	
V/C Ratio	0.687	0.721	0.441	0.453	0.894	0.754	0.641	
Control Delay, s/veh	14.5	15.0	10.9	10.4	55.4	32.6	16.8	
LOS	В	С	В	В	F	D	С	
95th %tile Queue, veh	6	7	2	2	9	6	5	

	≯	-	\mathbf{r}	1	-	•	1	1	1	1	Ļ	
ane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	
ane Configurations	۲	<u></u>	1	ኘ	<u></u>	1	<u> </u>	र्स	1	٦	¢î	
Fraffic Volume (vph)	5	1709	244	334	1350	13	435	8	780	23	29	
Future Volume (vph)	5	1709	244	334	1350	13	435	8	780	23	29	
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	Split	NA	pm+ov	Split	NA	
Protected Phases	5	2	8	1	6		8	8	. 1	4	4	
Permitted Phases			2			6			8			
Detector Phase	5	2	8	1	6	6	8	8	1	4	4	
Switch Phase												
Vinimum Initial (s)	5.0	10.0	5.0	5.0	10.0	10.0	5.0	5.0	5.0	6.0	6.0	
Vinimum Split (s)	11.0	38.7	47.0	11.0	25.7	25.7	47.0	47.0	11.0	44.3	44.3	
Total Split (s)	11.0	50.0	27.0	29.0	68.0	68.0	27.0	27.0	29.0	14.0	14.0	
Total Split (%)	9.2%	41.7%	22.5%	24.2%	56.7%	56.7%	22.5%	22.5%	24.2%	11.7%	11.7%	
Yellow Time (s)	4.0	4.7	4.0	4.0	4.7	4.7	4.0	4.0	4.0	3.3	3.3	
All-Red Time (s)	2.0	1.0	2.0	2.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	6.0	5.7	6.0	6.0	5.7	5.7	6.0	6.0	6.0	5.3	5.3	
_ead/Lag	Lag	Lead		Lag	Lead	Lead			Lag			
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes			Yes			
Recall Mode	None	C-Max	None	None	C-Max	C-Max	None	None	None	None	None	
Act Effct Green (s)	5.0	49.3	74.9	23.0	76.1	76.1	19.9	19.9	44.1	7.0	7.0	
Actuated g/C Ratio	0.04	0.41	0.62	0.19	0.63	0.63	0.17	0.17	0.37	0.06	0.06	
//c Ratio	0.09	0.89	0.27	0.55	0.41	0.01	0.89	0.80	1.35	0.35	0.51	
Control Delay	58.2	40.5	2.9	47.7	12.7	0.0	82.6	68.2	195.0	63.7	57.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	58.2	40.5	2.9	47.7	12.7	0.0	82.6	68.2	195.0	63.7	57.8	
LOS	E	D	А	D	В	A	F	E	F	E	E	
Approach Delay		35.8			19.5			151.7			59.9	
Approach LOS		D			В			F			E	
ntersection Summary												
Cycle Length: 120												
Actuated Cycle Length: 120												
Offset: 72 (60%), Referenced	l to phase	e 2:EBT a	nd 6:WB	T, Start of	f Green							
Natural Cycle: 145												
Control Type: Actuated-Coord	dinated											
Vaximum v/c Ratio: 1.35												
ntersection Signal Delay: 58.				li li	ntersectio	n LOS: E						
ntersection Capacity Utilizati	on 101.5	%		10	CU Level	of Service	θG					
Analysis Period (min) 15												
Splits and Phases: 7: Hayo	lon Dood	9 Eropk	Lloyd Wr	aht Dould	word							
		arrank	LIUYU VVI	1				N	•	Ø8		
₩ 102 (R)				€ fø	1			Ø4		Ø8	_	_
50 s				29 s			14	s	27 s			
Ø6 (R)						<u> </u>	Ø5					
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CivTech BR

19-ZN-2013#2 8/8/2019

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
ane Configurations	٦	^	1	ኘኘ	^	1	۲	ર્સ	1	٦	4Î	
Traffic Volume (veh/h)	5	1709	244	334	1350	13	435	8	780	23	29	13
Future Volume (veh/h)	5	1709	244	334	1350	13	435	8	780	23	29	13
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	1772	1969	1772	1772	1969	1772	1772	1969	1772	1772	1969	1772
Adj Flow Rate, veh/h	6	1964	148	344	1392	5	469	0	617	34	43	4
Peak Hour Factor	0.87	0.87	0.87	0.97	0.97	0.97	0.94	0.94	0.94	0.67	0.67	0.67
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	114	1984	817	712	2790	780	591	0	589	79	83	8
Arrive On Green	0.07	0.37	0.37	0.22	0.52	0.52	0.17	0.00	0.17	0.05	0.05	0.05
Sat Flow, veh/h	1688	5375	1502	3274	5375	1502	3375	0	1502	1688	1774	165
Grp Volume(v), veh/h	6	1964	148	344	1392	5	469	0	617	34	0	47
Grp Sat Flow(s),veh/h/ln	1688	1792	1502	1637	1792	1502	1688	0	1502	1688	0	1939
Q Serve(g_s), s	0.4	43.6	6.0	11.0	20.2	0.2	16.0	0.0	21.0	2.4	0.0	2.8
Cycle Q Clear(g_c), s	0.4	43.6	6.0	11.0	20.2	0.2	16.0	0.0	21.0	2.4	0.0	2.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		0.09
Lane Grp Cap(c), veh/h	114	1984	817	712	2790	780	591	0	589	79	0	90
V/C Ratio(X)	0.05	0.99	0.18	0.48	0.50	0.01	0.79	0.00	1.05	0.43	0.00	0.52
Avail Cap(c_a), veh/h	114	1984	817	712	2790	780	591	0	589	122	0	141
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	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	52.4	37.6	13.8	41.0	18.7	13.9	47.4	0.0	36.4	55.7	0.0	55.9
Incr Delay (d2), s/veh	0.1	17.9	0.5	0.2	0.6	0.0	6.8	0.0	49.9	1.4	0.0	1.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	22.0	3.1	4.5	8.4	0.1	7.3	0.0	14.1	1.0	0.0	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.4	55.6	14.3	41.2	19.4	13.9	54.2	0.0	86.3	57.0	0.0	57.6
LnGrp LOS	D	E	В	D	В	В	D	A	F	E	A	E
Approach Vol, veh/h		2118			1741			1086			81	
Approach Delay, s/veh		52.7			23.7			72.5			57.4	
Approach LOS		D			С			E			E	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	32.1	50.0		10.9	14.1	68.0		27.0				
Change Period (Y+Rc), s	6.0	5.7		* 5.3	6.0	5.7		6.0				
Max Green Setting (Gmax), s	23.0	44.3		* 8.7	5.0	62.3		21.0				
Max Q Clear Time (g_c+I1), s	13.0	45.6		4.8	2.4	22.2		23.0				
Green Ext Time (p_c), s	0.2	43.0		0.0	0.0	4.8		0.0				
$u = \gamma$	0.2	0.0		0.0	0.0	1.0		0.0				
Intersection Summary			47.0									
HCM 6th Ctrl Delay HCM 6th LOS			47.0 D									
Notes												
Jser approved pedestrian inter Jser approved volume balancir t HCM 6th computational engin	ng amor	ig the lan	es for turr	ning move	ement.		ng tha ha	rrior				



August 6, 2019

Brad Carr, Senior Planner City of Scottsdale 7447 East Indian School Scottsdale, AZ 85251

Re: 19-ZN-2013 #2, 906-PA-2018

Mr. Carr-

I wanted to update you regarding Yam's concerns over the Impact Church's proposed amendments to the Approved Development Plan (19-ZN-2019 #2). We have had an opportunity to meet with Mr. Leary and his client regarding Yam's issues with the proposed entitlement changes to the vacant 6.6 acres fronting on Hayden Road at 84th Street.

As a result of this discussion, we offer the following comments-

- 1. Both parties agree that a traffic signal is necessary at the entrance located at 84th street and Hayden Road to control traffic movements at this intersection. The subject project will be responsible for the design and installation of this traffic signal.
- 2. There is considerable concern regarding the amount of floor area that is available for retail/restaurant uses. As a result, we feel it is imperative that the proposed uses and their respective allowable maximum floor areas be identified and stipulated as part of the overall entitlement approval.

We believe the overall proposed retail/restaurant area should not exceed 35% of the total building square footage that is physically built and the total restaurant use should be limited to 35% of the total retail use. Should the overall square footage built decrease, we believe the allowable retail/restaurant square footage should decrease in proportion to maintain the aforementioned percentages.

At the current total square footage of 194,000 SF, the allowable maximum area for the 3 uses would breakdown as follows-

•	Office	126,100	SF
•	Retail	44,135	SF

- 23,765 SF Restaurant
- 194,000 SF Total

Page 2-Letter to Mr. Brad Carr (19-ZN-2013 #2)

However, if the total building square footage were to decease to 130,000 SF, for example, then the allowable maximum area for the 3 uses would adjust in proportion and breakdown as follows-

•	Office	84,500 SF
-	Potail	29 575 SF

- Retail 29,575 SF
 Restaurant 15,925 SF
- Total 130,000 SF

We appreciate your time and attention to our concerns. Please contact me at your earliest convenience to discuss.

Thank-you, David Gulino

Land Development Services, LLC (602) 330-5252 DGULINO@LDSERVICES.NET

c. Dan Dahl, Yam Properties, LLC

Michael P. Leary, LTD

10278 E. Hillery Drive Scottsdale, Arizona 85255 cell (480) 991-1111 michaelpleary@cox.net

19-ZN-2013#2

8/8/2019

DATE: August 4, 2019

TO: Brad Carr, Senior Planner

FROM: Mike Leary

RE: CORE CENTER – 19-ZN-2013 #2 Response to 1st review letter/PC meeting in September

Brad below are the responses to the 1st review letter. Based upon our responses we would appreciate being scheduled for the first available Planning Commission meeting in order for our project being considered by City Council as anticipated in October due to contractual obligations. Discussions on any areas of disagreement can continue and, if needed, resolved at public hearing.

Thanks again for all the help Brad. ML

7/12/2019

Michael P. Leary, LTD 10278 E Hillery Dr Scottsdale, AZ 85255

RE: 19-ZN-2013#2 Core Center H4145 (Key Code)

Dear Mr. Leary:

The Planning & Development Services Division has completed the review of the above referenced development application submitted on 6/5/2019. The following **1**st **Review Comments** represent the review performed by our team, and is intended to provide you with guidance for compliance with city codes, policies, and guidelines related to this application.

Zoning Ordinance and Scottsdale Revise Code Significant Issues

The following code and ordinance related issues have been identified in the first review of this application, and shall be addressed in the resubmittal of the revised application material. Addressing these items is critical to scheduling the application for public hearing, and may affect the City Staff's recommendation. Please address the following:

Zoning:

- Please revise the Project Narrative to include a discussion of the use of the PCP district bonus provisions. Discussion should include the proposed bonus to be requested, the justification for the proposed bonus, calculations for the estimated value of the bonus, as well as a plan for community benefit related to the estimated value of the bonus. (Zoning Ordinance, Sec. 5.4008. and 7.1200.) Done
- 2. Please revise the project plans to demonstrate compliance with the setback and stepback requirements of the PCP zoning district. The setback requirement is a minimum of 25 feet from the curb line along N. Hayden Road. The stepback requirements starts at the minimum setback line. (Zoning Ordinance, Sec. 5.4007.D. & 5.4007.E.) Done
- 3. Please revise the project plans to include the calculations for floor area ratio (FAR) in compliance with the Zoning Ordinance, Sec. 5.4007.A. *Done*
- 4. The site and Core Apartments as part of case 19-ZN-2013 appears to not have complied with stipulation 7 "PEDESTRIAN CONNECTIONS. The site shall provide a minimum of three (3) pedestrian connections to existing properties surrounding the site. A minimum of one (1) connection having a minimum with of six (6) feet shall be provided to each of the west, south and east sides of the site. Pedestrian connections shall be reviewed and approved by city transportation staff." Please revise the project plans to identify compliance with these requirements. According to the Sunrise apartments developer, no response was received from the adjoining properties (Costco and Home Depot) to requests for approval to make pedestrian connections. The apartments did provide a sidewalk that connects to the walled-in stormwater pumps. The sidewalk appears to be a possibly route for future access to a nearby sidewalk in Costco's parking lot. No potential access is possible on the gas station side of the Costco property due to an existing wash. The proposed plan does show a possible connection to an existing Burger King sidewalk which then leads to a series of striped pedestrian crossings including one that winds around the side of the Home Depot building. In addition to the existing 5' sidewalk from Hayden a pedestrian crossing from Buildings D and E is provided to the existing 5' apartment sidewalk.



- 5. Please submit a revised copy of the Citizen Review Report summary to include details of the most recent public outreach efforts, including any additional public comments that may have been received. (Zoning Ordinance, Sec. 1.305.C.2.b.) **Done**
- 6. Please provide conceptual elevations in conformance with the district requirements with the next submittal. (Zoning Ordinance, Sec. 1.303.) *Elevations are provided demonstrating compliance with development standards of setback, stepbacks and heights.*

2001 General Plan & Greater Airpark Character Area Plan (GAPCAP) Analysis:

7. The first submittal narrative/ development master plan- a document that is intended to provide overall coordination of urban design character, buffering to adjacent uses, transportation systems, and infrastructure necessary for the proposed development – includes unnecessary/oppositional statements that are not material in any manner to the application request; please see applicant responses to General Plan Growth Area Element

19-ZN-2013#2

Goal #2, Bullet #1, and Community Mobility Element Goal #5, Bullet#3 regarding light-rail transit and equestrians. Please revise the Project Narrative to include only necessary statements are in direction relation to the proposed development be included in the development master plan upon resubmittal. **Done**

To this end, please ensure that responses that are completed with "refer to prior responses" (found throughout the document) indicate by numerical identification, and page number, reference to the response the applicant is directing the reader to. Additionally, please remove responses that indicate "not applicable". **Done**

8. The General Plan Character and Design Element (Goal 4, bullets 10, 14, and 15) encourage "streetscapes for major roadways that promote the city's visual quality and character; and blend into the character of the surrounding area. The Greater Airpark Character Area Plan Character and Design Element (Goal CD2, Policy CD 2.1.6, CD 2.2, and CD2.7), and Economic Vitality Element (Goal 5, bullet 6) promotes vibrant Signature Corridors in the Greater Airpark to provide a distinct identify and design theme in the area. Although the first submittal discusses Hayden Road being designated as a Signature Corridor, there appears to be no indication as to what that means as a result of this development proposal – details of such are expected of a formal Development Plan. Please note Hayden Road at the subject site's frontage is a designated Signature Corridor and Buffered Roadway – an area in which 50' foot minimum setback, measured from back of curb line, is expected to be maintained as per CD2.7 of the GACAP. Please respond both graphically and narratively as to how the proposed development will provide this dimension and enhance the Streetscape in response to the cited considerations. Please consider additions of areas of pedestrian lighting, public art, bus shelters, and other public amenities to enhance the pedestrian environment and streetscape. The 2014 zoning approval established the landscaped setbacks for the Hayden Road streetscape (Stipulation #6) and the specifics of the Signature Cooridor streetscape plan were approved by the Development Review Board. The streetscape landscaping and new sidewalks were installed and constructed with the development of the apartments. Enclosed are the zoning stipulations for reference.



9. Please respond to Goal 10, along with any applicable bullets, of the of the General Plan Preservation and Environmental Planning Element, and Goal EP5 of the Greater Airpark Character Area Plan addressing how the proposed development may, if at all, utilize green building alternatives that support sustainable desert living. Done – see revised comments Attachment B

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a. Please note, **(Noted)** Scottsdale is progressively attempting to install in capital projects, and request from private development applications, Low Impact Development (LID) and Green Infrastructure (GI) as a method of stormwater control, water harvesting, and cleansing for the first flush requirements of the City's Floodplain Ordnance. Accordingly, please consider utilization of this resource. More information on this initiative can be found at:

https://sustainability.asu.edu/sustainable-cities/resources/lid-handbook/

10. As a respond to Goal 1 of the Community Involvement Element, with a resubmittal, please provide an updated Citizen Involvement Report that describes the key issues that have been identified through the public involvement process. **Done**

Fire:

- **11.** Please revise the project plans to demonstrate hydrant spacing, existing and proposed (Fire Ord. 4283, 507.5.1.2) *Hydrants are shown on the Preliminary Site Utility Plan.*
- 12. Please revise the project plans to demonstrate the location of Fire Department Connection(s). (Fire Or. 4283, 912) *Done*

Drainage:

13. Please submit a copy of the revised Drainage Report with the remainder of the resubmittal material identified in Attachment A. Please see comments within the red-lined 1st submittal of the Drainage Report and Preliminary G&D and address accordingly. There were no comments on the Drainage Plan

Water and Wastewater:

- 14. Please submit a revised Water and Wastewater Design Report with the remainder of the resubmittal material identified in Attachment A. Please see comments within the red-lined 1st submittal of the Report. The Preliminary Basis of Design Report must be accepted by the Water Resources Department prior to scheduling of first hearing of project. *Comments addressed see report dated 7/30/19.*
- **15.** Please submit flow monitoring results of northern 8-inch sewer in Hayden Road with next submittal. Added flow monitoring from the Wood/Patel report in Appendix E. Because the possible sewer capacity issues to the "north" sewer main, the site sewer design was changed in Figure 2 so that wastewater discharge is to the "south" main.

Airport:

16. The subject site is within Airport noise compatibility study AC-2 area. Please note that a signed Avigation Easement along with the required legal descriptions and graphic, and a copy of the Noise Disclosure statement will be required with the final plans submittal. Noted

Engineering:

- 17. All waste shall be placed in suitable containers to facilitate waste removal in a sanitary condition. Please revise the project plans accordingly. (SRC, Sec. 24-13) Noted. As the project is at the concept zoning stage, waste removal will be demonstrated in subsequent development plans.
- 18. Off-site transportation, stormwater and water resources improvements along property frontages to existing supporting infrastructure, with associated dedications, is required. Please update the project plans accordingly. (SRC, Sec. 48-7, 47-10 & 49-219) **Done**

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Significant Policy Related Issues

The following policy related issues have been identified in the first review of this application. While these issues may not be critical to scheduling the application for public hearing, they may affect the City Staff's recommendation pertaining to the application and should be addressed with the resubmittal of the revised application material. Please address the following:

Transportation:

- 19. The entry drive should be redesigned to be in conformance with COS Standard Detail #2257, CH-2. The proposed raised median creates offset lanes alignments with the existing driveway to the northwest. An entry drive of 48 feet of pavement width transitioning to 55 feet is unnecessary. Please revise the project plans accordingly. (DSPM, Sec. 5-3.200 & 5-3.205) Please refer to response included with the revised traffic study.
- 20. The north end of the site is designed poorly. The driveway leading from Hayden Road directs vehicles into the pedestrian courtyard. The short turning radius on the site drive leading to this driveway will create issues with vehicle queuing and blocking inbound traffic. Please revise the project plans to correct these issues. (Zoning Ordinance, Sec. 1.204.) *The geometry has been modified to increase the turning radii*.

Traffic Study:

- 21. Transportation staff is not fully supportive of the installation of a traffic signal at 84th Street/Hayden Road due to signal spacing. The proposed change from a church to offices and restaurants result in ~ 4x the daily and AM peak hour trips generated and ~10X the PM peak hour trips generated. This has profound impacts on traffic, particularly at the 84th Street/Hayden Road intersection. Signalization was not intended/planned for this location. DSPM 5-3.123 G3 indicates that "At Minor Arterial/Minor Arterial (or smaller designated streets) intersections the designer should evaluate using a roundabout as an alternative to a traffic signal for all new or significantly rebuilt intersections." The TIMA appears to include no indication that a roundabout option was evaluated. Please address these issues with the next submittal. (DSPM, Sec. 5-3.123) *Please refer to response included with the revised traffic study.*
- 22. Please revise the traffic study to add a queue analysis for site driveways due to the substantial increase in projected trip generation as well as queue analysis for the intersection of 84th Street and Hayden Road due to the proposed control change (signalization). (Zoning Ordinance, Sec. 1.303.) *Done Please refer to response included with the revised traffic study.*
- **23.** Please revise the traffic study to provide project site & total ADT on major street(s) within the study area. (DSPM, Sec. 5-1.701) **Done**

24.

Page 31, 1st bullet (84th Street & Hayden Road), 3rd sentence - the site plan depicts a redesign of the existing site driveway. The developer is responsible for correct alignment of their proposed new driveway to prevent negative offset of left turning vehicles. Should the intersection be signalized, the developer will be responsible for improvements associated with

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the traffic signal, including and not limited to providing a left turn lane on all approaches. Please revise the project plans to address this comment. (Zoning Ordinance, Sec. 1.204.) **Done**

New comments received after July 12th 1st review letter_____

From: Ostler, Douglas <DOstler@Scottsdaleaz.gov> Sent: Monday, **July 29, 2019 11:58 AM** To: Tove White Cc: Kercher, Phillip; Guntupalli, Kiran; Carr, Brad Subject: Core Center Traffic Study Comments, 19-ZN-2013 #2

Transportation staff had additional discussions and review of the proposed CORE Center project and associated TIMA. In addition to the comments already provided, please address the following items related to evaluation of appropriate traffic control at the 84th Street and Hayden Road intersection:

- Please use the 24-hour counts that were collected at the 84th Street and Hayden Road intersection for evaluating the signal warrants in existing conditions.
- A reduction for right turning traffic is expected to be applied to the minor street approach volumes (see MUTCD Section 4C.01 Paragraph 8).
- Staff recommends consideration of restricting left turns out of the driveway as an alternative to signalization, even if signal warrants are met (see MUTCD Section 4B.04 Paragraph 2J). This restriction would be for the driveway by means of a pork-chop median or channelization, etc.; 84th Street would remain full access.
 - Note: this does not retract comment 21 in the comment letter. You may state the circumstances and/or reference discussion(s) indicating compliance with DSPM 5-30123 G3.
- Correct reference to Sarival Avenue (instead of Hayden Road) on page 17 of the study.
- Using the 24-hour counts that were collected at the 84th Street and Hayden Road intersection, state the 24-hour volume on Hayden Road in existing conditions as well as the projected ADT added by the site.

Please refer to responses included with the revised traffic study_____

Engineering:

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^{25.} Please review the Context Aerial with corrections provided by Engineering for existing easement conflicts that will need to be modified or released prior to permit issuance, including:

- a. Any GLO easements in conflict with proposed development and not required by city LAIPS or TMP will need to be abandoned by property owner prior to any permit issuance. Specifically for this project, the supplied ALTA survey identified GLOs per the following recording information: docket 1443 page 63 and docket 3025 page 473. Please call out required abandonments on site plan. (DSPM, Sec. 1-2.400) Noted.
- b. Water lines located outside of a public right-of-way or street tract must be placed in a minimum 20' wide easement:
 - i. Horizontally, a minimum of 6' is required between the water line and the edge of easement. *Modified the proposed water easement accordingly. Please see updated Preliminary Site Utility Plan (Figure 2) in the water/sewer BOD report*
 - ii. The easement will be free of obstructions, shall not be in a fenced area, and shall be accessible always to city service equipment such as trucks and backhoes. *Noted*
 - iii. Easements outside of paved areas shall have a 10' wide hardened patch with a cross-slope not greater than 10% and a longitudinal slope not greater than 20%.
 Hardened paths shall consist of native soil compacted to 95% to a depth of 1'. Noted
 - iv. Revegetation within the easement shall consist of low growing shrubs. Update site plan accordingly. Noted As the plan is at a conceptual zoning stage these items will be addressed and incorporated into subsequent plans.
- c. Existing cross access and emergency services access easement through project parcel to abutting parcel in conflict with proposed development will need to be relocated to provide cross access to southern and eastern abutting parcels. Please update the project plans accordingly. (DSPM, Sec. 5-3.201) Noted As the plan is conceptual zoning stage cross-access and emergency access will be addressed and incorporated into subsequent plans.
- 26. Please revise the project plans to comply with the following location and design requirements for non-residential, mixed-use, and multi-family residential refuse and recycling enclosures. Please locate and position the enclosure(s): (DSPM, Sec. 2-1.309)
 - a. A minimum of one (1) enclosure shall be provided for every 20,000 square feet of office/retail space.
 - b. So that the approach pad for the enclosure(s) is located that the refuse truck route to and from the public street has a minimum unobstructed vertical clearance of 13 feet 6 inches (14 feet is recommended), and unobstructed minimum vertical clearance above the approach pad and refuse enclosure of 25 feet. (The vertical clearances are subject to modification based on enclosure container size, location, and positioning as determined by the Sanitation Director, or designee.);
 - c. In a location that is easily accessible for collection, and does not require the refuse truck to "backtrack";
 - d. A maximum 100 feet distance from building service exit to refuse enclosure;
 - e. So that collection vehicles do not back up more than 35 feet;
 - f. So that the path of travel for the refuse truck accommodates a minimum vehicle turning radius of 45 feet, and a minimum length of 40 feet;

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- g. So that the approach pad is level, with a maximum of 2 percent slope;
- So that the enclosure(s) are not placed between the on-site buildings and adjacent lower density residential unless there is no reasonable alternative. In these situations, orient the enclosure(s) towards the interior of the property;
- i. So that the enclosure(s) are not placed next to drainage ways or basins, unless there is no reasonable alternative;
- j. So that the enclosure(s) are not placed between the street and the front of the building, unless there is no reasonable alternative; and
- k. So that the enclosure(s) are not placed at the end of a dead-end parking aisle.

Noted – As the plan is at the conceptual zoning stage these items including the provision for compactors will be addressed and incorporated into subsequent plans.

- 27. Compactors may be used as an alternative to refuse or recycling containers. To determine adequacy and site location of compactors, if proposed, please provide the following on a refuse plan:
 - a. Compactor type,
 - b. Compactor capacity state on site plan compactor capacity conversion equating to the city's required 1 enclosure for every 20,000 square feet with no recycling,
 - c. Compactor location, addressing the following:
 - i. Place the refuse compactor container and approach pad so that the refuse truck route to and from the public street has a minimum unobstructed vertical clearance of thirteen (13) feet six (6) inches (fourteen (14) feet is recommended), and unobstructed minimum vertical clearance above the concrete approach slab and refuse compactor container storage area concrete slab of twenty-five (25) feet,
 - ii. Place the refuse compactor container in a location that does not require the bin to be maneuvered or relocated from the bin's storage location to be loaded on to the refuse truck,
 - iii. Provide a refuse compactor container approach area that has a minimum width of fourteen (14) feet and length of sixty (60) feet in front of the container, and
 - iv. Demonstrate path of travel for refuse truck accommodates a minimum vehicle turning radius of 45', and vehicle length of 40'.

Noted – As the plan is at the conceptual zoning stage the provision for compactors will be addressed and incorporated into subsequent plans.

- 28. Although not a requirement, recycling is an amenity found to be desired by Scottsdale residents. Please note if recycling containers will be provided for the development project. Noted As this project is at the conceptual zoning stage recycling will be addressed with subsequent development plans.
- 29. Please revise the project plans with a 6' width accessible pedestrian route from the main entry of the development to each Hayden. (DSPM, Sec. 2-1.310) The apartments constructed a 5' sidewalk from its building entrance to Hayden Road and a new 8' sidewalk along portions of Hayden Road transitioning into existing 5' wide sidewalks leading from Costco and Burger King/Home Depot. Consistent with these recently constructed improvements, 5' sidewalks are also proposed from the development to

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30. Please revise the project plans to provide an eight (8) foot wide minimum, curb-separated sidewalk along the project boundary. (DSPM, Sec. 5-3.102 and 5-3.110) Per Item 29 above, an 8' wide sidewalk was constructed along portions of the Hayden Road frontage as part of the construction of the apartment project.

Technical Corrections

The following technical ordinance or policy related corrections have been identified in the first review of the project. While these items are not as critical to scheduling the case for public hearing, they will likely affect a decision on the final plans submittal (construction and improvement documents) and should be addressed as soon as possible. Correcting these items before the hearing may also help clarify questions regarding these plans. Please address the following:

<u>Site</u>:

31. Please revise the project plans to identify pedestrian connections to the surrounding commercial businesses. (Zoning Ordinance, Sec. 1.303.) According to the developer of the Sunrise apartments, no response was received from the adjoining properties (Costco and Home Depot) to requests for approval to make pedestrian connections. The proposed plan shows a possible connection to the Burger King property which leads to a striped pedestrian path that winds around the side of the Home Depot building. Two connections to existing sidewalks on the apartment project are proposed. The apartments constructed a sidewalk leading to the stormwater pump house for a possible connection to the Costco parking lot

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sidewalk.



Transportation:

32. Please revise the project plans to identify what measures will be provided to ensure a safe pedestrian crossing of the main entry drive. (Zoning Ordinance, Sec. 1.303.) *Done – At-grade pedestrian refuge provided within median.*

33. The proposed entry drive is showing a raised median. Please note that this will require the reconstruction of the existing curb returns on Hayden Road. Please revise the project plans to identify this. (Zoning Ordinance, Sec. 1.204.)

Traffic Study:

34. Potential errors were noticed in the study which may not necessarily affect the final recommendations of the study nor necessitate a revised study. Please verify the following items prior to a future resubmittal:

- a. Page 7, 3rd paragraph (Hayden Road), 1st Sentence Hayden Road is a minor arterial within the vicinity of the site, not a major arterial.
- b. Page 7, 4th paragraph (83rd Place), 2nd & 3rd sentences these two sentences likely belong in the next paragraph (83rd Way/Costco Driveway) Please verify.
- c. Page 7, 5th paragraph (83rd Way/Costco Driveway), 2nd & 3rd sentences these two sentences likely belong in the prior paragraph (83rd Place). Please verify.
- d. Page 8, 4th paragraph (Costco/Hayden), last sentence missing "lane" after "deceleration".

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- e. Page 13-14, 83rd Place & Hayden Road, last sentence intersection is operating acceptably per DSPM 5-1.801 B.1, please verify recommendation to monitor the intersection.
- f. Page 14, 2nd full paragraph (84th Street & Hayden Road), 2nd sentence. See DSPM 5-1.801 B for correct threshold requirements (Generally LOS D or better overall, individual/approach should be LOS D or better, must be LOS E or better). This comment may be applicable to other locations that are not marked. Please revise the Traffic Study and project plans to address this.

Please refer to responses included with the revised traffic study.

Other:

35. Please revise the Zoning Boundary Exhibit to include half of the right-of-way for N. Hayden Road as it fronts the site. All zoning boundaries include adjacent right-of-way. (Zoning Ordinance, Sec. 1.303.) **Done**

Please resubmit the revised application requirements and additional/supplemental information identified in Attachment A, Resubmittal Checklist, and a written summary response addressing the comments/corrections identified above as soon as possible for further review. The City will then review the revisions to determine if the application is to be scheduled for a hearing date, or if additional modifications, corrections, or additional/supplemental information is necessary.

PLEASE CALL 480-312-7767 TO SCHEDULE A RESUBMITTAL MEETING WITH ME PRIOR TO YOUR PLANNED RESUBMITTAL DATE. DO NOT DROP OFF ANY RESUBMITTAL MATERIAL WITHOUT A SCHEDULED MEETING. THIS WILL HELP MAKE SURE I'M AVAILABLE TO REVIEW YOUR RESUBMITTAL AND PREVENT ANY UNNECESSARY DELAYS. RESUBMITTAL MATERIAL THAT IS DROPPED OFF MAY NOT BE ACCEPTED AND RETURNED TO THE APPLICANT.

The Planning & Development Services Division has had this application in review for 28 Staff Review Days since the application was determined to have the minimal information to be reviewed.

These **1**st **Review Comments** are valid for a period of 180 days from the date on this letter. The Zoning Administrator may consider an application withdrawn if a revised submittal has not been received within 180 days of the date of this letter (Section 1.305. of the Zoning Ordinance).

If you have any questions, or need further assistance please contact me at 480-312-7713 or at bcarr@ScottsdaleAZ.gov.

Sincerely,

Brad Carr, AICP Principal Planner

Case 19-ZN-2013

Stipulations for the Zoning Application:

Impact Church/Sunrise Commons

Case Number: 19-ZN-2013

These stipulations are in order to protect the public health, safety, welfare, and the City of Scottsdale.

GOVERNANCE

1. APPLICABILITY. All stipulations of cases 19-ZN-2013 supersede all of the stipulations of case numbers 42-ZN-1997.

SITE DESIGN

- 2. CONFORMANCE TO DEVELOPMENT PLAN. Development shall conform with the Development Plan, entitled "Impact Church/Sunrise Commons Development Plan," which is on file with the City Clerk and made a public record by Resolution No. 9665 and incorporated into these stipulations and ordinance by reference as if fully set forth herein. The Development Plan is contingent upon special public improvements, drainage, airport requirements, pedestrian and vehicular circulation improvements, landscaping and other site planning concerns to be addressed at the time of Development Review Board approval. Any proposed significant change to the Development Plan, as determined by the Zoning Administrator, prior to the Development Review Board approval shall be subject to additional public hearings before the Planning Commission and City Council.
- 3. DEVELOPMENT AGREEMENT. Within six (6) months of City Council approval of the zoning district map amendment, the owner of the residential portion of the Development Plan shall enter into a special public improvements development agreement with the City to execute the bonus floor area as outlined in the Development Plan. The special public improvements development agreement shall require a minimum improvement contribution equal to or greater than the value determined by the Special Public Improvements Contribution Calculation. If a special public improvements development agreement is not executed with the City prior to the expiration of the six (6) months requirement, then all bonus development standards, as outlined in the Development Plan, shall become null and void.
- SPECIAL PUBLIC IMPROVEMENTS CONTRIBUTION CALCULATION. The special public improvements contribution shall be the value as determined by the following equation: \$100,000 times (1.035 ^(CY-2014)), whereas CY = Current Year.
- MAXIMUM DWELLING UNITS/MAXIMUM DENSITY. Maximum dwelling units and maximum density for that portion of the site zoned Planned Airpark Core Development, Airpark Mixed Use – Residential (PCP-AMU-R) shall be as indicated on the Land Use Budget Table below.

Parcel	Gross Acres	Zoning	Maximum Dwelling Units	Maximum DU/Gross Acre
Sunrise Commons	4.59 +/-	PCP-AMU-R	311	67.8 DU/Gross Acre

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- 6. HAYDEN ROAD LANDSCAPE SETBACK. A minimum thirty-five (35) foot, with an average (40) foot, landscape setback shall be provided between N. Hayden Road and parking improvements on the site. Setback shall be measured from existing curb line.
- 7. PERIMETER LANDSCAPING AREAS. The developer shall be responsible to maintain, where possible, any existing mature landscaping along the west, south and east portions of the site. With the Development Review Board submittal, the developer shall submit a detailed plant salvage plan that identifies existing tree locations on, and adjacent to, the site's west, south and east property lines.
- 8. PEDESTRIAN CONNECTIONS. The site shall provide a minimum of three (3) pedestrian connections to existing properties surrounding the site. A minimum of one (1) connection having a minimum with of six (6) feet shall be provided to each of the west, south and east sides of the site. Pedestrian connections shall be reviewed and approved by city transportation staff.
- BUILDING HEIGHT LIMITATIONS. No building on the site shall exceed 75 feet in height, inclusive of mechanical, measured as provided in the applicable section of the Zoning Ordinance.
- 10. PERIMETER EXCEPTION. Concurrent or prior to any land division on the site, a perimeter exception development agreement shall be executed with the City recognizing the shared Development Plan of the site.

AIRPORT

- 11. AIRCRAFT NOISE AND OVERFLIGHT DISCLOSURE. With the final plans submittal, the owner shall provide noise disclosure notice to occupants, potential homeowners, employees and/or students in a form acceptable to the Scottsdale Aviation Director.
- 12. AVIGATION EASEMENT. With the Development Review Board submittal, the owner shall provide a signed and completed Avigation Easement in a form acceptable to the City for recording.
- 13. AVIGATION EASEMENT AND LAND RESTRICTION. With the Development Review Board submittal, the owner shall provide a signed and completed Avigation Easement in a form acceptable to the City for recording. Owner has agreed to and therefore shall record a restriction on the southern portion of the site (the residential property) prohibiting the property from being subdivided into parcels, lots or units that would allow for separate individuals to own each such parcel, lot or unit individually.
- 14. SOUND ATTENUATION MEASURES. With the final plans submittal, the developer shall provide sound attenuation measures that are limited to a sound transmission class of not less than 50 (45 if field tested) as provided in the International Building Code (IBC).

INFRASTRUCTURE AND DEDICATIONS

- 15. CIRCULATION IMPROVEMENTS. Before any certificate of occupancy is issued for the site, the owner shall make the required dedications and provide the following improvements in conformance with the Design Standards and Policies Manual and all other applicable city codes and policies.
 - a. STREETS. Dedicate the following right-of-way and construct the following street improvements:

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Street Name	Street Type	Dedications	Improvements	Notes
Hayden Road	Minor Arterial	55 feet half- street Right- of-Way (existing)	Deceleration lane at northeastern driveway, sidewalk, signing and striping	a.1., a.2., a.3.

a.1. The owner shall construct a deceleration lane and provide striping and signing at the northeastern site driveway.

- a.2. The owner shall construct an 8 foot wide sidewalk along the site's N. Hayden Road frontage. Sidewalk shall be separated from the back of curb, except at deceleration lane locations.
- a.3. The owner shall provide pavement striping at the southwestern site driveway to show inbound, left, right/through lanes.
- b. VEHICLE NON-ACCESS EASEMENT. Dedicate a one foot wide vehicular non-access easement along the site's E. Hayden Road frontage, except at the approved street entrance.
- c. CROSS ACCESS EASEMENT. With the final plans submittal, the owner shall dedicate a cross access easement dedicated to the adjoining property owner east of the site. The cross access easement shall be located along the drive aisle of the northern most row of parking adjacent to N. Hayden Road, to the satisfaction of Transportation Department staff.
- 16. RESIDENCE SIDEWALK. With the Development Review Board submittal, the developer shall modify the site plan to include a continuous sidewalk along the southern and eastern portions of the residential development. In areas where sidewalk overlaps required 24-foot fire lane, sidewalk shall be designed to accommodate fire truck loads. Design and location of sidewalk shall be reviewed and approved by transportation staff.
- 17. SITE ACCESS. Access to the site shall be limited to the two (2) existing site driveways on N. Hayden Road.
- RESIDENTIAL REFUSE COLLECTION. The owner shall provide a minimum of one (1) refuse compactor on site for the residential development. Refuse compactor location(s) shall be reviewed and approved by city engineering and solid waste staff.
- 19. SEWER INFRASTRUCTURE. Discharge flow from on-site sewer system lift station to public sewer system in Hayden Road shall not exceed 80 gallons per minute (gpm). If the discharge from the on-site sewer system lift station exceeds 80 gpm, as determined by Water Resources staff, improvements to the off-site public sewer system shall be required.
- 20. BASIS OF DESIGN REPORTS (WATER and WASTEWATER). The owner shall submit Basis of Design reports (Water and Wastewater) for review and acceptance by City of Scottsdale Water Resources staff prior to submitting final improvement plans for review.

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ATTACHMENT A Resubmittal Checklist

Case Number: **19-ZN-2013#2**

Please provide the following documents, in the quantities indicated, with the resubmittal (all plans larger than 8 $\frac{1}{2}$ x11 shall be folded):

Digital submittals shall include one copy of each item identified below.

One copy:	$\underline{\text{COVER LETTER}} - \text{Respond to all the issues identified in the first review comment}$
	letter.
One copy:	Revised Narrative for Project
One copy:	Revised Traffic Impact Mitigation Analysis (TIMA)
	One copy:

Context Aerial with the proposed Site Plan superimposed

	Color	1	24" x 36"	11" x 17"	8 ½" x 11"
\boxtimes	<u>Site Plan:</u>				
	1	24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Open Space P	lan:			
	1	24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Elevations:				
	Color B/W	1	24" x 36" 24" x 36"	11" x 17" 11" x 17"	8 ½" x 11" 8 ½" x 11"
\boxtimes	Elevation Wo	rksheet(s):			
	1	24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Perspectives:				
	Color	1	24" x 36"	11" x 17"	8 ½" x 11"

\boxtimes	Color Site Plan:	<u>.</u>					
	Color _	1	24" x 36"		11" x 1	7"	8 ½" x 11"
\boxtimes	Landscape Plar	<u>ı:</u>					
	B/W	1	24" x 36"		11″ x 1	7"	8 ½" x 11"
\boxtimes	Site Cross Sect	ions:					
	1	24" x 36"		11" x 1	L7″		8 ½" x 11"
\boxtimes	Preliminary Gra	ading & Drai	nage Plan:				
	1	_ 24" x 36"		11" x 1	L7"		8 ½" x 11"
\boxtimes	Pedestrian & V	<u>ehicular Circ</u>	culation Plan				
	1	24" x 36"		11″ x 1	L7"		8 ½" x 11"
\square	Dimensioned Z	Coning Bound	dary Exhibit				
	1	24" x 36"		11" x 1	L7"		8 ½" x 11"
\boxtimes	Slope Analysis	(superimpos	sed on a topogra	phy map)			
	Development F The Developme		<u>s</u> oklets shall be clij	oped toget	her sep	arately, and not	be bounded.
	Color		11" x 17"	1	8 ½" x 1	11"	
			r copy on archiva on hearing.)	ll (acid free	e paper)	(To be submitt	ed after the
Teo	chnical Reports:	Please inclu	de one (1) digital	l copy of ea	ach repo	ort	
			rainage Report Vater and Waste	water Desi	gn Repc	ort	
Por	submit the revis	od Drainago	Penart and Wat	or and Wa	stowato	r Design Penert	to your Proje

<u>Resubmit the revised Drainage Report and Water and Wastewater Design Report to your Project</u> <u>Coordinator.</u>



7/12/2019

Michael P. Leary, LTD 10278 E Hillery Dr Scottsdale, AZ 85255

RE: 19-ZN-2013#2 Core Center H4145 (Key Code)

Dear Mr. Leary:

The Planning & Development Services Division has completed the review of the above referenced development application submitted on 6/5/2019. The following **1**st **Review Comments** represent the review performed by our team, and is intended to provide you with guidance for compliance with city codes, policies, and guidelines related to this application.

Zoning Ordinance and Scottsdale Revise Code Significant Issues

The following code and ordinance related issues have been identified in the first review of this application, and shall be addressed in the resubmittal of the revised application material. Addressing these items is critical to scheduling the application for public hearing, and may affect the City Staff's recommendation. Please address the following:

Zoning:

- 1. ML Please revise the Project Narrative to include a discussion of the use of the PCP district bonus provisions. Discussion should include the proposed bonus to be requested, the justification for the proposed bonus, calculations for the estimated value of the bonus, as well as a plan for community benefit related to the estimated value of the bonus. (Zoning Ordinance, Sec. 5.4008. and 7.1200.)
- 2. JE/ML Please revise the project plans to demonstrate compliance with the setback and stepback requirements of the PCP zoning district. The setback requirement is a minimum of 25 feet from the curb line along N. Hayden Road. The stepback requirements starts at the minimum setback line. (Zoning Ordinance, Sec. 5.4007.D. & 5.4007.E.)
- 3. JE Please revise the project plans to include the calculations for floor area ratio (FAR) in compliance with the Zoning Ordinance, Sec. 5.4007.A.
- 4. ML/JE The site and Core Apartments as part of case 19-ZN-2013 appears to not have complied with stipulation 7 "PEDESTRIAN CONNECTIONS. The site shall provide a minimum of three (3) pedestrian connections to existing properties surrounding the site. A minimum

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of one (1) connection having a minimum with of six (6) feet shall be provided to each of the west, south and east sides of the site. Pedestrian connections shall be reviewed and approved by city transportation staff." Please revise the project plans to identify compliance with these requirements.

- 5. ML Please submit a revised copy of the Citizen Review Report summary to include details of the most recent public outreach efforts, including any additional public comments that may have been received. (Zoning Ordinance, Sec. 1.305.C.2.b.)
- 6. JE/ML Please provide conceptual elevations in conformance with the district requirements with the next submittal. (Zoning Ordinance, Sec. 1.303.)

2001 General Plan & Greater Airpark Character Area Plan (GAPCAP) Analysis:

7. ML The first submittal narrative/ development master plan- a document that is intended to provide overall coordination of urban design character, buffering to adjacent uses, transportation systems, and infrastructure necessary for the proposed development – includes unnecessary/oppositional statements that are not material in any manner to the application request; please see applicant responses to General Plan Growth Area Element Goal #2, Bullet #1, and Community Mobility Element Goal #5, Bullet#3 regarding light-rail transit and equestrians. Please revise the Project Narrative to include only necessary statements are in direction relation to the proposed development be included in the development master plan upon resubmittal.

To this end, please ensure that responses that are completed with "refer to prior responses" (found throughout the document) indicate by numerical identification, and page number, reference to the response the applicant is directing the reader to. Additionally, please remove responses that indicate "not applicable".

8. ML The General Plan Character and Design Element (Goal 4, bullets 10, 14, and 15) encourage "streetscapes for major roadways that promote the city's visual quality and character; and blend into the character of the surrounding area. The Greater Airpark Character Area Plan Character and Design Element (Goal CD2, Policy CD 2.1.6, CD 2.2, and CD2.7), and Economic Vitality Element (Goal 5, bullet 6) promotes vibrant Signature Corridors in the Greater Airpark to provide a distinct identify and design theme in the area. Although the first submittal discusses Hayden Road being designated as a Signature Corridor, there appears to be no indication as to what that means as a result of this development proposal – details of such are expected of a formal Development Plan. Please note Hayden Road at the subject site's frontage is a designated Signature Corridor and Buffered Roadway – an area in which 50' foot minimum setback, measured from back of curb line, is expected to be maintained as per CD2.7 of the GACAP.

ML/JE Please respond both graphically and narratively as to how the proposed development will provide this dimension and enhance the Streetscape in response to the cited considerations. Please consider additions of areas of pedestrian lighting, public art, bus shelters, and other public amenities to enhance the pedestrian environment and streetscape.

9. ML Please respond to Goal 10, along with any applicable bullets, of the of the General Plan Preservation and Environmental Planning Element, and Goal EP5 of the Greater Airpark

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Character Area Plan addressing how the proposed development may, if at all, utilize green building alternatives that support sustainable desert living.

a. ML/WC Please note, Scottsdale is progressively attempting to install in capital projects, and request from private development applications, Low Impact Development (LID) and Green Infrastructure (GI) as a method of stormwater control, water harvesting, and cleansing for the first flush requirements of the City's Floodplain Ordnance. Accordingly, please consider utilization of this resource. More information on this initiative can be found at:

https://sustainability.asu.edu/sustainable-cities/resources/lid-handbook/

Noted

10. ML As a respond to Goal 1 of the Community Involvement Element, with a resubmittal, please provide an updated Citizen Involvement Report that describes the key issues that have been identified through the public involvement process.

Fire:

11. WC/JE Please revise the project plans to demonstrate hydrant spacing, existing and proposed (Fire Ord. 4283, 507.5.1.2)

Fire hydrants are shown in the Preliminary Site Utility Plan

12. WC/JE Please revise the project plans to demonstrate the location of Fire Department Connection(s). (Fire Or. 4283, 912)

Drainage:

13. WC Please submit a copy of the revised Drainage Report with the remainder of the resubmittal material identified in Attachment A. Please see comments within the red-lined 1st submittal of the Drainage Report and Preliminary G&D and address accordingly.

Did not receive any comments on the Drainage Report.

Water and Wastewater:

14. WC Please submit a revised Water and Wastewater Design Report with the remainder of the resubmittal material identified in Attachment A. Please see comments within the redlined 1st submittal of the Report. The Preliminary Basis of Design Report must be accepted by the Water Resources Department prior to scheduling of first hearing of project.

Comments addressed. See Report dated 7/30/19.

15. WC Please submit flow monitoring results of northern 8-inch sewer in Hayden Road with next submittal.

Added flow monitoring results from the Wood/Patel report in Appendix E. Because of the possible sewer capacity issues in the "north" sewer main, the site sewer design was changed in Figure 2 so that wastewater discharge is to the "south" main.

<u>Airport:</u>

16. ML NOTED The subject site is within Airport noise compatibility study AC-2 area. Please note that a signed Avigation Easement along with the required legal descriptions and

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graphic, and a copy of the Noise Disclosure statement will be required with the final plans submittal.

Engineering:

- 17. JE All waste shall be placed in suitable containers to facilitate waste removal in a sanitary condition. Please revise the project plans accordingly. (SRC, Sec. 24-13)
- 18. WC Off-site transportation, stormwater and water resources improvements along property frontages to existing supporting infrastructure, with associated dedications, is required. Please update the project plans accordingly. (SRC, Sec. 48-7, 47-10 & 49-219)

ОК

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- 20. TW/JE/WC The north end of the site is designed poorly. The driveway leading from Hayden Road directs vehicles into the pedestrian courtyard. The short turning radius on the site drive leading to this driveway will create issues with vehicle queuing and blocking inbound traffic. Please revise the project plans to correct these issues. (Zoning Ordinance, Sec. 1.204.)

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- 21. TW Transportation staff is not fully supportive of the installation of a traffic signal at 84th Street/Hayden Road due to signal spacing. The proposed change from a church to offices and restaurants result in ~ 4x the daily and AM peak hour trips generated and ~10X the PM peak hour trips generated. This has profound impacts on traffic, particularly at the 84th Street/Hayden Road intersection. Signalization was not intended/planned for this location. DSPM 5-3.123 G3 indicates that "At Minor Arterial/Minor Arterial (or smaller designated streets) intersections the designer should evaluate using a roundabout as an alternative to a traffic signal for all new or significantly rebuilt intersections." The TIMA appears to include no indication that a roundabout option was evaluated. Please address these issues with the next submittal. (DSPM, Sec. 5-3.123)
- 22. TW Please revise the traffic study to add a queue analysis for site driveways due to the substantial increase in projected trip generation as well as queue analysis for the

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intersection of 84th Street and Hayden Road due to the proposed control change (signalization). (Zoning Ordinance, Sec. 1.303.)

- 23. TW Please revise the traffic study to provide project site & total ADT on major street(s) within the study area. (DSPM, Sec. 5-1.701)
- 24. TW/JE/WC Page 31, 1st bullet (84th Street & Hayden Road), 3rd sentence the site plan depicts a redesign of the existing site driveway. The developer is responsible for correct alignment of their proposed new driveway to prevent negative offset of left turning vehicles. Should the intersection be signalized, the developer will be responsible for improvements associated with the traffic signal, including and not limited to providing a left turn lane on all approaches. Please revise the project plans to address this comment. (Zoning Ordinance, Sec. 1.204.)

Engineering:

- 25. ML/WC Please review the Context Aerial with corrections provided by Engineering for existing easement conflicts that will need to be modified or released prior to permit issuance, including:
 - Any GLO easements in conflict with proposed development and not required by city LAIPS or TMP will need to be abandoned by property owner prior to any permit issuance. Specifically for this project, the supplied ALTA survey identified GLOs per the following recording information: docket 1443 page 63 and docket 3025 page 473. Please call out required abandonments on site plan. (DSPM, Sec. 1-2.400)
 - b. WC Water lines located outside of a public right-of-way or street tract must be placed in a minimum 20' wide easement:
 - i. Horizontally, a minimum of 6' is required between the water line and the edge of easement.

Modified the proposed water easement accordingly. See updated *Preliminary Site Utility Plan* (Figure 2) in the water/sewer BOD report.

ii. The easement will be free of obstructions, shall not be in a fenced area, and shall be accessible always to city service equipment such as trucks and backhoes.

Will comply.

Easements outside of paved areas shall have a 10' wide hardened patch with a cross-slope not greater than 10% and a longitudinal slope not greater than 20%.
 Hardened paths shall consist of native soil compacted to 95% to a depth of 1'.

Will comply.

iv. Revegetation within the easement shall consist of low growing shrubs. Update site plan accordingly.

Will comply.

c. ML/JE Existing cross access and emergency services access easement through project parcel to abutting parcel in conflict with proposed development will need to be relocated to provide cross access to southern and eastern abutting parcels. Please update the project plans accordingly. (DSPM, Sec. 5-3.201)

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- 26. JE Please revise the project plans to comply with the following location and design requirements for non-residential, mixed-use, and multi-family residential refuse and recycling enclosures. Please locate and position the enclosure(s): (DSPM, Sec. 2-1.309)
 - a. A minimum of one (1) enclosure shall be provided for every 20,000 square feet of office/retail space.
 - b. So that the approach pad for the enclosure(s) is located that the refuse truck route to and from the public street has a minimum unobstructed vertical clearance of 13 feet 6 inches (14 feet is recommended), and unobstructed minimum vertical clearance above the approach pad and refuse enclosure of 25 feet. (The vertical clearances are subject to modification based on enclosure container size, location, and positioning as determined by the Sanitation Director, or designee.);
 - c. In a location that is easily accessible for collection, and does not require the refuse truck to "backtrack";
 - d. A maximum 100 feet distance from building service exit to refuse enclosure;
 - e. So that collection vehicles do not back up more than 35 feet;
 - f. So that the path of travel for the refuse truck accommodates a minimum vehicle turning radius of 45 feet, and a minimum length of 40 feet;
 - g. So that the approach pad is level, with a maximum of 2 percent slope;
 - So that the enclosure(s) are not placed between the on-site buildings and adjacent lower density residential unless there is no reasonable alternative. In these situations, orient the enclosure(s) towards the interior of the property;
 - i. So that the enclosure(s) are not placed next to drainage ways or basins, unless there is no reasonable alternative;
 - j. So that the enclosure(s) are not placed between the street and the front of the building, unless there is no reasonable alternative; and
 - k. So that the enclosure(s) are not placed at the end of a dead-end parking aisle.
- 27. JE Compactors may be used as an alternative to refuse or recycling containers. To determine adequacy and site location of compactors, if proposed, please provide the following on a refuse plan:
 - a. Compactor type,
 - b. Compactor capacity state on site plan compactor capacity conversion equating to the city's required 1 enclosure for every 20,000 square feet with no recycling,
 - c. Compactor location, addressing the following:
 - i. Place the refuse compactor container and approach pad so that the refuse truck route to and from the public street has a minimum unobstructed vertical clearance of thirteen (13) feet six (6) inches (fourteen (14) feet is recommended), and unobstructed minimum vertical clearance above the concrete approach slab and refuse compactor container storage area concrete slab of twenty-five (25) feet,

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- ii. Place the refuse compactor container in a location that does not require the bin to be maneuvered or relocated from the bin's storage location to be loaded on to the refuse truck,
- iii. Provide a refuse compactor container approach area that has a minimum width of fourteen (14) feet and length of sixty (60) feet in front of the container, and
- iv. Demonstrate path of travel for refuse truck accommodates a minimum vehicle turning radius of 45', and vehicle length of 40'.
- 28. ML Although not a requirement, recycling is an amenity found to be desired by Scottsdale residents. Please note if recycling containers will be provided for the development project.
- 29. JE Please revise the project plans with a 6' width accessible pedestrian route from the main entry of the development to each Hayden. (DSPM, Sec. 2-1.310)
- 30. ML (sidewalk existing) Please revise the project plans to provide an eight (8) foot wide minimum, curb-separated sidewalk along the project boundary. (DSPM, Sec. 5-3.102 and 5-3.110)

Technical Corrections

The following technical ordinance or policy related corrections have been identified in the first review of the project. While these items are not as critical to scheduling the case for public hearing, they will likely affect a decision on the final plans submittal (construction and improvement documents) and should be addressed as soon as possible. Correcting these items before the hearing may also help clarify questions regarding these plans. Please address the following:

<u>Site</u>:

31. JE/ML Please revise the project plans to identify pedestrian connections to the surrounding commercial businesses. (Zoning Ordinance, Sec. 1.303.)

Transportation:

- 32. TW/JE/ML Please revise the project plans to identify what measures will be provided to ensure a safe pedestrian crossing of the main entry drive. (Zoning Ordinance, Sec. 1.303.)
- 33. TW/JE/ML The proposed entry drive is showing a raised median. Please note that this will require the reconstruction of the existing curb returns on Hayden Road. Please revise the project plans to identify this. (Zoning Ordinance, Sec. 1.204.)

Traffic Study:

- 34. TW Potential errors were noticed in the study which may not necessarily affect the final recommendations of the study nor necessitate a revised study. Please verify the following items prior to a future resubmittal:
 - a. Page 7, 3rd paragraph (Hayden Road), 1st Sentence Hayden Road is a minor arterial within the vicinity of the site, not a major arterial.
 - b. Page 7, 4th paragraph (83rd Place), 2nd & 3rd sentences these two sentences likely belong in the next paragraph (83rd Way/Costco Driveway) Please verify.

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- c. Page 7, 5th paragraph (83rd Way/Costco Driveway), 2nd & 3rd sentences these two sentences likely belong in the prior paragraph (83rd Place). Please verify.
- d. Page 8, 4th paragraph (Costco/Hayden), last sentence missing "lane" after "deceleration".
- e. Page 13-14, 83rd Place & Hayden Road, last sentence intersection is operating acceptably per DSPM 5-1.801 B.1, please verify recommendation to monitor the intersection.
- f. Page 14, 2nd full paragraph (84th Street & Hayden Road), 2nd sentence. See DSPM 5-1.801 B for correct threshold requirements (Generally LOS D or better overall, individual/approach should be LOS D or better, must be LOS E or better). This comment may be applicable to other locations that are not marked. Please revise the Traffic Study and project plans to address this.

Other:

35. JE Please revise the Zoning Boundary Exhibit to include half of the right-of-way for N. Hayden Road as it fronts the site. All zoning boundaries include adjacent right-of-way. (Zoning Ordinance, Sec. 1.303.)

Please resubmit the revised application requirements and additional/supplemental information identified in Attachment A, Resubmittal Checklist, and a written summary response addressing the comments/corrections identified above as soon as possible for further review. The City will then review the revisions to determine if the application is to be scheduled for a hearing date, or if additional modifications, corrections, or additional/supplemental information is necessary.

PLEASE CALL 480-312-7767 TO SCHEDULE A RESUBMITTAL MEETING WITH ME PRIOR TO YOUR PLANNED RESUBMITTAL DATE. DO NOT DROP OFF ANY RESUBMITTAL MATERIAL WITHOUT A SCHEDULED MEETING. THIS WILL HELP MAKE SURE I'M AVAILABLE TO REVIEW YOUR RESUBMITTAL AND PREVENT ANY UNNECESSARY DELAYS. RESUBMITTAL MATERIAL THAT IS DROPPED OFF MAY NOT BE ACCEPTED AND RETURNED TO THE APPLICANT.

The Planning & Development Services Division has had this application in review for 28 Staff Review Days since the application was determined to have the minimal information to be reviewed.

These **1**st **Review Comments** are valid for a period of 180 days from the date on this letter. The Zoning Administrator may consider an application withdrawn if a revised submittal has not been received within 180 days of the date of this letter (Section 1.305. of the Zoning Ordinance).

If you have any questions, or need further assistance please contact me at 480-312-7713 or at bcarr@ScottsdaleAZ.gov.

Sincerely,

Brad Carr, AICP Principal Planner

ATTACHMENT A Resubmittal Checklist

Case Number: 19-ZN-2013#2

Please provide the following documents, in the quantities indicated, with the resubmittal (all plans larger than $8 \frac{1}{2} \times 11$ shall be folded):

Digital submittals shall include one copy of each item identified below.

One copy:	COVER LETTER – Respond to all the issues identified in the first review comment
	letter.
One copy:	Revised Narrative for Project

 \square One copy: Revised Traffic Impact Mitigation Analysis (TIMA)

Context Aerial with the proposed Site Plan superimposed

	Color	1	24" x 36"	11" x 17"	8 ½" x 11"
\boxtimes	<u>Site Plan:</u>				
	1	24" x 36"	. <u> </u>	11" x 17"	8 ½" x 11"
\boxtimes	Open Space Pl	lan:			
	1	24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Elevations:				
	Color B/W	<u>1</u> 1	24" x 36" 24" x 36"	11" x 17" 11" x 17"	8 ½" x 11" 8 ½" x 11"
\boxtimes	Elevation Wor	<u>ksheet(s):</u>			
	1	24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Perspectives:				
	Color	1	24" x 36"	11" x 17"	8 ½" x 11"
\boxtimes	Color Site Plan	<u>ı:</u>			
	Color	1	24" x 36"	11" x 17"	8 ½" x 11"

Landscape Plan:

	B/W	1	24" x 36"	11" x 17"	8 ½" x 11"
\boxtimes	Site Cross Se	ections:			
	1	24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Preliminary	Grading & Dra	inage Plan:		
	1	24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Pedestrian &	k Vehicular Cir	culation Plan		
	1	24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Dimensione	d Zoning Boun	<u>dary Exhibit</u>		
	1	24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Slope Analys	sis (superimpo	sed on a topogi	raphy map)	
\boxtimes		i <u>t Plan Bookle</u> i ment Plan bo		lipped together separat	ely, and not be bounded.
	Color		11" x 17"	1 8 ½" x 11"	
		′ x 11″ – 3 colo ning Commiss	• •	val (acid free paper) (To	be submitted after the
Tec	hnical Repor	<u>ts</u> : Please inclu	ıde one (1) digi	tal copy of each report	

☑ 1 copy of Revised Drainage Report

□ _ _ _ _ _ _ _ _ _ copy of Revised Water and Wastewater Design Report

<u>Resubmit the revised Drainage Report and Water and Wastewater Design Report to your Project</u> <u>Coordinator.</u>



7/12/2019

Michael P. Leary, LTD 10278 E Hillery Dr Scottsdale, AZ 85255

RE: 19-ZN-2013#2 Core Center H4145 (Key Code)

Dear Mr. Leary:

The Planning & Development Services Division has completed the review of the above referenced development application submitted on 6/5/2019. The following **1**st **Review Comments** represent the review performed by our team, and is intended to provide you with guidance for compliance with city codes, policies, and guidelines related to this application.

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- 22. Please revise the traffic study to add a queue analysis for site driveways due to the substantial increase in projected trip generation as well as queue analysis for the intersection of 84th Street and Hayden Road due to the proposed control change (signalization). (Zoning Ordinance, Sec. 1.303.)
- 23. Please revise the traffic study to provide project site & total ADT on major street(s) within the study area. (DSPM, Sec. 5-1.701)
- 24. Page 31, 1st bullet (84th Street & Hayden Road), 3rd sentence the site plan depicts a redesign of the existing site driveway. The developer is responsible for correct alignment of their proposed new driveway to prevent negative offset of left turning vehicles. Should the intersection be signalized, the developer will be responsible for improvements associated with the traffic signal, including and not limited to providing a left turn lane on all approaches. Please revise the project plans to address this comment. (Zoning Ordinance, Sec. 1.204.)

Engineering:

- 25. Please review the Context Aerial with corrections provided by Engineering for existing easement conflicts that will need to be modified or released prior to permit issuance, including:
 - a. Any GLO easements in conflict with proposed development and not required by city LAIPS or TMP will need to be abandoned by property owner prior to any permit issuance. Specifically for this project, the supplied ALTA survey identified GLOs per the following recording information: docket 1443 page 63 and docket 3025 page 473. Please call out required abandonments on site plan. (DSPM, Sec. 1-2.400)

- b. Water lines located outside of a public right-of-way or street tract must be placed in a minimum 20' wide easement:
 - i. Horizontally, a minimum of 6' is required between the water line and the edge of easement.
 - ii. The easement will be free of obstructions, shall not be in a fenced area, and shall be accessible always to city service equipment such as trucks and backhoes.
 - iii. Easements outside of paved areas shall have a 10' wide hardened patch with a cross-slope not greater than 10% and a longitudinal slope not greater than 20%. Hardened paths shall consist of native soil compacted to 95% to a depth of 1'.
 - iv. Revegetation within the easement shall consist of low growing shrubs. Update site plan accordingly.
- c. Existing cross access and emergency services access easement through project parcel to abutting parcel in conflict with proposed development will need to be relocated to provide cross access to southern and eastern abutting parcels. Please update the project plans accordingly. (DSPM, Sec. 5-3.201)
- 26. Please revise the project plans to comply with the following location and design requirements for non-residential, mixed-use, and multi-family residential refuse and recycling enclosures. Please locate and position the enclosure(s): (DSPM, Sec. 2-1.309)
 - a. A minimum of one (1) enclosure shall be provided for every 20,000 square feet of office/retail space.
 - b. So that the approach pad for the enclosure(s) is located that the refuse truck route to and from the public street has a minimum unobstructed vertical clearance of 13 feet 6 inches (14 feet is recommended), and unobstructed minimum vertical clearance above the approach pad and refuse enclosure of 25 feet. (The vertical clearances are subject to modification based on enclosure container size, location, and positioning as determined by the Sanitation Director, or designee.);
 - c. In a location that is easily accessible for collection, and does not require the refuse truck to "backtrack";
 - d. A maximum 100 feet distance from building service exit to refuse enclosure;
 - e. So that collection vehicles do not back up more than 35 feet;
 - f. So that the path of travel for the refuse truck accommodates a minimum vehicle turning radius of 45 feet, and a minimum length of 40 feet;
 - g. So that the approach pad is level, with a maximum of 2 percent slope;
 - So that the enclosure(s) are not placed between the on-site buildings and adjacent lower density residential unless there is no reasonable alternative. In these situations, orient the enclosure(s) towards the interior of the property;
 - i. So that the enclosure(s) are not placed next to drainage ways or basins, unless there is no reasonable alternative;
 - j. So that the enclosure(s) are not placed between the street and the front of the building, unless there is no reasonable alternative; and

- k. So that the enclosure(s) are not placed at the end of a dead-end parking aisle.
- 27. Compactors may be used as an alternative to refuse or recycling containers. To determine adequacy and site location of compactors, if proposed, please provide the following on a refuse plan:
 - a. Compactor type,
 - b. Compactor capacity state on site plan compactor capacity conversion equating to the city's required 1 enclosure for every 20,000 square feet with no recycling,
 - c. Compactor location, addressing the following:
 - i. Place the refuse compactor container and approach pad so that the refuse truck route to and from the public street has a minimum unobstructed vertical clearance of thirteen (13) feet six (6) inches (fourteen (14) feet is recommended), and unobstructed minimum vertical clearance above the concrete approach slab and refuse compactor container storage area concrete slab of twenty-five (25) feet,
 - ii. Place the refuse compactor container in a location that does not require the bin to be maneuvered or relocated from the bin's storage location to be loaded on to the refuse truck,
 - iii. Provide a refuse compactor container approach area that has a minimum width of fourteen (14) feet and length of sixty (60) feet in front of the container, and
 - iv. Demonstrate path of travel for refuse truck accommodates a minimum vehicle turning radius of 45', and vehicle length of 40'.
- 28. Although not a requirement, recycling is an amenity found to be desired by Scottsdale residents. Please note if recycling containers will be provided for the development project.
- 29. Please revise the project plans with a 6' width accessible pedestrian route from the main entry of the development to each Hayden. (DSPM, Sec. 2-1.310)
- 30. Please revise the project plans to provide an eight (8) foot wide minimum, curb-separated sidewalk along the project boundary. (DSPM, Sec. 5-3.102 and 5-3.110)

Technical Corrections

The following technical ordinance or policy related corrections have been identified in the first review of the project. While these items are not as critical to scheduling the case for public hearing, they will likely affect a decision on the final plans submittal (construction and improvement documents) and should be addressed as soon as possible. Correcting these items before the hearing may also help clarify questions regarding these plans. Please address the following:

<u>Site</u>:

31. Please revise the project plans to identify pedestrian connections to the surrounding commercial businesses. (Zoning Ordinance, Sec. 1.303.)

Transportation:

32. Please revise the project plans to identify what measures will be provided to ensure a safe pedestrian crossing of the main entry drive. (Zoning Ordinance, Sec. 1.303.)

33. The proposed entry drive is showing a raised median. Please note that this will require the reconstruction of the existing curb returns on Hayden Road. Please revise the project plans to identify this. (Zoning Ordinance, Sec. 1.204.)

Traffic Study:

- 34. Potential errors were noticed in the study which may not necessarily affect the final recommendations of the study nor necessitate a revised study. Please verify the following items prior to a future resubmittal:
 - a. Page 7, 3rd paragraph (Hayden Road), 1st Sentence Hayden Road is a minor arterial within the vicinity of the site, not a major arterial.
 - b. Page 7, 4th paragraph (83rd Place), 2nd & 3rd sentences these two sentences likely belong in the next paragraph (83rd Way/Costco Driveway) Please verify.
 - c. Page 7, 5th paragraph (83rd Way/Costco Driveway), 2nd & 3rd sentences these two sentences likely belong in the prior paragraph (83rd Place). Please verify.
 - d. Page 8, 4th paragraph (Costco/Hayden), last sentence missing "lane" after "deceleration".
 - e. Page 13-14, 83rd Place & Hayden Road, last sentence intersection is operating acceptably per DSPM 5-1.801 B.1, please verify recommendation to monitor the intersection.
 - f. Page 14, 2nd full paragraph (84th Street & Hayden Road), 2nd sentence. See DSPM 5-1.801 B for correct threshold requirements (Generally LOS D or better overall, individual/approach should be LOS D or better, must be LOS E or better). This comment may be applicable to other locations that are not marked. Please revise the Traffic Study and project plans to address this.

Other:

35. Please revise the Zoning Boundary Exhibit to include half of the right-of-way for N. Hayden Road as it fronts the site. All zoning boundaries include adjacent right-of-way. (Zoning Ordinance, Sec. 1.303.)

Please resubmit the revised application requirements and additional/supplemental information identified in Attachment A, Resubmittal Checklist, and a written summary response addressing the comments/corrections identified above as soon as possible for further review. The City will then review the revisions to determine if the application is to be scheduled for a hearing date, or if additional modifications, corrections, or additional/supplemental information is necessary.

PLEASE CALL 480-312-7767 TO SCHEDULE A RESUBMITTAL MEETING WITH ME PRIOR TO YOUR PLANNED RESUBMITTAL DATE. DO NOT DROP OFF ANY RESUBMITTAL MATERIAL WITHOUT A SCHEDULED MEETING. THIS WILL HELP MAKE SURE I'M AVAILABLE TO REVIEW YOUR RESUBMITTAL AND PREVENT ANY UNNECESSARY DELAYS. RESUBMITTAL MATERIAL THAT IS DROPPED OFF MAY NOT BE ACCEPTED AND RETURNED TO THE APPLICANT.

The Planning & Development Services Division has had this application in review for 28 Staff Review Days since the application was determined to have the minimal information to be reviewed. These **1**st **Review Comments** are valid for a period of 180 days from the date on this letter. The Zoning Administrator may consider an application withdrawn if a revised submittal has not been received within 180 days of the date of this letter (Section 1.305. of the Zoning Ordinance).

If you have any questions, or need further assistance please contact me at 480-312-7713 or at bcarr@ScottsdaleAZ.gov.

Sincerely,

Bral Com

Brad Carr, AICP Principal Planner

ATTACHMENT A Resubmittal Checklist

Case Number: **19-ZN-2013#2**

Please provide the following documents, in the quantities indicated, with the resubmittal (all plans larger than $8 \frac{1}{2} \times 11$ shall be folded):

Digital submittals shall include one copy of each item identified below.

One copy:	COVER LETTER – Respond to all the issues identified in the first review comment
	letter.
One copy:	Revised Narrative for Project

One copy: Revised Traffic Impact Mitigation Analysis (TIMA)

Context Aerial with the proposed Site Plan superimposed

	Color	1	24" x 36"	11" x 17"	8 ½" x 11"
\boxtimes	Site Plan:				
	1	_ 24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Open Space Pl	an:			
	1	_ 24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Elevations:				
	Color B/W	1 1	24" x 36" 24" x 36"	11″ x 17″ 11″ x 17″	8 ½" x 11" 8 ½" x 11"
\boxtimes	Elevation Wor	<u>ksheet(s):</u>			
	1	_ 24" x 36"		11" x 17"	8 ½" x 11"
\boxtimes	Perspectives:				
	Color	1	24" x 36"	11" x 17"	8 ½" x 11"
\boxtimes	Color Site Plan	<u>:</u>			
	Color	1	24" x 36"	11" x 17"	8 ½" x 11"

Landscape Plan:

	B/W	1	_ 24" x 36"	11" x	17"	8 ½" x 11"	
\boxtimes	Site Cross Se	ctions:					
	1	24" x 36"		11" x 17"		8 ½" x 11"	
\boxtimes	Preliminary (Grading & Dra	iinage Plan:				
	1	24" x 36"		11" x 17"		8 ½" x 11"	
\boxtimes	Pedestrian &	Vehicular Cir	culation Plan				
	1	24" x 36"		11" x 17"		8 ½" x 11"	
\boxtimes	Dimensioned	d Zoning Bour	idary Exhibit				
	1	24" x 36"		11" x 17"		8 ½" x 11"	
\boxtimes	Slope Analysis (superimposed on a topography map)						
	<u>Developmen</u> The Develop			lipped together se	parately, and	not be bounded	
	Color		_ 11" x 17"	<u> 1 8 ½" x</u>	< 11"		
 8 ½" x 11" – 3 color copy on archival (acid free paper) (To be submitted af Planning Commission hearing.) 						nitted after the	

Technical Reports: Please include one (1) digital copy of each report

1	сору	of	Revised	Drainag

1 copy of Revised Drainage Report
 1 copy of Revised Water and Wastewater Design Report

Resubmit the revised Drainage Report and Water and Wastewater Design Report to your Project Coordinator.