The Speedway + Campbell Gateway Project

PLANNED AREA DEVELOPMENT

MAY | 2018

SPEEDWAY + CAMPBELL GATEWAY PROJECT

PLANNED AREA DEVELOPMENT

Prepared for

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Section One | Introduction and Policy

I.A Forward

This PAD applies to an existing 2.49-acre privately-held property (the "Property", the "Subject Property" or the "Site") located near the northwest corner of Speedway Boulevard at Campbell Avenue, an intersection which is one of the busiest in the entire metropolitan Tucson region and which serves as the effective "gateway" to the University of Arizona (UA) main campus. The Property is zoned C-1 and R-3, sits adjacent to the southern edge of the UA's Arizona Health Sciences Center (AHSC), and is less than two hundred fifty feet (250') from the Helen-Warren Station of the Tucson Streetcar system.

Since 1998, the Property has been owned and operated by the Palm Shadows Joint Venture and been the home of Palm Shadows Apartments (PSA), a two-story apartment complex comprised of 152 rental units. While quite dated by today's standards, PSA remains one of the more popular privately-held housing options for UA students due to its close proximity to the campus and the nearby complement of fast-food restaurants and basic services that lie within easy walking distance.

This local appeal notwithstanding, the property has clearly attained a state of functional obsolescence, a condition wherein the basic design features, amenities, and living arrangements within the complex are so out of date by modern apartment standards that any further investment in the remodeling or renovation of the units cannot be economically justified. Even a complete renovation program would still not raise the units to a level that is commensurate with modern apartment living due to the inherent limitations of the shell structures themselves. The cost-benefit equation of any such reinvestment is a wholly negative one.

For this reason, the owners have long envisioned the redevelopment of the Property into a much more intensive and vibrant activity center due to its key strategic location at the University's gateway, the generally underdeveloped nature of the private properties comprising the Speedway/Campbell corners and, most recently, the Site's adjacency to the eastern terminus (Helen-Warren Station) of the Tucson Streetcar system. The Streetcar's presence now provides a direct and efficient linkage of the Property with Tucson's central core and with all of the other major activity centers established along the Streetcar's four-mile route.

Early conceptual renderings of the proposed project; its proximity to the Tucson Streetcar is key.

There is no question that the Streetcar is a key component of this proposed Planned Area Development (PAD). This major investment in transit was first approved by the citizenry as a formal element of the Regional Transportation Authority (RTA) Plan in 2006. The City and RTA subsequently undertook extensive studies, public workshops, and lengthy interactions with the Federal Transit Administration (FTA) to pursue more than sixty million dollars in grant funds from the FTA's Transportation Investments Generating Economic Recovery (TIGER) program. In 2010, the FTA awarded the City a sixty-three million dollar ($63M) TIGER grant, which was combined with significant local RTA and City funds to facilitate the final design and construction of the Streetcar's first phase.

In pursuit of the aforementioned TIGER funds, significant specific attention was given to the Subject Property by federal and local representatives alike, their focus being intently upon confirming the owner's plans to redevelop the Site in a high-intensity, multi-use manner. Such intensive and high-density activity centers are essential to the long-term success and viability of all modern streetcars, with it being especially critical that these activity centers be located near streetcar stops. To support this effort, the owner prepared myriad conceptual plans and programming analyses to illustrate various redevelopment scenarios for the Property that would robustly support the Streetcar system and thereby help justify the investment of significant and diverse public funds in its construction.

The owners' vision to create an intensive multi-use activity center on the Property was already well known in local circles, pre-dating the entire Streetcar effort by several years. The advent and reality of the Tucson Streetcar has now only further strengthened the appropriateness and suitability of the Site for its intended redevelopment as proposed in this PAD.

To effectuate the first step in their redevelopment program, the owners successfully completed a formal amendment to the University Area Plan (UAP) in 2014. This amendment detailed a multi-use, transit-oriented development (TOD) project featuring a ground-level grocery, retail, and restaurant plaza, together with integrated above-ground and sub-surface parking structures, and upwards of a twenty-story high-rise providing first-class office space and higher-end residential units.

The Streetcar provides essential connectivity to the downtown Tucson core and other activity centers.

This PAD and accompanying rezoning is the next step in the entitlement process, outlining the specific design elements, guidelines, and development standards for the project. The PAD also contains a detailed regulatory protocol that will both guide the Site's redevelopment and will assist the City Planning and Development Services Department (PDSD) to oversee all final design and construction activities and ensure full follow-through by the developer on public promises and representations made during the legislative process.

I.A.1 Rationale for Using the Planned Area Development (PAD) Zone

The Planned Area Development (PAD) zone is the only appropriate zoning district for this project. Mixed-use developments inherently embody unique parameters that require highly specialized development standards and regulatory protocols. For example, vehicle parking requirements, especially when applied to a transit-oriented development (TOD) environment, must consider the varying demand-times and intensities of the specific uses that comprise the overall project program, as well as the appropriate overall parking reductions that should inure due to the proximity of alternative multi-modal opportunities. Parking in the mixed-use and TOD realm simply cannot be promulgated based upon a mere aggregation of the traditional parking demands for each individual use.

Beyond such customized project parameters, this particular redevelopment also includes several unique aspects, such as the need to assess the visual impacts of a tall building high-rise upon surrounding residential neighborhoods, the sun reflection and shade characteristics associated with such an element, and the manner in which the proposed project can integrate into the larger Speedway/ Campbell intersection when the other corners are redeveloped and an ultimate building massing occurs there over time.

The PAD zone clearly provides the best vehicle by which such specialized parameters can be delineated and organized into an integrated whole that not only embodies and protects the developer's interests and preserves the integrity of the proposed project, but which also provides the best mechanism for proper and efficient regulation by the City of Tucson. It is appropriate to note that the Planned Area Development zoning option was originally adopted by the City with the express purpose of facilitating the exact type of unique and customized development that this rezoning intends.

I.A.2 Economic, Physical and Environmental Suitability of the PAD

From an economic perspective, the PAD Property is located within a surrounding area that is already experiencing intensive redevelopment and construction activity. Banner Health is currently constructing its brand new Banner/University Medical Center (BUMC) Hospital approximately one-quarter mile north of the Site. This facility will ultimately comprise more than 1.8 million square feet of floor area, be upwards of one hundred eighty-five feet (185') tall, and contain approximately eight hundred (800) patient beds. When completed, it will provide a complete replacement of the existing UMC hospital.

Within the Arizona Health Sciences Center (AHSC), to the immediate north of the Subject Property, several major construction projects are currently underway:

- The Health Sciences Innovation Building, an eight-story, two hundred twenty thousand square-foot (220,000 SF) facility for multi-disciplinary, inter-professional education, and simulated medical practice,
- The Bioscience Research Laboratory (BSRL) Building, a four-story, one hundred thousand square foot (100,000 SF) collaborative research facility to advance the understanding of human health, aging and disease, and
- The realignment and reconstruction of significant portions of the existing Ring Road that serves the BUMC Hospital and the entire AHSC campus. The Ring Road also abuts the northern boundary (Helen Street) of the Subject Property.

At the time of this writing, private development interests are also actively attempting to assemble the individual properties in and around the southwest quadrant of the Speedway/Campbell intersection toward an ultimate objective of redeveloping and intensifying this adjacent corner.

With all of the above in mind, redevelopment of the Subject Property as intended is appropriate, timely, and even essential. In its presently outdated form, the Site is far from its highest and best use, especially when contemplated against the type of intensive, multi-use activity centers that are essential to furthering the City of Tucson's goals for a vibrant, economically successful Streetcar line, a more walkable community, and a true multi-modal transportation system.

Artist's rendering of the new Banner/UMC Hospital | Banner/UMC PAD, 2015

From a physical and environmental standpoint, this is the redevelopment of an existing property that is comprised of 100% impervious surface (buildings and concrete/asphalt pavements). When completed as proposed, the Site will feature substantial green spaces and a pedestrian-oriented plaza, as well as modern components for the catchment and harvesting of stormflows. Given the Property's present impervious/paved nature, there are no natural environmental issues (e.g. sensitive habitats, natural resources) that come into play.

For all of the above reasons, most notably the emerging intensification of the surrounding area and its significant on-going construction activities, together with the essential need to provide the kind of high-density, multi-use activity centers that are essential to a viable and economically successful Tucson Streetcar, the Property is wholly suitable for redevelopment as intended under this Planned Area Development program.

I.A.3 General Compatibility of the PAD with Adjoining Land Uses

Any consideration of this PAD's compatibility with its adjoining land uses must recognize, from the onset, that this project is an entirely forward-looking land use proposal. This future perspective is not only acceptable in this particular case, but is appropriate and logical given the facts of the Site and the emerging nature of this key location.

The Speedway Boulevard/Campbell Avenue intersection, while inarguably one of the busiest in the metropolitan area and the effective gateway to the University of Arizona main campus, remains one of our most underutilized and underdeveloped set of private properties anywhere in Tucson. At present, only the Aloft Hotel, at the southeast corner of this major intersection, approaches the type of land use intensity that is proper for such a robust and important transportation node. The need for redeveloping and intensifying this node is made even more manifest by the fact that the Tucson Streetcar's eastern terminus (Helen-Warren Station) is located here.

This PAD proposal is the first step in the private redevelopment process of the entire Speedway/Campbell intersection and its adjoining corridor properties. Such redevelopments will raise the profile of this key node and provide a more appropriate and deserved gateway sequence for the University of Arizona, while also working synergistically with the Tucson Streetcar to both energize it and ensure its long-term economic success.

With the above perspective in mind, the compatibility of this PAD with its adjoining uses is assured. The PAD's entire immediate surroundings, even in their present state, are wholly non-residential in character, being comprised of various commercial enterprises (restaurants, strip centers) or institutional uses (several administrative buildings and a major medical campus) administered by the University of Arizona and the Arizona Health Sciences Center.

Multi-story buildings are common in the surrounding context. While one-story commercial structures characterize the adjacent properties to the south and east (with building heights of up to 30'), the seven-story A-Loft Hotel lies to the southeast and the two-story Babcock Hall administrative and residence complex sits to the adjacent west. To the northwest and north are numerous institutional buildings within the Arizona Health Sciences Center, ranging in height from four (4) to eight (8) stories. Further north, within Banner-University Medical Center, a new eleven-story hospital is presently under construction. The nearest residential neighborhoods are outlying from this immediate context and are effectively buffered from the PAD Site by the intervening commercial and institutional makeup.

The compatibility of the proposed PAD Project within this context will only increase over time as the various private properties in and around the Speedway/Campbell intersection and in proximity to the Helen-Warren Streetcar station are redeveloped in the coming years into more intensive and high-density uses.

The above justification notwithstanding, it remains essential that all intensification and redevelopment in and around the Speedway/Campbell intersection give due and just consideration to the more outlying residential neighborhoods that will be impacted by the redevelopment process. This PAD is highly sensitive to this essential need and includes a variety of special studies and parameters designed specifically to identify such impacts and provide mitigative measures as appropriate.

With that being the case, the proposed project can proceed in a manner that balances both long-range planning principles and larger community objectives, while still demonstrating appropriate sensitivity to those nearby neighborhoods wishing to preserve their existing character and desirable qualities. This equation ensures the compatibility that must underlie any unique and bold PAD proposal.

Birdseye view of the Speedway/Campbell intersection looking northwest

University / Tucson Aloft Hotel

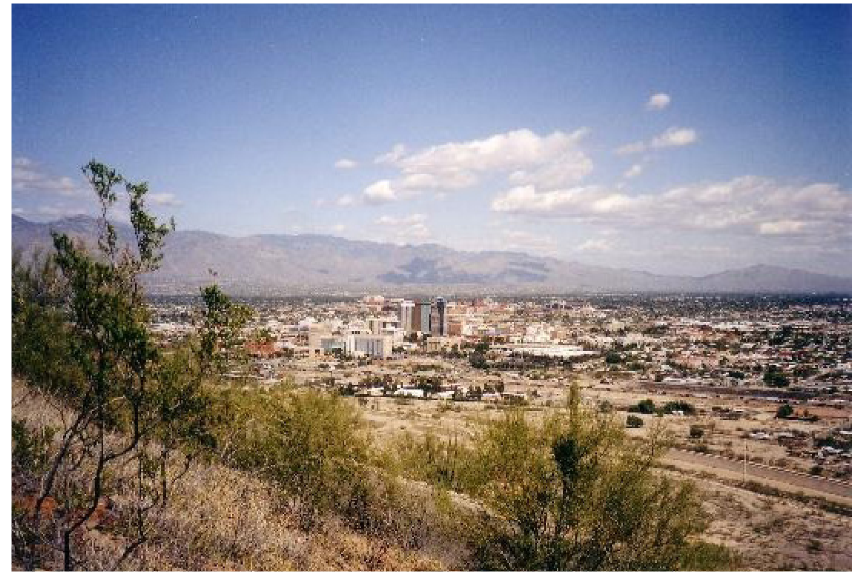
UA Campus Main Mall

I.B. Introduction and Guiding Principles

This PAD represents a first step in advocating a new direction and urban form for Tucson. It is a departure from the primary growth model which has characterized our metropolitan area for nearly a century, wherein densities were low, and building heights short, while growth spread out across our readily available Sonoran Desert. Decades of this approach have brought us to a community where we have stretched across and razed nearly three hundred square miles of natural desert, while populating that huge impacted area with barely one million people. This may sound like a large number, but it represents a population density of less than 3,500 people per square mile, which is almost unheard of by any reasonable urban standard.

While there are those who may support and even applaud such a low-density community, the negative effects and inefficiencies of it have now become palpable. The impacts have been mounting from this form of growth for decades, and have now brought us to the place where all of our public infrastructure systems (transportation, sewer, potable water, etc.) are stretched beyond their functional and budgetary capacities. This condition is inevitable when we are forced to construct and maintain infrastructure systems over a huge geographic area, while serving only a comparatively small number of people. City and County municipalities struggle annually just to keep up, even resorting to bond initiates and tax increases simply to provide such basic services as routine road repairs. This condition represents only the municipal aspects of our historical growth paradigm. The environmental consequences of it, in the form of our wanton destruction of the natural desert environment, are arguably even more substantial.

From a land use planning perspective, it is necessary that we pursue a new and more appropriate urban form, one which accepts and even embraces density and height as things which are positive rather than things which must be fought. More recently, and admirably, our leaders have expounded the importance of creating a more walkable City, one where basic goods and services, activity centers, and restaurant/retail venues all lie within easy walking distance of the user. Concentrated population densities are fundamentally essential to this objective. In point of fact, all of the great walkable cities in the world are built upon a high-density, high-intensity urban form. In the simplest terms, the creation of a truly walkable environment and the sustaining of viable public transit systems requires high concentrations of people.



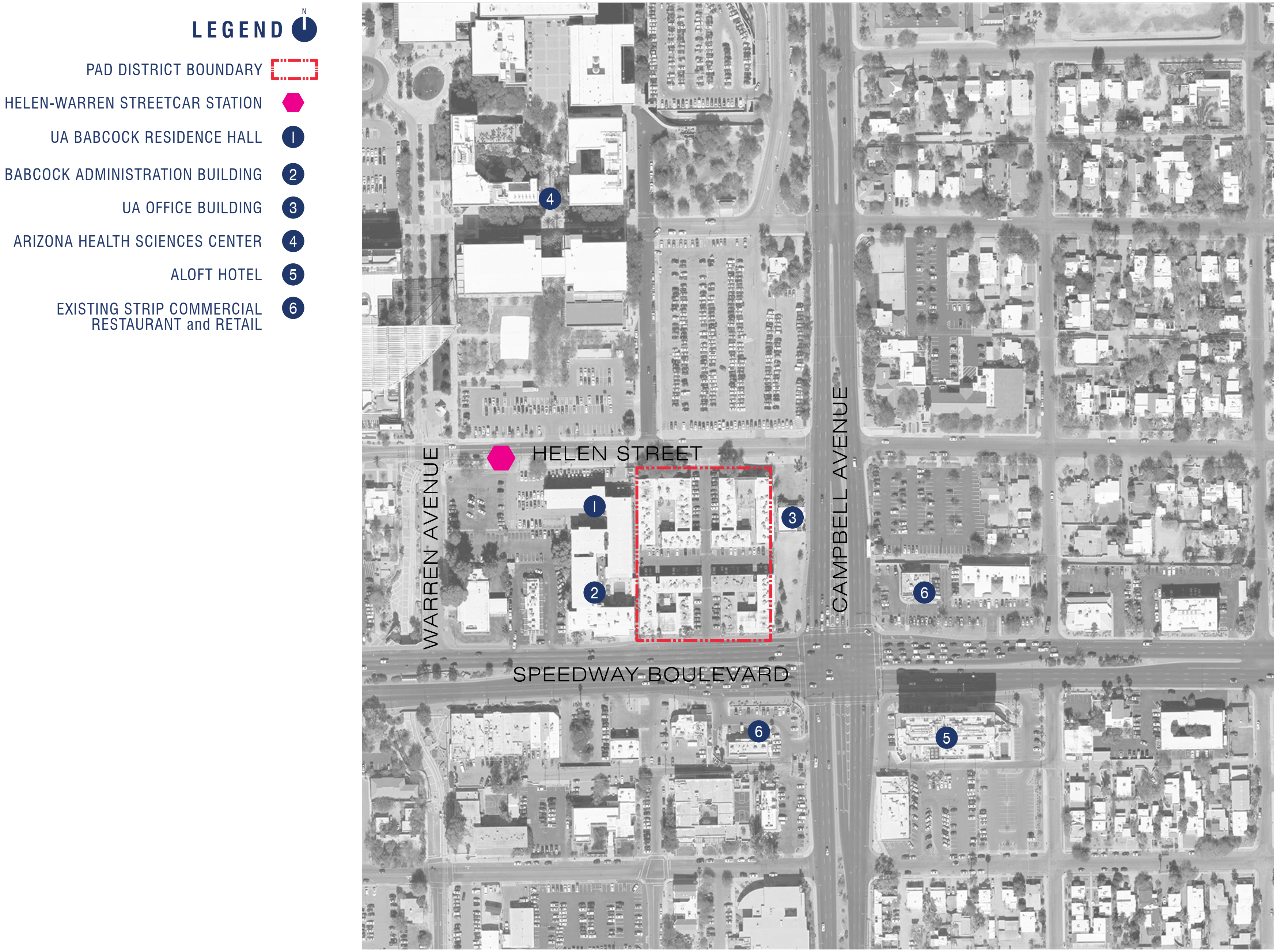
The 300 square mile Tucson metro region

This proposed PAD is driven by these principles and by the desire to create a new, vibrant, and high-density activity center that, together with other similar redevelopment efforts, will provide retail goods & services, employment, and residential opportunities in a truly walkable framework and in close proximity to the Tucson Streetcar. It embodies transit-oriented development in its fullest sense and represents a critical first step toward defining a new urban form for the City of Tucson and our subsequent generations. In practical terms, our community stands at a threshold moment.

I.B.1 Project Location

The PAD site is 2.49 acres in size and is located in the northwest quadrant of the Speedway Boulevard/Campbell Avenue intersection. It also fronts upon Helen Street to the north. The University of Arizona (UA) owns a small piece of property to the immediate east of the site that has frontage along Campbell Avenue and which contains a small office building. The UA also owns the property to the immediate west, this containing the Babcock Residences and the Babcock Administration Building. Exhibits No. 1 and 2 illustrate the regional and site-specific contexts of the Property.

Exhibit No. 1 | Regional Location Map


LEGEND
N
PAD DISTRICT BOUNDARY
HELEN-WARREN STREETCAR STATION
UA BABCOCK RESIDENCE HALL 1
BABCOCK ADMINISTRATION BUILDING 2
UA OFFICE BUILDING 3
ARIZONA HEALTH SCIENCES CENTER 4
ALOFT HOTEL 5
EXISTING STRIP COMMERCIAL RESTAURANT and RETAIL 6
HELEN STREET
WARREN AVENUE
CAMPBELL AVENUE
SPEEDWAY BOULEVARD

I.B.2 Historic Uses of the Site

The Property has housed the Palm Shadows Apartments (PSA) since the early 1960's. This complex is two (2) stories in height and contains one hundred fifty-two (152) rental units within four (4) buildings. While dated in its architecture and amenities, the complex remains desirable to University students due to its direct accessibility to the campus (via the Warren Avenue underpass) and the complement of nearby fast-food restaurants and retail outlets that lie within easy walking distance.

Photo montage of the existing Palm Shadows Apartments

I.B.3 Proposed Multi-Use Project - General Description

The proposed PAD is a mixed-use project that provides ground-level retail, grocery, and restaurants organized around an open pedestrian plaza and gathering area that provides direct access to the adjacent Speedway Boulevard and Campbell Avenue streetscapes, as well as to the Helen-Warren station of the Tucson Streetcar. Upper-story components of the project provide first-class office space, higher-end residential suites, and a potential hospitality component so as to round out a live-work-play equation on the Property. The architecture of the project and the treatment of its public plaza spaces will draw upon design references from around the world, all towards creating a truly unique destination activity center.

The Project is currently programmed to provide the following uses (the specific regulatory use parameters are provided in Section IV [PAD District Proposal] of this document):

- 30,000 to 40,000 square feet (SF) of retail trade and restaurants (food services)
- 20,000 to 30,000 SF of grocery (food and beverage sales)
- 100,000 SF (approximately 80 units) of residential or hotel (travelers' accommodations, lodging)
- 250,000 SF of professional offices and/or medical outpatient services, including medical offices and health clinics
- Approximately 1,350 parking spaces (both above-ground and sub-surface structures)

The above square-footage will be organized within three (3) different height districts on the property (also refer to Section I.C.2; Exhibit No. 5: UAP Allowable Building Envelopes and Heights): 1) a maximum seven-story element (one hundred four foot maximum building height) along Speedway Boulevard and the southern portion of the site's Campbell Avenue frontage; 2) a maximum six-story element (ninety foot maximum building height) for the parking structure (that includes lower-story retail) along Helen Street and the northern portion of the Campbell Avenue frontage; and 3) a maximum twenty-story high-rise element (two hundred fifty-foot maximum building height) within the Site's interior. This twenty-story element is limited to no more than 33% of the defined 20-story building envelope (shown on Exhibit No. 5) and no more than 25% of the Project's total building envelope. The proposed high-rise element must satisfy both of these percentage maximums.

Thumbnail sketches and photographic references have been incorporated throughout this Section of the document so as to provide a sense of the design, character and quality of the proposed Project.

I.B.4 Project Goals

In the largest sense, a primary project goal of this PAD is to help further a new urban form and development paradigm in the City of Tucson. We have evolved significantly over the past several years toward a desire to create a more walkable and transit-oriented/multi-modal community. Embracing increased density, building height, and higher-intensity activity centers is a basic requirement of achieving this objective, especially when it comes to the redevelopment of sites nearest the designated stations of the Tucson Streetcar. This PAD represents one step in establishing a first-class, high-intensity activity center that will specifically feed and energize the nearby Helen-Warren streetcar station by providing a critical mass of retail, restaurant, entertainment, office and residential components in an integrated whole and within a prominent and distinctive architectural statement that serves to elevate the standard of Tucson's built environment.

a. Project Guiding Objectives & Vision

The owners of the Property have, for decades, envisioned its redevelopment into something that is commensurate and appropriate for a location that is the effective gateway to the University of Arizona and which sits at one of the most important street intersections in the entire metropolitan Tucson region. While still viable as a small apartment complex, the Property is grossly underutilized, as is the case with many of the private holdings in and around the Speedway Boulevard/Campbell Avenue intersection.

In visioning their ultimate development program, the owners have never simply embraced density and land-use intensity as ends in themselves. They have held from the onset that any redevelopment project at this location must constitute an architectural statement that will help raise the bar on our City's built environment. Specific design guidelines and parameters have therefore included in Section IV (PAD District Proposal) of this document to ensure follow-through on this basic objective in the final constructed product.

b. Tucson's Urban Growth Paradigm – Historic and Emerging

As alluded to previously, Tucson is currently in a paradigm shift in terms of it predominant philosophy on growth and development. The prior grow-low-and-spread-out mindset is being replaced by a new paradigm that embraces a fresh and more appropriate urban form, one which accepts and even encourages density and height as things which are positive community elements. Our leaders have repeatedly expounded and supported the notion of creating a more walkable City, one where basic goods and services, activity centers, and restaurant/retail venues all lie within easy walking distance of the user. This proposed PAD is in alignment with these positive community objectives and seeks to be a first step in their fulfillment.

c. Specific Goals of this PAD

The specific goals of this PAD are the following:

- Establish a PAD district which provides a clear framework of zoning regulation that fully accommodates all proposed site improvements and uses as envisioned, while still providing reasonable flexibility to the owner to respond to fluid market conditions over time,
- Establish a PAD district which accommodates the unique design requirements, development standards and operational particulars of a destination activity center that integrates grocery, retail, restaurant, office, and residential uses into a synergistic whole,
- Establish a PAD district that clearly communicates the proposed development program to the University of Arizona as a basis for integrating and coordinating with UA as it proceeds with the update of its current Comprehensive Campus Plan,
- Establish a PAD district that reflects a formalized, on-going dialogue and coordination effort with the leadership of the most directly-affected, adjacent residential neighborhoods, and which provides an opportunity for their material input into the project.
- Establish a PAD district that, in the end, facilitates and ensures a high-quality architectural statement for the larger community and which serves to elevate the local standard of our built environment.

I.C Conformance with General Plan, Area Plans and Policy Documents

The applicable policy guidance from the City of Tucson as it pertains to the PAD Site is discussed and detailed in the Sections that follow.

I.C.1 Plan Tucson

Plan Tucson identifies the PAD Property as part of a "Campus Area" on its Future Growth Scenario map (see Exhibit No.3). Campus Areas, by definition, include those properties that are within or are in close proximity to established master-planned educational, medical, and/or business facilities. The University of Arizona main campus and the immediately adjacent Arizona Health Sciences Center are both examples of established Campus Areas. Based on this designation and as detailed below, Plan Tucson supports the redevelopment of the PAD Site into an integrated multi-use project and activity center.

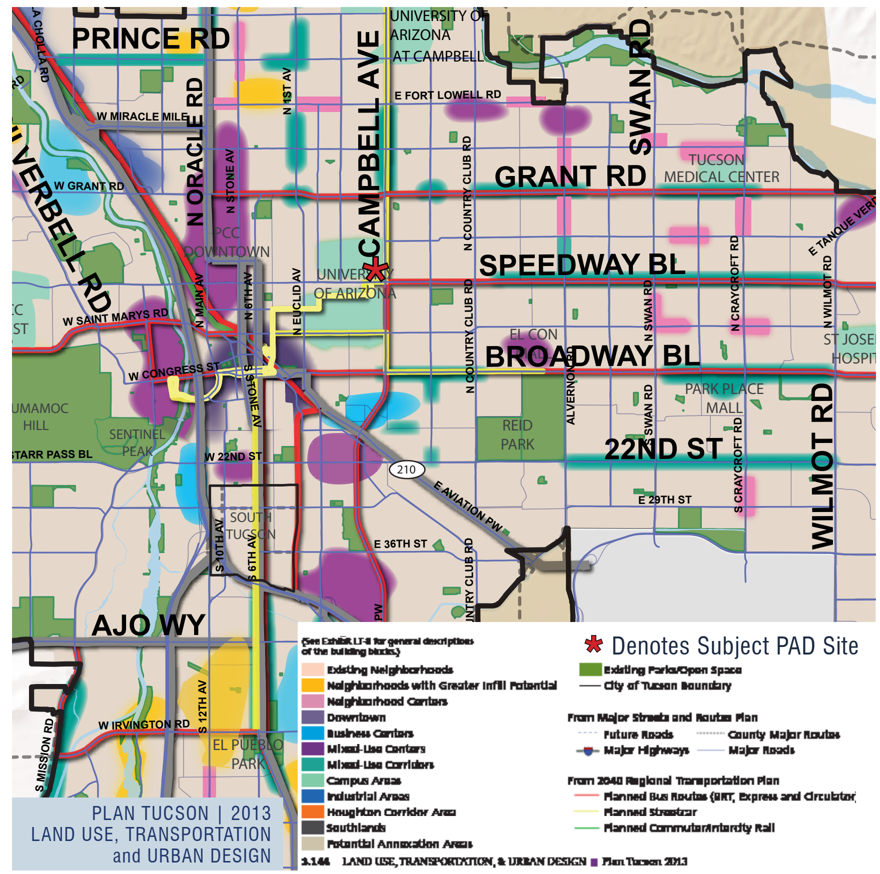
Chapter 3 (Built Environment section; pp. 3.129 through 3.131) goes to great lengths to emphasize the importance of integrating land use, transportation, and urban design in a holistic manner. The multi-use activity center proposed by this PAD is a quintessential example of this integration. The City Council, at the owner/developer's request, has previously amended the University Area Plan (UAP) to specifically allow for the kind of transit-oriented development on this Property under a detailed set of policies that will ensure the proper linkage between a new and intensive commercial, office and high-rise residential development with the nearby Helen-Warren streetcar station. It will also include numerous elements to enhance and encourage multi-modal transportation opportunities. The driving goal is to create a unique, vibrant, and welcoming pedestrian-oriented destination. This three-way integration of land use, transportation and urban design is a fundamental plank in the Built Environment platform of Plan Tucson 2013.

The following Land Use, Transportation & Urban Design policies from Plan Tucson are also relevant:

- *LT 28.5.7: Support environmentally sensitive design that protects the integrity of existing neighborhoods, complements adjacent land uses, and enhances the overall function and visual quality of the street, adjacent properties, and the community.*
- *LT 28.5.8: Support infill and redevelopment projects that reflect sensitivity to site and neighborhood conditions and adhere to relevant site and architectural design guidelines.*
- *LT 29.5.9: Protect established residential neighborhoods by supporting compatible development, which may include other residential, mixed-used infill and appropriate non-residential uses.*

Design particulars, safeguards and regulatory parameters in accordance with the above policies are provided in Section IV (PAD District Proposal).

Exhibit No. 3 | Plan Tucson Excerpt



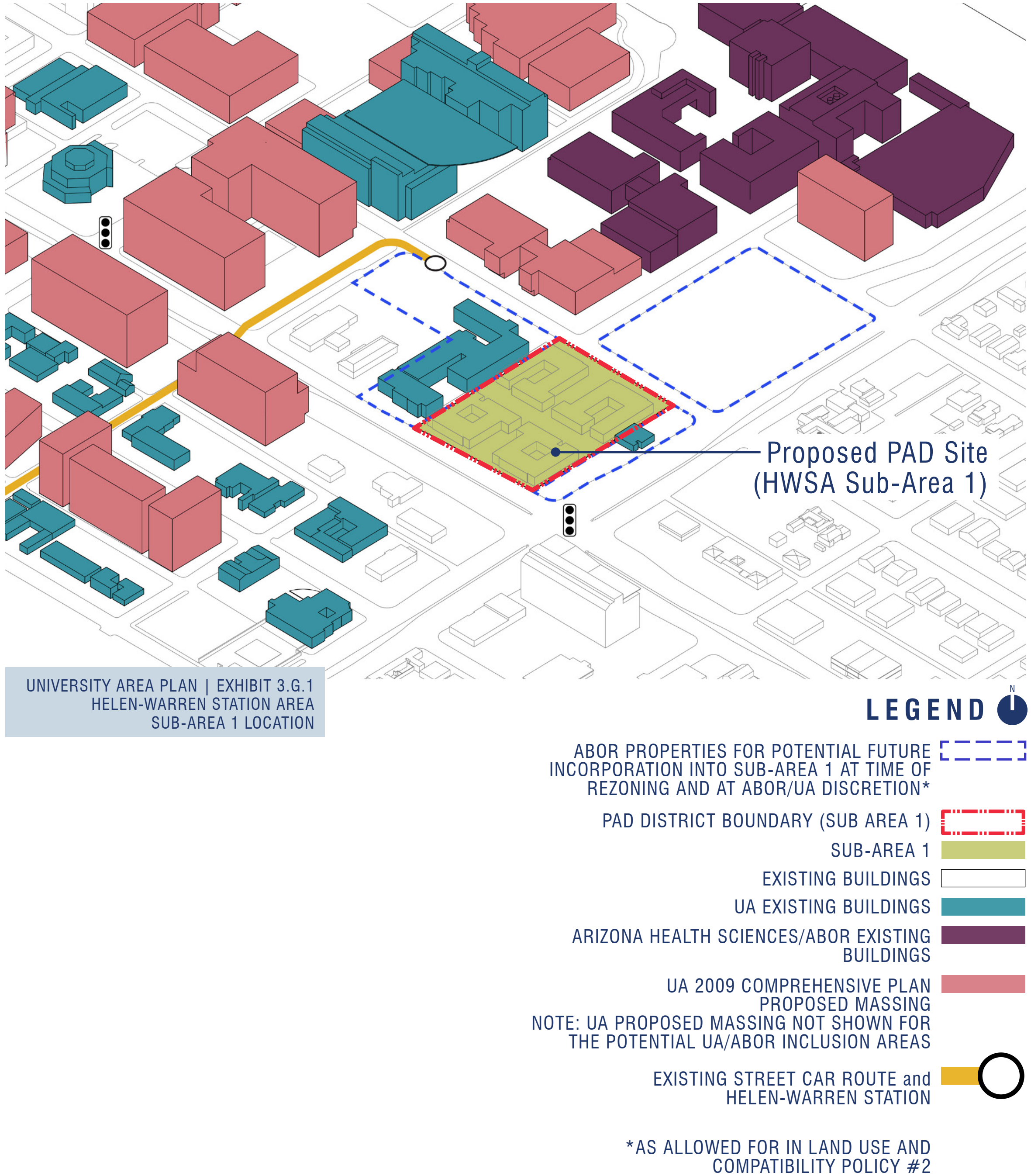
I.C.2 University Area Plan

In October of 2014, the Mayor and Council approved an amendment to the University Area Plan (UAP), Resolution No. 22310, to provide the specific parameters and guidelines for redevelopment of the Subject Property as a multi-use activity center as proposed in this PAD document. This approval was in support of a new vision for the Property and its surrounding area.

The approved plan amendment formally established the Helen-Warren Station Area (HWSA) under Section 3.G of the UAP, in recognition of the then-new Helen-Warren streetcar station located on the south side of Helen Street, approximately three hundred feet (300') from the Project. The purpose of the HWSA is to provide a framework for the development of properties near the station in a way that is consistent with the opportunities which the streetcar provides, as well as to promote other multi-modal transportation opportunities in conjunction with it.

The Subject Property PAD Site is designated as "Sub-Area 1" of the HWSA by the amended UAP (See Exhibit No. 4, this page).

Exhibit No. 4 | University Area Plan - Section 3.G



UNIVERSITY AREA PLAN | EXHIBIT 3.G.1
HELEN-WARREN STATION AREA
SUB-AREA 1 LOCATION

The HWSA does not have a strict physical boundary, but is generally comprised of the area in and around the intersection of Speedway Boulevard and Campbell Avenue, with particular recognition being given to those properties north and west of the intersection. The HWSA will be definitively comprised of a set of formally delineated Sub-Areas, each of which will constitute a future amendment to UAP Section 3.G and which will proceed through the established plan amendment public process.

This HWSA will be implemented by a series of Sub-Goals, Policies and Guidelines adopted for each Sub-Area that may ultimately be delineated within it. The subject PAD Property is designated as Sub-Area 1 of the HWSA. The UAP sub-goals, policies and guidelines for Sub-Area 1 are detailed below.

Sub-Area 1 Intent Statement: *The intent of Sub-Area 1 is to provide for a mixed-use development, consistent with the primary Sub-Goals defined below, that complements the Helen-Warren streetcar station.*

Sub-Goals:
Promote a complement of land uses that is appropriate for a transit-oriented infill development; this mix of uses could include indoor and outdoor commercial retail and services, restaurants, a full-size grocery, professional offices, and residential condominiums or leased apartments.

Promote compatibility with the surrounding commercial, retail, University of Arizona, and Arizona Health Sciences Center land-use context as it currently exists and as it is planned for the future.

Promote access to and facilitate various modes of transportation, including vehicular, bicycle, pedestrian, bus transit, and streetcar.

Promote recognition and the consideration of the established residential neighborhoods located to the north, east/northeast, and southeast of the Sub-Area by establishing a vehicle for on-going communication and interaction; use this vehicle to reasonably address pertinent neighborhood issues and provide for appropriate safeguards.

Incorporate pedestrian spaces and streetscapes into the project that provide for both active and passive outdoor activities and which also complement and benefit the mix of land uses provided.

Provide appropriate design guidelines and a coordinated plan, in both architecture and landscape architecture, that creates an integrated, urban environment.

The above Sub-Goals will be advanced by the specific Policies and Guidelines presented below. These Policies and Guidelines supersede any others, elsewhere within the University Area Plan, in the event that conflicts arise between the two.

As explained in the UAP, a *Policy* is a statement of principle or of guiding action that implies a clear, specific commitment and which is viewed as a firm standard; a *Policy* must be demonstratively met at the time of any rezoning. A *Guideline*, on the other hand, expands on the overall policy direction by providing complementary or supplemental direction or by illustrating ways to meet the policy objectives. While *Guidelines* provide direction, alternative methods and approaches can be utilized to achieve the overall *Policy* direction if sufficient justification is provided. Section III.B (p. 60) of this PAD describes the manner in which the UAP policies outlined below have been addressed by the proposed Project.

Land Use and Compatibility

Policy 1: *Provide for commercial/retail, restaurant, office, grocery and residential uses in a mixed-use, integrated mid-rise and high-rise building framework.*

Policy 2: *Allow for the inclusion of adjacent Arizona Board of Regents ("ABOR") lands into the project in the event that UA elects to participate. In this event, the UA's participation is considered in accordance with this Section and with the policies of this Sub-Area 1, such that incorporation of ABOR lands into the project can occur in conjunction with a rezoning/Planned Area Development application and shall not require a separate plan amendment to the UAP.*

Guideline 1: *In accordance with the spirit and intent of established policies within the University Area Plan (see Section 7), on-going coordination and interaction by the owner/developer of Sub-Area 1 is encouraged with University of Arizona regarding its adjacent properties, UA plans for same, and their potential incorporation into the project by way of a public-private partnership or appropriate alternative mechanism.*

Guideline 2: *Ensure coordination with the UA Comprehensive Campus Plan as it exists and as it is periodically updated by the University.*

Transportation: Vehicular Circulation and Access to Various Modes

Policy 1: *Principal vehicular access to and from the site shall occur via Helen Street; fire/emergency, disabled and grocery delivery access only shall be allowed to and from Speedway Boulevard.*

Policy 2: *Traffic and transportation impacts of the proposed development, as well as provisions for alternative modes, shall be studied in detail; the proposed development shall proceed subject to a Traffic Impact Analysis (TIA) as reviewed and approved by the Department of Transportation.*

Policy 3: *The developer shall pay its fair share cost of off-site transportation or traffic improvements necessary to serve the proposed development and address its impacts; the extent of the contribution shall be determined in conjunction with a TIA approved by the Department of Transportation.*

Policy 4: *Parking facilities as required to serve the proposed complement of land uses will be wholly accommodated on-site. Within the rezoning/Planned Area Development process, parking calculations and analyses shall be furnished to reflect the mixed-use nature of the project so as to insure that the parking provided is based upon actual usage, not upon a mere aggregation of the normal Unified Development Code (UDC) parking requirements for each individual use. The actual-usage calculations shall account for the varying demand times associated with the mix of uses, existing and planned transit facilities in the vicinity, existing bike routes, and other multi-modal opportunities.*

Coordination with and Protection of Surrounding Neighborhoods

Policy 1: *Promote the creation of a neighborhood liaison group, with individuals from the surrounding neighborhood associations, to insure neighborhood input and feedback throughout the design and rezoning process. The specific membership structure, procedures and duties of the group will be detailed in the future Planned Area Development (PAD) document during the rezoning process. The liaison group and the developer shall work together in mutual good faith to reasonably address the specific issues outlined in the Guidelines below.*

Guideline 1*: An analysis will be provided that assesses viewshed impacts and illustrates project visibility from a variety of surrounding vantage points, most notably from those in the existing residential neighborhoods to the north, northeast, east, and southeast.*

Guideline 2: *Sun-reflection and shade studies will be provided as necessary to understand the impacts of the development on the above residential neighborhoods. The results of the studies will be shared and discussed with the neighborhood liaison group during the rezoning/PAD process to determine associated mitigation measures, if any.*

Guideline 3: *In recognition of existing drainage issues impacting neighborhood areas downstream of Sub-Area 1, a drainage analysis will be prepared at the time of rezoning. In addition to standard measures required by the Planning & Development Services Department (PDSD), additional methods of containment will be evaluated to accommodate run-off on-site, including water harvesting features, both passive and active. The results of this evaluation will be discussed with the neighborhood liaison group during the rezoning/PAD process as it relates to the mitigation of downstream drainage impacts attributable to Sub-Area 1, if any.*

Guideline 4: *Building windows and balconies are permitted to face in all directions, with the attendant understanding that consideration of, and provisions for, privacy protection will be given to those outlying neighborhood residents whose properties are visible from the high-rise portion of the project.*

Guideline 5: *An assessment will be provided as to the impacts, if any, of the proposed high-rise building on the flight paths and associated noise of the helicopters serving the Arizona Health Sciences Center. The results of this assessment will be shared and discussed with the neighborhood liaison group during the rezoning/PAD process to determine associated mitigation measures, if any.*

Urban Design

Policy 1: *Building massing and placement shall be organized so as to provide visual variety and create urban open spaces or plaza areas.*

Policy 2: *Building massing and placement shall be organized so as to provide view penetration into the project from perimeter vantage points.*

Policy 3: *Efficient and easily-identifiable pedestrian and bicycle way-finding shall be provided between principal building entrances and nearby transportation facilities, including the Helen Street streetcar station, Sun Tran bus stops, established bike routes, and existing pedestrian linkages to major nearby uses, such as the University of Arizona campus and Arizona Health Sciences Center.*

Policy 4: *Building heights, number of stories, and massing envelopes shall be limited in accordance with Exhibit 3.G.2. (See Exhibit No. 5 on this page) The twenty-story, 250' building height allowance illustrated on this Exhibit shall be limited as follows:*

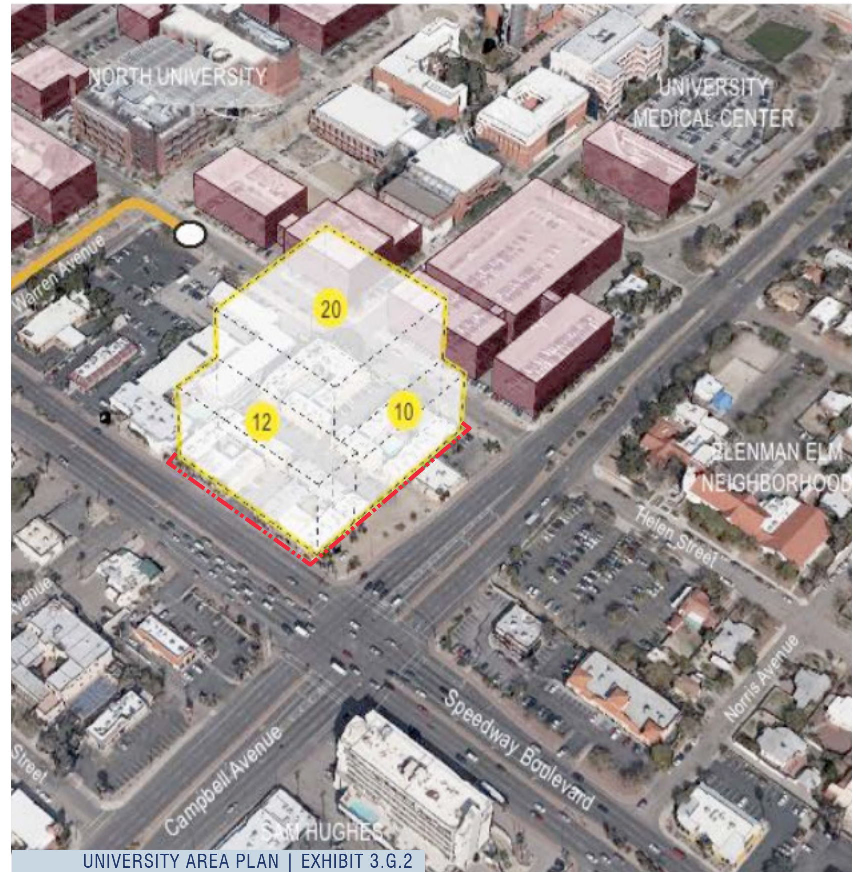
1) it shall comprise no more than 33% of the 20-story building envelope's ground area as delineated on the Exhibit, and

2) it shall comprise no more than 25% of the entire property's ground area.

Policy 5: *In the event that adjacent ABOR parcels are incorporated into Sub-Area 1 during the rezoning/PAD process as allowed for under Land Use and Compatibility Policy #2, building placement, massing and heights shall be in keeping with the spirit and intent of the relevant Urban Design Policies and Guidelines herein and shall be finalized in conjunction with the neighborhood liaison group as part of the rezoning/PAD process.*

Guideline 1: *The project will demonstrate an architecture that recognizes and respects the Sonoran Desert environment by addressing climate, consideration of sun angles and shading, and incorporation of energy and water conservation building principles on a high-rise scale.*

Exhibit No. 5 | UAP Allowable Building Envelopes and Heights



UNIVERSITY AREA PLAN | EXHIBIT 3.G.2
HELEN-WARREN STATION AREA
ALLOWABLE BUILDING ENVELOPES and HEIGHTS
SUB-AREA 1 LOCATION

LEGEND

PAD DISTRICT BOUNDARY (SUB AREA 1)

20 STORIES: MAX HEIGHT = 250'* — 20

12 STORIES: MAX HEIGHT = 154' — 12

10 STORIES: MAX HEIGHT = 130' — 10

UA 2009 COMPREHENSIVE PLAN PROPOSED MASSING

STREET CAR ROUTE and HELEN-WARREN STATION

* NOTE: PER URBAN DESIGN POLICY #4, THE 20-STORY, 250' HEIGHT ALLOWANCE IS LIMITED TO:
1. NO MORE THAN 33% OF THE ENVELOPE SHOWN HEREON
2. NO MORE THAN 25% OF THE ENTIRE PROPERTY

Guideline 2: *Building design and organization will ensure appropriate transitions (in terms of height and massing), recognize existing project perimeters, interface well with adjacent streets, and generally demonstrate a sense of proportion with the project's surroundings.*

Guideline 3: *The project design will demonstrate a recognition of the specific site conditions, both existing and planned, and represent a building profile and form that integrates with this context.*

Guideline 4: *The project will generally provide for a pedestrian-friendly environment that facilitates both the active and passive pedestrian enjoyment of functional and well-designed outdoor spaces and which provides for a comfortable and interesting pedestrian experience that complements the mix of land uses provided.*

Guideline 5: *Principal building entrances will be provided from the interior pedestrian spaces or plazas, and not solely from the exterior/perimeter sidewalk locations.*

Guideline 6: *The design of building facades will foster a streetscape setting that is enjoyable and interesting for the pedestrian. The perimeter sidewalks along the site's Speedway Boulevard frontage should be a comfortable pedestrian environment.*

Guideline 7: *The design of all pedestrian areas and outdoor spaces shall incorporate design elements, street furniture, and landscaping materials that complement the building designs and which demonstrate a coordinated, cohesive design statement and plan for the entire project.*

Guideline 8: *The project shall recognize the potential need for pedestrian and bicycle connectivity to the other three corners of the Speedway Boulevard/Campbell Avenue intersection as all four of these corners redevelop over time in more dense and intensive ways. As part of the rezoning/PAD process, a conceptual projection of redevelopment massing for the four corners shall be developed and shall identify appropriate points of pedestrian and bicycle linkage between the developments.*

I.C.3 Applicable Overlay Zones

Both Speedway Boulevard and Campbell Avenue are designated on the City of Tucson Major Streets & Routes Plan (MSRP) as Major Arterial Streets, while Campbell Avenue is also a designated Gateway Route.

I.C.4 Related Plans and Policy Documents

a. University of Arizona Comprehensive Campus Plan

The City's University Area Plan (UAP) recognizes the importance of the University of Arizona Comprehensive Campus Plan (UACCP) and stresses the need to enhance coordination between its policies and those of the UAP in the best interests of UA, the surrounding established neighborhoods, and the community at large (see Exhibit No. 6 for an excerpt of the UAP Land Use Plan, on which the PAD Site has been delineated).

It should be noted that interactions occurred with UA representatives during the aforementioned amendment process of the University Area Plan which added the Section 3.G and which specifically outlined the redevelopment parameters for this Subject Property as a multi-use activity center. UA is presently in the early stages of updating its UACCP and the PAD owner/developer is committed to coordinating with their representatives as part of this PAD process and subsequent redevelopment of the Subject Property.

The UACCP features several over-arching elements and themes which guide the entire University of Arizona campus plan. The following ones are particularly relevant to the PAD site:

Infill. Many current University programs are challenged by significant space deficiencies while, at the same time, there is precious little campus acreage available and limited capacity for outward campus expansion. Current space deficiencies must primarily be met by building new facilities on underdeveloped real estate throughout the campus proper. The PAD Site represents a substantial redevelopment endeavor that will create substantial professional office and/or medical outpatient/clinic space that may provide a significant opportunity toward addressing this goal.

Connections. The UACCP-designated Warren Avenue Corridor, now replete with the City of Tucson Streetcar route and Helen-Warren station, represents a primary opportunity to link the proposed PAD Site with the balance of the UA campus, as well as with more distant points and activity centers toward the City's downtown core.

Edges & Gateways. The Campbell Avenue frontage along the current Arizona Health Sciences Center is designated as an "enhanced edge and gateway" zone of the UACCP. For all intents and purposes, this zone is one of the "front doors" of the proposed PAD Site and will, as such, represent an opportunity for significant aesthetic enhancements in conjunction with the proposed PAD's redevelopment program.

b. Banner/University Medical Center PAD

The Banner/University Medical Center (BUMC) PAD was approved by the Mayor & Council in December, 2015, allowing the private acquisition of the former University Medical Center (UMC) campus and surroundings by Banner Health, a non-profit healthcare company. As part of this acquisition, the BUMC PAD provided the requisite development guidelines and parameters to allow for regulation of the now-private property by the City of Tucson.

While the BUMC PAD has no regulatory bearing on the Subject Property, it is important to note the significant redevelopment efforts that are occurring therein, not the least of which is the current construction of a brand new, 800-bed state-of-the-art hospital that, when completed, will fully replace the former UMC Hospital. The new facility will encompass more than 1.8 million square feet of floor area and will rise to a height of one hundred eighty-five feet (185'). The significant height of this new structure, along with many other operational realities of the new Banner Health campus, were coordinated carefully with representatives of the adjacent Jefferson Park Neighborhood Association and the other Associations in the surrounding area.

Exhibit No. 6 | UACCP Land Use Plan

PAD DISTRICT BOUNDARY

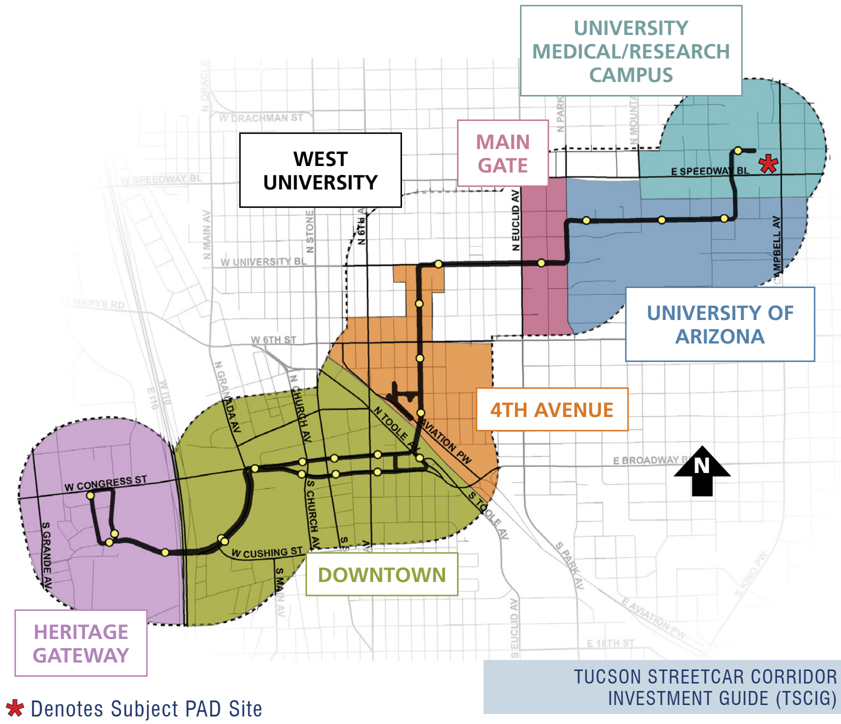
c. Tucson Streetcar Corridor Investment Guide

While not a regulatory document, the Tucson Streetcar Corridor Investment Guide (TSCIG, or the "Guide") provides valuable insight into the public goals of the streetcar system and the high priority which the City places on the investment and redevelopment opportunities it can spur throughout the corridor. To stimulate activity in this regard, the Guide describes numerous economic development tools in certain areas, including tax incentive districts, overlay zones, and primary job incentive programs.

Exhibit No. 7 illustrates the seven (7) distinct character areas that the TSCIG has identified along the entire Streetcar route; the Subject PAD Property lies within the designated University Medical/Research Campus Area at the eastern terminus of the system. Within this area, the TSCIG identifies a sole opportunity for investment by private interests, namely, the "underutilized sites at the intersection of Campbell Avenue and Speedway Boulevard".

The proposed PAD represents the first significant investment by a private interest to redevelop one of these underutilized sites, feed and energize the nearby Helen-Warren streetcar station, link the redevelopment Site to the downtown core and other activity centers within the streetcar corridor, and generally change the fundamental character and direction of the entire Speedway/Campbell intersection.

Exhibit No. 7 | TSCIG's Seven (7) Character Areas



* Denotes Subject PAD Site

d. COT Transit-Oriented Development Handbook

The City of Tucson Transit-Oriented Development Handbook (the “TOD Handbook”) is an invaluable guide for design and development within the Tucson Streetcar corridor, especially for those properties in close proximity to streetcar stops. The following notable principles put forth in the TOD Handbook are especially relevant to the subject PAD Site and so are presented here verbatim:

- *Tucson’s Modern Streetcar line represents a new era of vibrancy in the City – one where neighborhoods and people are connected better than ever and where new opportunities for development and revitalization exist at every streetcar stop (p. 2),*

- *TOD is a development pattern that is characterized by a mix of uses where buildings and uses cater to the pedestrian accessing the area via alternative modes of transportation. It typically incorporates compact development and dense activity centers within easy walking distance of transit stops. It generally includes a mix of residential, employment and shopping opportunities … (p. 4),*

- *The City of Tucson and its residents have expressed a vision of walkable vibrancy for the City, where goods and services can be obtained without an automobile, where pedestrians are respected and encouraged, where residents live close to other uses, and where public spaces are popular destinations (p. 5),*

- *Concentrating retail uses in the TOD area surrounding the streetcar stops helps focus activity and development there. Retail is essential to creating a high activity level in the TOD’s stop areas (p. 8),*

- *With diverse building types and architecture, higher densities are possible without negative visual impacts and, with adequate planning, can fit into a neighborhood. Surrounding the streetcar stops with higher density uses is important for the pedestrian-oriented environment along the corridor (p. 10).*

The subject PAD Property is specifically identified in the TOD Handbook as an “opportunity site” for redevelopment due to its proximity to the Helen-Warren streetcar station. Per the Handbook, this station area offers significant positive characteristics for new development, including the relatively higher incomes and home prices that characterize the surroundings, close proximity to the Arizona Health Sciences Center and Banner/University Medical Center, and the existing presence of larger buildings that suggest an opportunity for higher densities.

The proposed redevelopment project, as described in this PAD, furthers all of the principles outlined above and is poised to leverage its location near the Helen-Warren streetcar station by creating a high-intensity, vibrant activity center. Such redevelopment will significantly contribute to the long-term financial viability and success of the Streetcar, while advancing the guiding principles of transit-oriented development promoted in the Handbook.

The Proposed PAD will link a new and vibrant urban activity center with the entire Streetcar corridor.

I.D Community Benefits

The proposed PAD will result in significant community benefits while involving neighborhood and community leadership in the PAD process in a substantive and meaningful way.

I.D.1 Benefits to the Community

This PAD will foster the following significant community benefits:

- It will provide the first private, high-intensity activity center near the Helen-Warren station of the Tucson Streetcar, thereby helping to feed and energize the streetcar system and further the long-term viability and financial success of this critical community asset,
- It will integrate restaurant, entertainment, retail goods & services, work, and residential components into an integrated whole and live-work-play equation,
- It will embody all of the basic tenets of transit-oriented development and help further Tucson's goals for a true multi-modal community,
- It will provide significant potential toward helping the University of Arizona address its severe deficiency of quality professional office and medical clinic/lab space for all on-going UA campus functions and research,
- It will serve as an important catalyst for further planning and redevelopment of the underutilized private properties in and around the Speedway Boulevard/Campbell Avenue intersection, thereby further enhancing this area's function as a key transit activity center and more suitable gateway for the University of Arizona.
- It will provide strong consideration of the surrounding residential neighborhoods by establishing a formal platform for their material input and feedback throughout the PAD process,

Architectural concept of the redeveloped PAD Site from the Speedway/Campbell intersection.

- It will ensure a multi-use activity center that is a strong and positive architectural statement that provides exciting and inviting exterior spaces and activities to the surrounding community, and which sets a high aesthetic standard for Tucson's built environment.

I.D.2 Recognition of Nearby Established Neighborhoods

The PAD Site is proximate to several established residential neighborhoods, including Jefferson Park, Catalina Vista, Blenman/Elm, Sam Hughes, and North University. As a routine matter of course, the owner/developer and their consultant team will interact with these neighborhoods in a manner that far exceeds the City of Tucson minimum requirements. As was the case during the amendment process for the University Area Plan (UAP), the PAD team has again conducted meetings and presentations with each individual neighborhood association and individual/small-group discussions with their leadership, as warranted, through this PAD process. Based on the successful foundation this approach laid during the prior plan amendment effort, it was clearly the most appropriate route to underlie this present PAD endeavor.

I.D.3 Formal Public Participation and Outreach Program

Beyond the above recognition of the nearby neighborhoods, and so as to ensure substantive neighborhood input and feedback as part of the rezoning process, this PAD effort has included on-going coordination and discussion with a formal group of leadership individuals from the most directly impacted nearby neighborhood associations. This interaction demonstrated follow-through on a formal commitment that was made during the University Area Plan amendment process. A specific policy for this PAD Site was incorporated into that amendment, stating:

> *The owner/developer will promote the creation of a neighborhood liaison group, with individuals from the surrounding neighborhood associations, to insure neighborhood input and feedback throughout the design and rezoning process. The specific membership structure, procedures and duties of the group will be detailed in the Planned Area Development (PAD) document as part of the rezoning process. The liaison group and the developer will work together in mutual good faith to reasonably address the specific issues outlined under five (5) specific guidelines enumerated in the UAP (see p. 16 of this PAD for a listing of the guidelines).*

The neighborhood liaison group, the owner, and the consultant team have worked together in mutual good faith to reasonably address the specific issues enumerated in the University Area Plan, including the several special studies described therein. The results of this formal outreach effort, and the findings of the special studies, are discussed more fully in Sections IV.A.2 and IV.C.5 of this PAD document.

Section Two | Site Analysis

II.A Land Uses and Zoning

The Speedway + Campbell Gateway PAD District is comprised entirely of the two (2) parcels that contain the existing Palm Shadows Apartments (PSA) complex. This Site is 2.49 acres in area and contains four (4) two-story apartment buildings, providing a total of 152 rental units, together with parking and basic on-site amenities for its residents.

II.A.1 Existing/Surrounding Site Context and Land Uses

Exhibit No. 8 illustrates the PAD District and its surroundings, as well as the existing on-site (PSA) and nearby off-site improvements. The PAD's context is comprised of the following:

- To the immediate north (across Helen Street) is the Arizona Health Sciences Center (AHSC) campus. Two (2) AHSC surface parking lots lie adjacent to Helen Street, with the predominant campus buildings lying further to the north. Presently under construction within the AHSC, just to the northwest of the PAD Site, are the new Health Sciences Innovation Building and the Bioscience Research Laboratory.
- To the south (across Speedway Boulevard) are established commercial uses in the form of fast-food restaurants (Taco Bell, Wendy's), a sports bar (Dirtbag's), a 7-Eleven convenience store, and a strip commercial center.
- To the immediate east is property owned by the Arizona Board of Regents (ABOR) containing an existing UA administrative office, together with excess holdings that provide continuous frontage along Campbell Avenue. Further east (across Campbell) are an existing church and its parking lot, together with a Boston Market restaurant and strip commercial center.
- To the southeast (kitty-corner to the Speedway/Campbell intersection), is the 7-story Aloft Tucson/University Hotel
- To the immediate west is property owned by the Arizona Board of Regents (ABOR), which contains the UA's Babcock Residence Hall and associated Babcock Administrative Office. Further westward are privately owned properties containing a McDonald's Restaurant and Wells Fargo Bank branch office.

Exhibit No. 8 | Existing Site Context

LEGEND

PAD DISTRICT BOUNDARY
HELEN-WARREN STREETCAR STATION
UA OFFICE BUILDING 1
OUR SAVIOUR'S LUTHERAN CHURCH 2
ALOFT TUCSON/UNIVERSITY HOTEL 3
FAST-FOOD RESTAURANTS AND STRIP COMMERCIAL CENTER 4
UA BABCOCK ADMINISTRATIVE BUILDING 5
UA BABCOCK RESIDENCE HALL 6
KEATING BIORESEARCH/BIO5 INSTITUTE 7
ARIZONA HEALTH SCIENCES CENTER(AHSC) 8
BANNER/UNIVERSITY MEDICAL CENTER 9
AHSC PARKING 10

a. Established Non-Residential Context

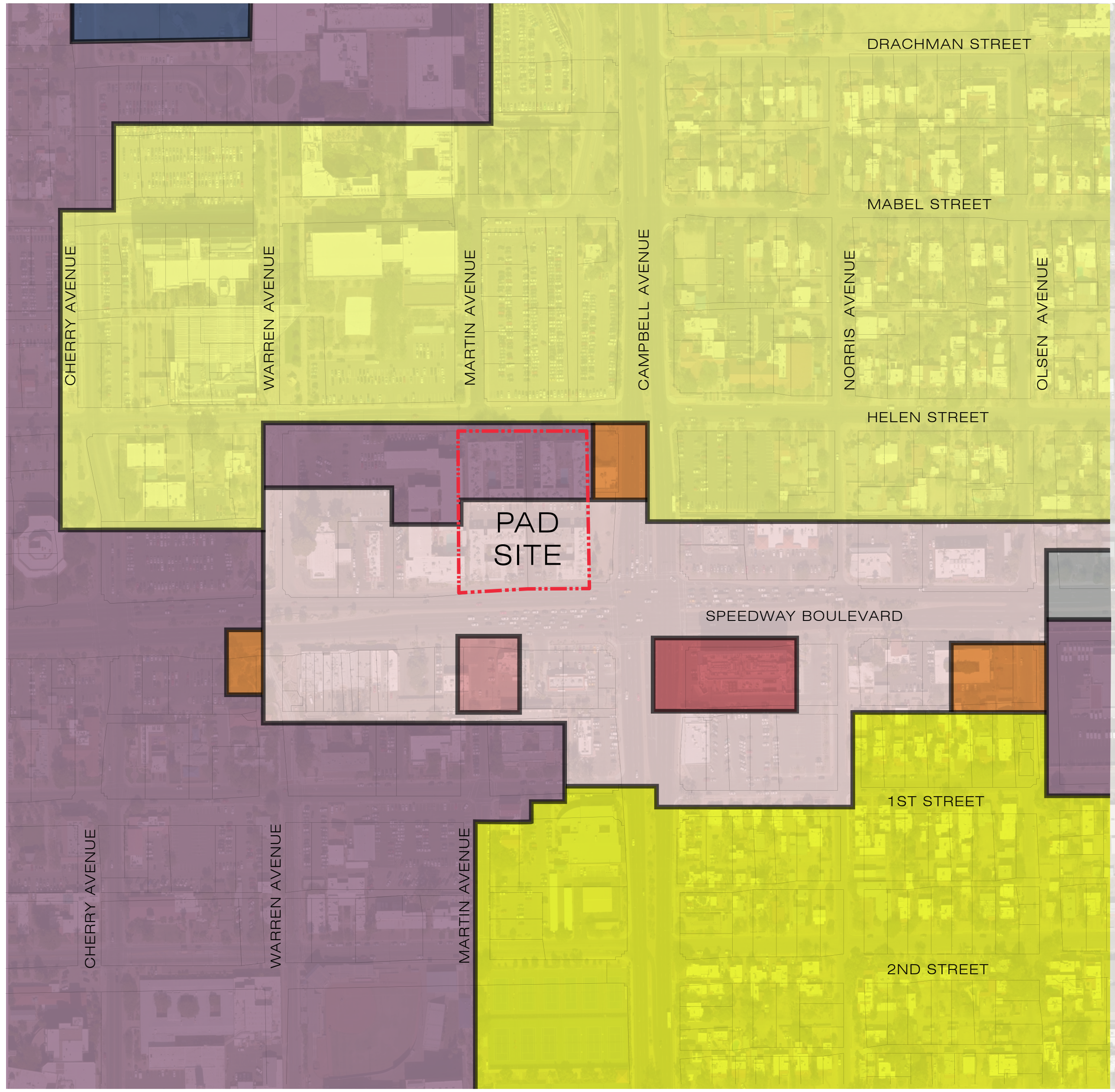
The PAD Property clearly lies within a well-established urbanized context of non-residential and institutional uses, including a significant massing of private commercial enterprises, a large 7-story hotel, the Arizona Health Sciences Center (AHSC) campus, and the UA main campus via the Warren Avenue underpass beneath Speedway Boulevard, a public street which generally embodies one of the longest and most intense commercial/arterial corridors in the entire Tucson metropolitan region. Campbell Avenue, for its own part, serves as a major north-south transportation corridor within the metro area, extending to the Catalina Foothills region in the north and directly linking the PAD District to significant points south, including Tucson International Airport. Exhibit No. 9 illustrates the immediate zoning context of the PAD Site, together with its more outlying areas.

Aloft Hotel at the southeast corner of Speedway Boulevard + Campbell Avenue

Adjacent strip commercial along Speedway Boulevard

Speedway Boulevard + Warren Avenue underpass

U of A Main Campus



LEGEND

N

- PAD DISTRICT BOUNDARY
- PAD ZONING (BANNER/UNIVERSITY MEDICAL CENTER)
- R-1 ZONING
- R-2 ZONING
- R-3 ZONING
- C-1 ZONING
- C-2 ZONING
- C-3 ZONING
- O-3 ZONING
- P ZONING

b. Helen-Warren Streetcar Station and Streetcar Route

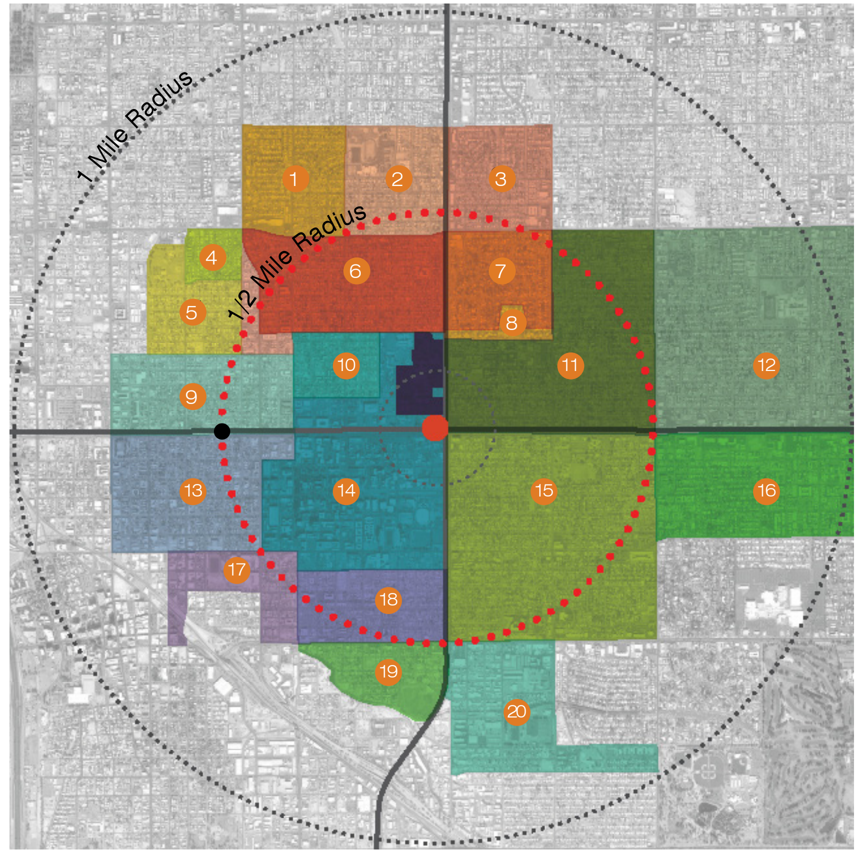
Prior Exhibit No. 8 identifies the location of the nearby Helen-Warren streetcar station, which sits less than three hundred feet (300’) from the northwest corner of the PAD Site. The station provides a convenient and direct linkage to Tucson’s downtown core and to the various activity centers that lie along the streetcar’s 4-mile corridor. The Helen-Warren station is a fundamental component in fostering the proposed PAD’s transit-oriented, multi-modal and high-intensity mixed-use redevelopment program.

c. Outlying Residential Neighborhoods

Exhibit No.10 illustrates the established neighborhood associations lying in relative proximity to the PAD Site. These neighborhoods were consulted when the proposed Project was first brought forward in 2014 to amend the University Area Plan (UAP). The ultimate approval of that UAP amendment contains language requiring the establishment of a formal Neighborhood Liaison Group (NLG) to engage the proximate neighborhood association entities more formally in this PAD process. The NLG and its input are discussed further in Sections I.D.3, IV.A.2 and IV.C.5 of this PAD document.

Examples of neighborhood character

Exhibit No. 10 | Existing Neighborhood Associations



1 Mile Radius • • • • • •
1/2 Mile Radius • • • • •

Mountain First Avenue	1	Blenman Elm	11
Samos	2	Palo Verde	12
Campbell Grant	3	West University	13
El Cortez	4	University of Arizona	14
Northwest	5	Sam Hughes	15
Jefferson Park	6	Miramonte	16
Catalina Vista	7	Pie Allen	17
Catalina Vista / Blenman Elm	8	Rincon Heights	18
Feldman’s	9	Miles	19
North University	10	Arroyo Chico	20

II.A.2 Natural and Built Constraints

There are no natural environmental constraints impacting the PAD Site's redevelopment. The Property lies within a completely urbanized context. The basic network of public and private infrastructure necessary to redevelop and serve it is already project convenient within adjacent street rights-of-way or within easements on adjoining properties.

The built constraints impacting this proposed redevelopment come in the form of those rather standard issues that attend any large urban infill project, namely the extreme limitations on physical space that come into play when constructing a high-density project, with a high-rise element of up to twenty (20) stories tall, on a 2.49-acre site that has neighboring development in close proximity. While challenging, these matters fall into the realm of routine within the urban environment and do not constitute anything uncommon or extraordinary.

II.B. Existing Educational, Community and Cultural Resources

The PAD District is located within a surrounding area that is rich in important educational, community and cultural resources. Exhibit No. 11 provides a comprehensive annotated depiction of the resources surrounding the Site.

II.B.1 Arizona Health Sciences Center

The AHSC lies immediately north of the PAD Site and contains facilities for the UA Colleges of Medicine, Nursing, Pharmacy, and Public Health, along with numerous operations of the UA's Facilities Management Department. Significant new development is also occurring just northwest of the PAD Site, where the AHSC's new Health Sciences Innovation Building and Bioscience Research Laboratory are presently under construction.

II.B.2 Banner-University Medical Center

Banner-University Medical Center (BUMC), located approximately 1/2 mile north of the PAD Property, is currently being redeveloped into a state-of-the-art medical campus that will feature, among other things, a brand new hospital and trauma-center facility to replace the original University Medical Center (UMC) hospital. The latter dated back to the 1960's and is simply obsolete by today's healthcare standards. In its ultimate build-out, the redeveloped BUMC campus will provide more than 1.6 million square feet of hospital space, comprising more than 750 beds, and will retain all of the Diamond Children's Medical Center (DCMC) square footage as it exists today, while repurposing much of the other existing campus buildings into supporting administrative functions or clinics.

II.B.3 University of Arizona Main Campus

The University of Arizona campus proper, lying to the south and west of the PAD Site, represents the most significant educational, community, and cultural resource in the vicinity of the proposed Project. The campus has a total population of more than 50,000 students, offers more than 300 accredited degree programs, and consistently ranks in the top twenty (20) national institutions, in terms of total research funding, according to annual rankings promulgated by the National Science Foundation. In real terms, the University brings national and worldwide notoriety to Tucson.

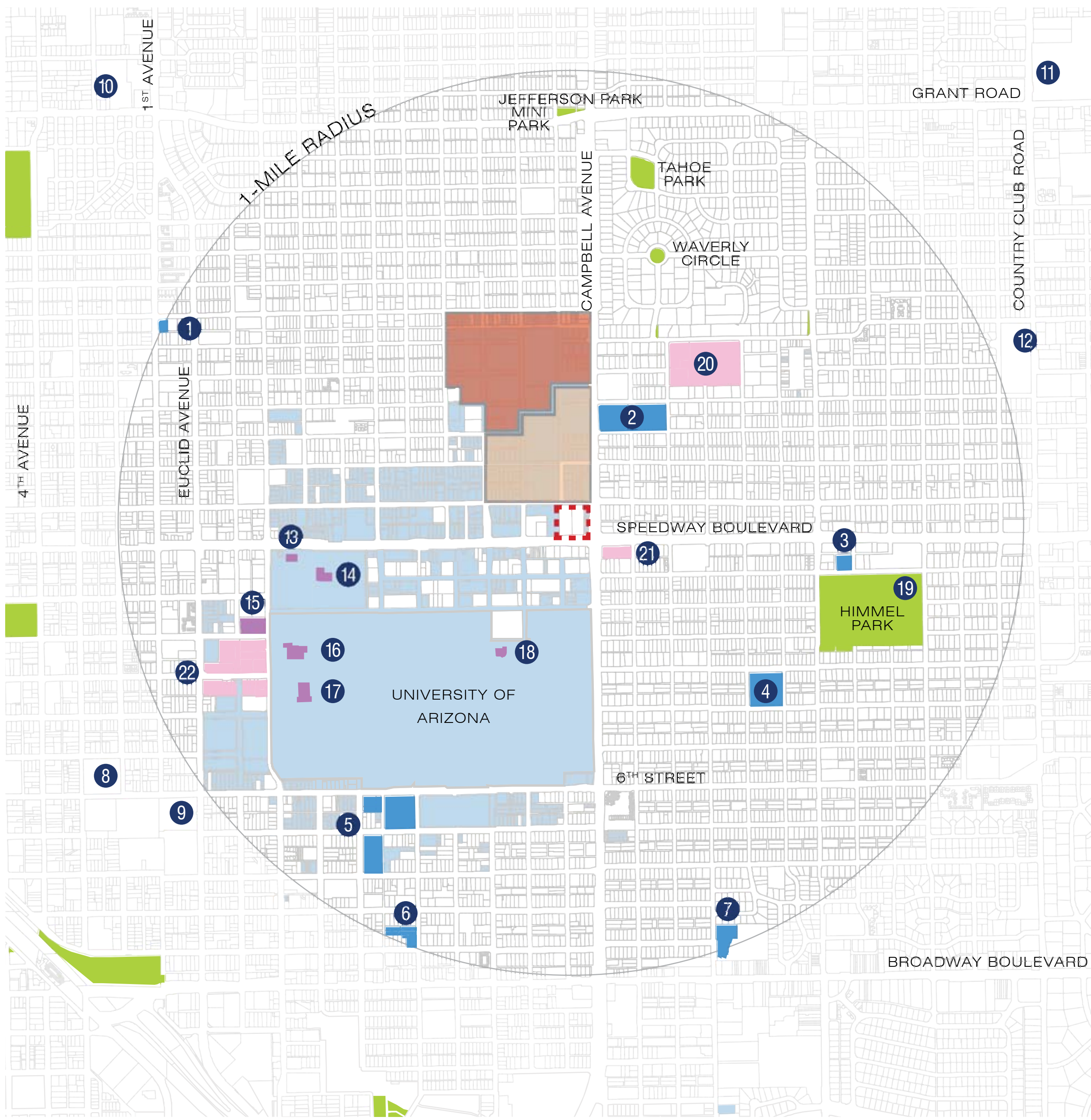
In addition to the profound academic qualities of the institution, UA also provides significant cultural offerings to the larger community, including the Arizona State Museum, the University Poetry Center, the Campus Arboretum, the UA Center for Creative Photography, and Centennial Hall.

The University of Arizona
Main Campus

Exhibit No. 11 | Educational, Community and Cultural Resources

LEGEND

PAD DISTRICT BOUNDARY	
1 MILE RADIUS	
UNIVERSITY OF ARIZONA	
PARCELS	
ARIZONA HEALTH SCIENCES CENTER	
BANNER/UNIVERSITY MEDICAL CENTER	
PUBLIC PARKS	
HOSPITALITY	
SCHOOLS	
ARTS AND SCIENCE	
INTERNATIONAL SCHOOL OF TUCSON	1
SAINTS PETER AND PAUL CATHOLIC SCHOOL	2
EDGE HIGH SCHOOL	3
HUGHES ELEMENTARY SCHOOL	4
MANSFIELD MIDDLE SCHOOL	5
HA SAN PREPERATORY AND LEADERSHIP SCHOOL	6
TEENAGE PARENT ALTERNATIVE SCHOOL	7
ROSKRUGE BILINGUAL K-8 MAGNET SCHOOL	8
TUCSON HIGH SCHOOL	9
KEELING ELEMENTARY SCHOOL	10
DOOLEN MIDDLE SCHOOL	11
BLENMAN ELEMENTARY SCHOOL	12
UNIVERSITY OF ARIZONA MUSEUM OF ART	13
CENTER FOR CREATIVE PHOTOGRAPHY	14
ARIZONA HISTORY MUSEUM	15
ARIZONA STATE MUSEUM	16
CENTENNIAL HALL	17
FLANDRAU SCIENCE CENTER	18
HIMMEL PARK LIBRARY	19
ARIZONA INN	20
ALOFT HOTEL	21
UNIVERSITY MARRIOT MAIN GATE SQUARE	22



II.B.4 Public Schools and Other Educational Facilities

Exhibit No. 11 also depicts the following public schools and private educational facilities located within the PAD vicinity:

Public Schools

- Keeling Elementary School, located 1-1/2 miles to the northwest
- Doolen Middle School, located 1-1/2 miles to the northeast
- Blenman Elementary School, located 1 mile to the east/ northeast
- Hughes Elementary School, located ½ mile to the southeast
- Mansfield Middle School, located ¼ mile to the south
- Tucson High School, located 1 mile to the southwest
- Roskruge Bilingual K-8 Magnet School, located ¾ mile to the southwest
- The University of Arizona Main Campus, located to the immediate south/southwest

Private Schools

- St. Peter & Paul Catholic School, located ½ mile to the northeast
- International School of Tucson (former site of Jefferson Park Elementary), located ½ mile to the north

II.B.5 Cultural Resources

Exhibit No. 11 further illustrates the location of various cultural facilities that exist in and around the University of Arizona campus, including the UA Museum of Art, the Center for Creative Photography, the Arizona State Museum, and other popular community venues. The Exhibit also shows the location of the historic Arizona Inn Hotel, on Elm Street, approximately one-half mile northeast of the PAD Site and east of Campbell Avenue. The Inn was built in 1930 by Isabella Greenway, Arizona's first congresswoman. It was added to the National Register of Historic Places in 1988 and remains a highly popular destination for those seeking a quintessentially Tucson and Southwestern lodging and dining experience.

II.B.6 Jefferson Park Historic District

The Jefferson Park Historic District (JPHD) lies to the immediate north of the Banner-University Medical Center and is approximately ¾ mile north of the PAD Site. The BUMC redevelopment undertook intensive coordination with the JPHD to establish and construct a new greenway that effectively buffers the District from the BUMC while also providing a shared community park amenity. The proposed PAD will have no material impact on the JPHD.

II.C Existing Open Space, Recreation and Trails

II.C.1 On-Site Open Space Areas, Recreation and Pedestrian Ways

The existing Palm Shadows Apartments property is comprised almost exclusively of buildings, paving, and hardscape, a characteristic that is not uncommon for projects that were constructed in the early 1960's. Each of the four (4) on-site apartment buildings contains a small interior courtyard, two (2) of which feature pools and two (2) of which have small ramadas. Even these interior courtyards are still primarily comprised of hardscape. Minimal landscape areas and tree specimens are found within the courtyards, as well as along the Property's Helen Street and Speedway Boulevard frontages.

Existing pedestrian ways within the Property are marginally defined, with most circulation occurring in self-directed fashion from the parking areas to the various buildings. Circulation within and around each of the individual building clusters is sufficient. The site has excellent connectivity to the larger surrounding circulation network, in that it has easy and direct access to Speedway Boulevard, Helen Street, and Campbell Avenue and their existing framework of sidewalks, street crossings, bus stops, and bikeways. Helen Street also provides an easy linkage to the Helen-Warren station of the Tucson Streetcar and, by extension, to Tucson's downtown core and all existing activity centers along the streetcar route. As mentioned previously, the PAD Site is also directly linked to the University main campus by the Warren Avenue pedestrian underpass beneath Speedway Boulevard.

II.C.2 Off-Site Parks, Recreation Areas and Urban Trails

The most significant public recreation facility located in relative proximity to the PAD Site is Himmel Park, approximately ½ mile to the east/southeast. This public community park contains athletic fields, tennis courts, and walking paths, and is also home to the Himmel Park branch of the public library system. Beyond Himmel Park, there are no other large or significant recreation or park facilities in the general vicinity of the PAD Site. Exhibit No. 12 provides a map of those which do exist.

At one time, an intergovernmental agreement was in place between the City of Tucson Department of Parks & Recreation and the Tucson Unified School District (TUSD), wherein the grounds of the former Jefferson Park Elementary School (approximately one (1) mile north of the PAD) was designated and maintained as a neighborhood park. That agreement lapsed when the TUSD elected to close the school in 2011.

The Likins Lester Street Landscape is a small, private pocket park presented in honor of retired UA former-president Dr. Peter Likins. It is located approximately 3/4 miles north of the PAD Property between two (2) existing residential lots within the Jefferson Park Neighborhood. The only other park in relative proximity to the PAD site is Tahoe Park, which is a small public neighborhood green located southeast of the Campbell Avenue/Grant Road intersection within the Catalina Vista Neighborhood.

In conjunction with the Campbell Avenue street improvement project completed by TDOT several years ago, a continuous frontage road and landscape border was constructed along the west side of Campbell Avenue, between Chauncey Lane and Grant Road, together with a small pocket park just north of Elm Street. These improvements provide a quality streetscape border and are popular with Jefferson Park residents.

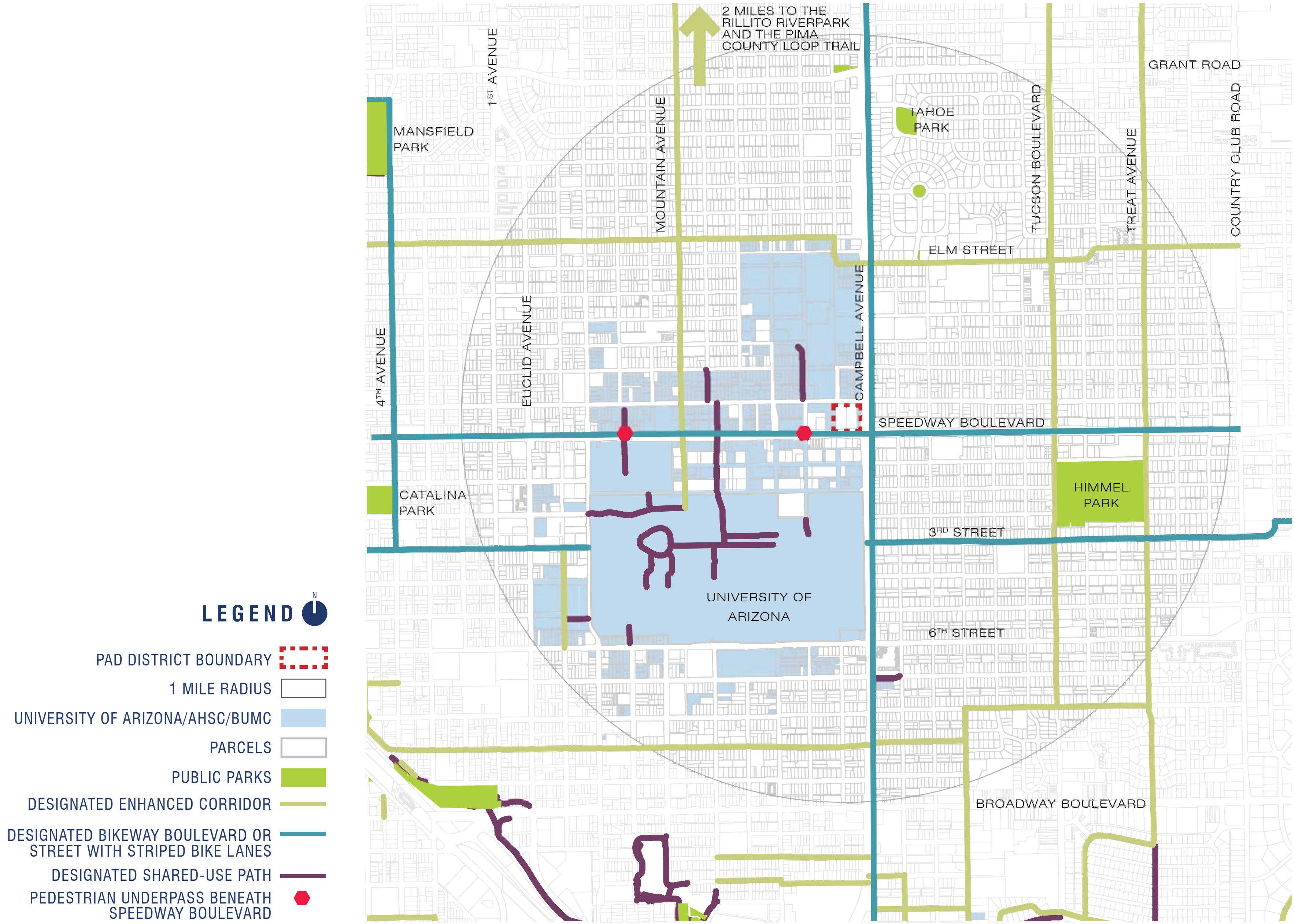
With respect to designated urban trails, the nearest ones are on Elm Street (1/2 mile north of the PAD Site) and 3rd Street (1/2 mile to the south), both of which are formally identified on the Pima County Regional Trails System Master Plan (August, 2010) as "Enhanced Corridors". The Master Plan defines enhanced corridors as routes that, "generally follow existing local or collector streets that carry a relatively low volume of automobile traffic". They are envisioned as primary pedestrian and bicycle arteries, and so commonly feature continuous bicycle lanes and accessible sidewalks, amenity landscaping, site furniture, connections to other modes of transit, and public art. Mountain Avenue and Tucson Boulevard are the nearest north-south enhanced corridors; these north-south linkages ultimately connect to the Rillito Riverpark Path, which is a primary multi-use component of the regional Pima County Loop Trail.

II.C.3 Pedestrian Connectivity to Off-Site Recreation and Trails

As mentioned above, the PAD Site has excellent connectivity to the larger surrounding pedestrian and bicycle network, in that it has immediate and direct access to Speedway Boulevard, Helen Street, and Campbell Avenue and their existing network of sidewalks, street crossings, and nearby designated bikeways and urban trails.

Pima County Loop Trail and Rillito River Park (above); Himmel Park (right).

Exhibit No. 12 | Urban Trails, Pedestrian Ways, Bike Ways and Parks



II.D Existing Transportation and Circulation

A number of public streets provide direct access or facilitate important circulation functions to and from the PAD Property. In addition, significant multi-modal opportunities exist within the general vicinity, including bus/transit service, streetcar access, and bicycle and pedestrian routes.

II.D.1 Relevant Public Streets, Lanes, and Capacities

Streets that provide general mobility and which facilitate access to and from the PAD Site are the following (refer to Exhibit No. 13):

Speedway Boulevard

Speedway Boulevard is the major east-west arterial roadway in the vicinity and comprises the south boundary of the PAD District. Speedway Boulevard is a six-lane arterial roadway with raised medians, bike lanes, and continuous sidewalks and has a 35 MPH posted speed limit. The roadway is constructed to the maximum cross-section supported by the City of Tucson Major Streets and Routes Plan.

Campbell Avenue

Campbell Avenue is the major north-south arterial roadway in the vicinity and lies approximately sixty feet (60’) east of the PAD Site (a sliver of UA property intervenes and has direct frontage onto Campbell Avenue). It is a six-lane arterial roadway with raised medians, bike lanes, and continuous sidewalks and has a 35 MPH posted speed limit. The road is constructed to the maximum cross-section supported by the City of Tucson Major Streets and Routes Plan.

Local Public Streets

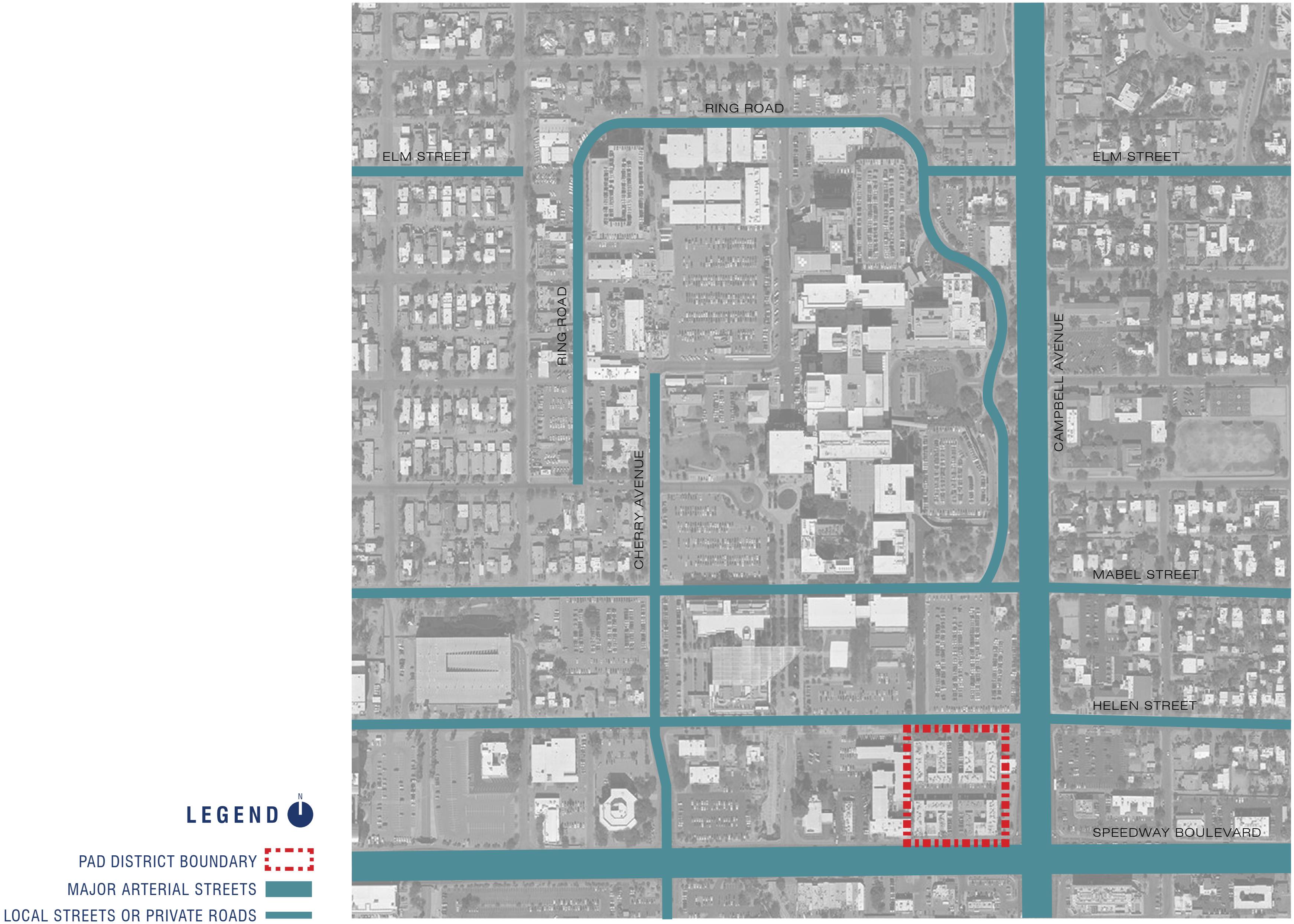
Helen Street serves as a minor east-west collector street and comprises the north boundary of the PAD Site. It provides access to many of the existing parking facilities and buildings within the Arizona Health Sciences Center (AHSC) campus north of the PAD Property, and will also provide the primary ingress and egress for the proposed PAD Project.

Cherry Avenue serves as a minor north-south collector street, providing access to the main University of Arizona campus, south of Speedway Boulevard, as well as northward to the AHSC campus. The intersection of Cherry Avenue and Speedway Boulevard is signalized.

Elm Street is a minor east-west collector street, providing access through the Banner-University Medical Center (BUMC) campus and circulation through the Blenman-Elm and Catalina Vista neighborhoods east of Campbell Avenue. In conjunction with the BUMC redevelopment project and construction of the new hospital thereon, the Elm/Campbell signalized intersection is being reconstructed to provide two (2) eastbound-to-northbound left-turn lanes, providing much improved northbound circulation than has previously been available to vehicles exiting the AHSC/BUMC properties.

Arizona Health Sciences Center (AHSC) Ring Road

Internal circulation within the AHSC campus and the BUMC campus is provided by a one-mile long Ring Road. This Ring Road is a low speed, two-lane roadway with a speed limit of approximately 20 MPH. It extends from Cherry Avenue, beginning at Drachman Street, north to Elm Street and then south to Mabel Street. The portion of Helen Street that abuts the PAD Site also connects directly to this Ring Road, providing a direct linkage northbound to Elm Street and (see immediately above) to the reconstructed Campbell Avenue/Elm Street intersection and its dual northbound left-turn lanes.

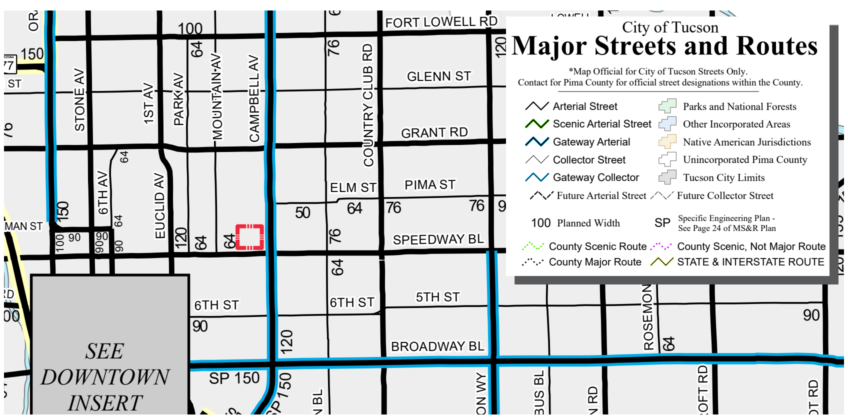

RING ROAD
ELM STREET
ELM STREET
RING ROAD
CHERRY AVENUE
CAMPBELL AVENUE
MABEL STREET
HELEN STREET
SPEEDWAY BOULEVARD
LEGEND
N
PAD DISTRICT BOUNDARY
MAJOR ARTERIAL STREETS
LOCAL STREETS OR PRIVATE ROADS

II.D.2 Major Streets and Routes Considerations

The City of Tucson Major Streets and Routes Plan (MS&R) identifies the general location and size of existing and proposed freeways, arterial and collector streets, future rights-of-way, setback requirements, typical intersections and cross sections, and gateway and scenic routes. The MS&R defines the ultimate right-of-way requirement for both Speedway Boulevard and Campbell Avenue as one hundred twenty feet (120'). The existing respective Speedway and Campbell right-of-way widths in place adjacent to the PAD Site are already at this maximum MS&R width; no additional rights-of-way are required.

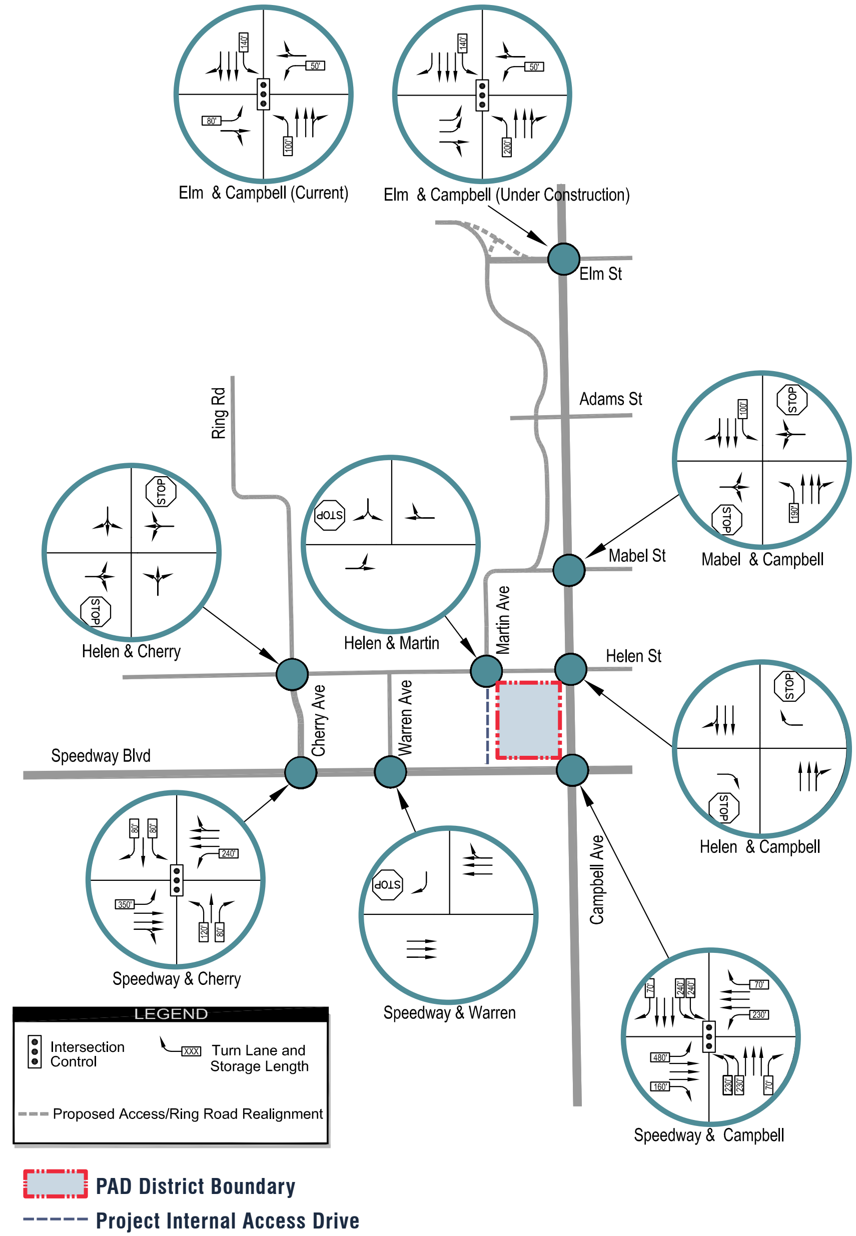
Campbell Avenue is also formally designated as a Gateway Arterial, which identifies it as an especially important route to and from major employment centers, shopping areas, recreational areas, and transportation centers and which is accordingly used regularly by a large number of residents and visitors. The purpose of this formal designation is to generally improve the appearance of the City's built environment through the use of quality standards for the design and landscaping of the roadway, as well as for adjacent private developments.

The existing lane configurations and traffic-control features for all of the primary intersections in the PAD Site vicinity are illustrated in Exhibit No. 14. These elements are taken from a comprehensive Traffic Impact Analysis (TIA) prepared by Kimley-Horn Associates in conjunction with this PAD. The findings and recommendation of the TIA are summarized in Section IV.D of this PAD document; the full Speedway+Campbell TIA is found in Appendix D.



PAD District Boundary

Exhibit No. 14 | Existing Traffic Control Configurations at Relevant Intersections



II.D.3 Public Transportation Components

The PAD Property benefits from a robust set of multi-modal opportunities located within close proximity to the Site. Exhibit No.15 provides a composite graphic illustrating these various transportation modes, which are further discussed below and also addressed in even finer supplemental detail within Section IV.D.1.c. (Public Transit and Multi-Modal Considerations) of this PAD document.

Sun Tran provides transit service to the PAD Property, with designated bus stops on both Campbell Avenue and Speedway Boulevard, one of which on Speedway is located directly in front of the Site. A full complement of standard and express routes is available, including Speedway Boulevard Route Nos. 4, 5, 102X, 103X, 105X and 109X. Numbered bus routes on Campbell Avenue include Nos. 9, 15, 20 and 103X. The University of Arizona Cat Tran system also circulates between the UA Main campus and the nearby Arizona Health Sciences Center (AHSC) campus.

The University's Cat Tran shuttle has multiple established routes providing regular service between the Main campus and AHSC.

Tucson Streetcar

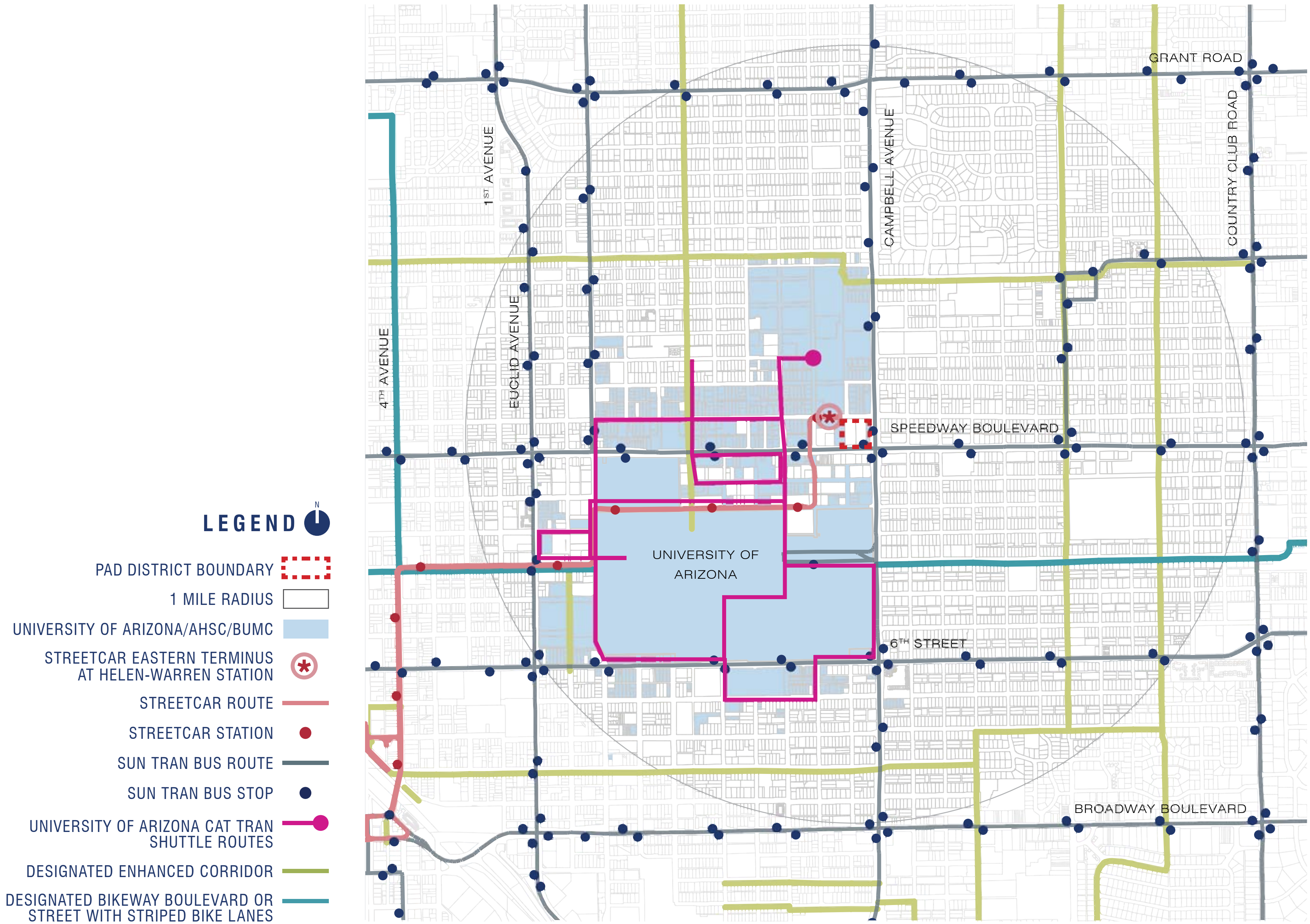
Suntran Bus and U of A Cat Tran Shuttle Bus

Warren Avenue + Helen Street Streetcar Station (left)

Bike Share Station in proximity to streetcar (below)

Downtown linkage via 4th Avenue underpass

Exhibit No. 15 | Public Transportation



Construction of the 3.9-mile first phase of the Tucson Streetcar system was completed in the summer of 2014. The Streetcar's eastern terminus is presently the Helen-Warren station, located less than three hundred feet (300') west of the PAD Site. This station provides direct access through the University of Arizona main campus and ultimately to the downtown Tucson core and all intervening activity centers along the alignment, ultimately terminating west of Interstate 10. Future Phases 2 and 3 of the Streetcar are respectively planned northward to the foothills and southward to Tucson International Airport.

Lastly, an extensive network of designated urban trails ("enhanced corridors"), bicycle routes and bike lanes are also in place. Both Speedway Boulevard and Campbell Avenue provide continuous striped bike lanes on both sides of the street prism. The designated Elm Street bikeway corridor (approximately 1/2 mile to the north) traverses through the Banner-University Medical Center and AHSC campus, and is further supplemented with striped bike lanes along significant portions of the Ring Road therein. In addition, existing shared-use paths along the Warren Avenue street alignment (1/4 mile to the west) and Mountain Avenue (1/2 mile to the west) serve as a north-south routes for both cyclists and pedestrians. The Warren Avenue underpass provides a grade-separated crossing beneath Speedway Boulevard to facilitate direct access to and from the University of Arizona main campus.

According to the City of Tucson and the University of Arizona, there are no current plans for the designation or construction of any other new or expanded bicycle routes in the PAD vicinity.

II.D.4 Existing Parking Facilities and Structures

Given the Site's proximity to the AHSC and UA main campuses, significant existing parking facilities exist in close proximity; Exhibit No. 16 illustrates these various surface lots and parking structures. These existing parking lots and structures are generally private in nature, providing spaces for either existing businesses or for UA and/or AHSC facilities. The UA/AHSC parking sites have some limited paid public parking, but the majority of their available spaces require formal permits. These existing facilities notwithstanding, it is the PAD's intent to meet its own parking requirements wholly on-site.

Exhibit No. 16 | Existing Parking Lots and Structures

II.E Existing Utility Infrastructure

In that this is an urban infill redevelopment project, the basic utility infrastructure necessary to service the PAD Site is already in place and project convenient. Pertinent utility detail is provided in the Sections that follow.

II.E.1 Existing Utilities

Exhibit No. 17 illustrates, in schematic format, the existing wet and dry utilities adjacent to and servicing the PAD site.

a. Public and Private Sewer

Public Sewer

Public wastewater conveyance and treatment (wastewater) is currently being provided to the existing Palm Shadows Apartments complex on the PAD Site by the Pima County Regional Wastewater Reclamation Department (PCRWRD), which will also be providing wastewater services to the proposed PAD Project. The following Table details the current existing public sewer mains adjacent to the PAD Site:

Sewer Main Location	*Sewer Plan No.	Conveyance Method	*Main Size	*Pipe Material	*Year Built
Helen Street	G-098	Gravity	8”	**VCP	1939
Campbell Avenue	G-098	Gravity	8”	**VCP	1939
Speedway Boulevard	G-098	Gravity	8”	**VCP	1922

*Information per Pima County MapGuide website.
**Vitrified Clay Pipe.

The current Palm Shadows Apartments complex is comprised of four (4) separate apartment buildings. Per PCRWRD records, the northern two (2) buildings are sewered via two (2) private six inch (6”) house connection sewer (HCS) lines (one for each building) to Sewer No. G-098, while the southern two (2) buildings are sewered via two private six inch (6”) HCS lines (one for each building) to Sewer No. G-049.

Private Sewer

Other than the above referenced building HCS’s, there are no known private sewers on-site.

b. Potable Water

Public domestic (potable) and fire-flow water service is currently being provided to the Palm Shadows Apartments by the City of Tucson Water Department (a.k.a. Tucson Water). It is anticipated that Tucson Water will also be providing these same water services to the proposed PAD Project redevelopment. The following summary details the existing public water mains adjacent to and servicing the PAD site:

Per Tucson Water’s valve maps, it appears that the Palm Shadows Apartments property utilizes four (4) 1” water services and four (4) 2” water services, together with a single irrigation service and a single 6” private fire service connection.

Water Main Location	Water Plan No.	Main Size	Pipe Material	Year Built
Helen Street	003-1938	6”	CA	1938
Campbell Avenue	091-1978	12”	CA	1978
Speedway Boulevard	202-1988	12”	PC	1988

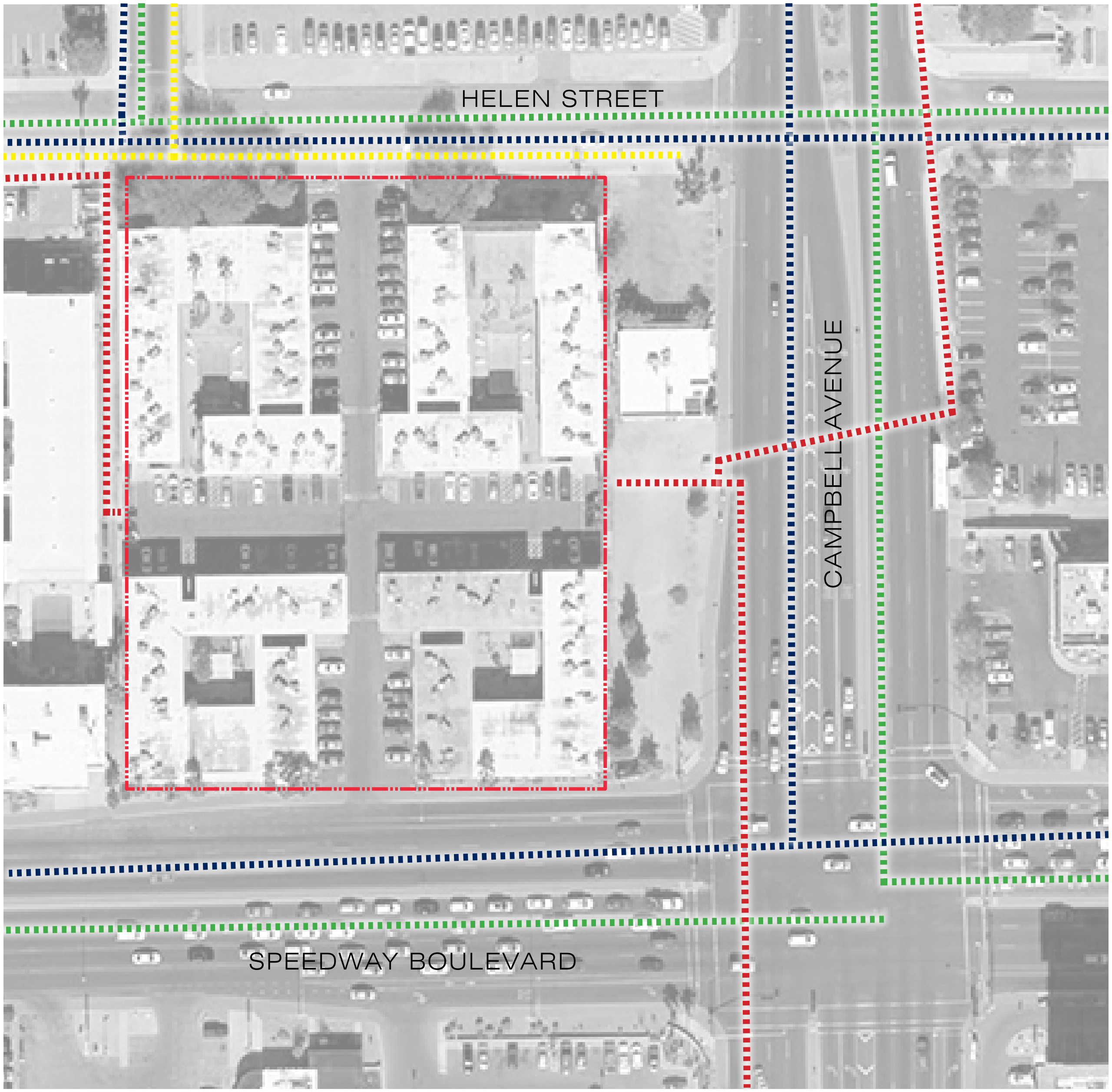
c. Gas, Water, Electric Service

The following summary details the dry utility providers that currently service the PAD Site, along with providing a brief description of their adjacent facilities:

Utility	Provider	Facilities
Electric	Tucson Electric Power	Three Phase overhead service within the Site
Natural Gas	Southwest Gas	Four (4) on-site meters fed by a 2” PE line in Helen Street
Telecom	Century Link	Service to site
Cable TV	Cox Communication	Service to site

The above providers have confirmed that they can provide service to the proposed PAD Project. All attendant facility adjustments, relocations, and extensions, together with necessary easements and service agreements, will be coordinated as a routine part of the final design and engineering of the proposed PAD improvements.

Exhibit No. 17 | Existing Utility Infrastructure



LEGEND

- PAD DISTRICT BOUNDARY
- EXISTING 6" OR 8" SEWER SERVICE LINE
- EXISTING 6" OR 12" WATER MAIN
- EXISTING 2" GAS SERVICE LINE
- EXISTING ELECTRIC

II.E.2 Conclusions and Statement of Overall Project Serviceability

The proposed PAD Project will depend upon the use of the existing utility infrastructure framework that is presently in place and which serves the Palm Shadows Apartments. Further, preliminary discussions initiated with PCRWRD indicate that downstream augmentation of their existing conveyance facilities should be anticipated as a part of this Project.

The extent of this augmentation has yet to be defined and thus, it will need to be determined at the time of future project engineering. The utility upgrades and modifications anticipated with the Project are considered to be within the typical range of improvements expected with this type of urban infill redevelopment in this location.

II.F Environmental Factors

The PAD Site is somewhat limited in any salient environmental factors due to the wholly urbanized context of its entire surroundings. The following Sections discuss the pertinent elements.

II.F. 1 Existing Drainage Patterns and Site Hydrology

The PAD Site, as has been previously discussed, is a fully developed residential apartment complex consisting of four (4) multi-story buildings, parking lots, and vehicular driveways. As a result, the surface area of the property is close to one hundred percent (100%) impervious, with the exception of small pervious areas located in and around portions of the buildings where minimal landscaping is in place. Most of the existing stormwater runoff from the PAD Site exits in a northerly direction as surface flow into Helen Street. The remaining smaller portion of stormwater runoff is discharged as surface flow into Speedway Boulevard.

a. Off-Site Characteristics and Downstream Issues

Exhibit No. 18 illustrates the drainage characteristics off-site and downstream of the PAD Property. The majority of the Site (approximately its northern two-thirds) is located within the Flowing Wells Wash regional watershed. Stormwater runoff from this watershed flows in a northwesterly direction and ultimately outfalls into the Santa Cruz River. The PAD Site is located at the upstream limit of this watershed.

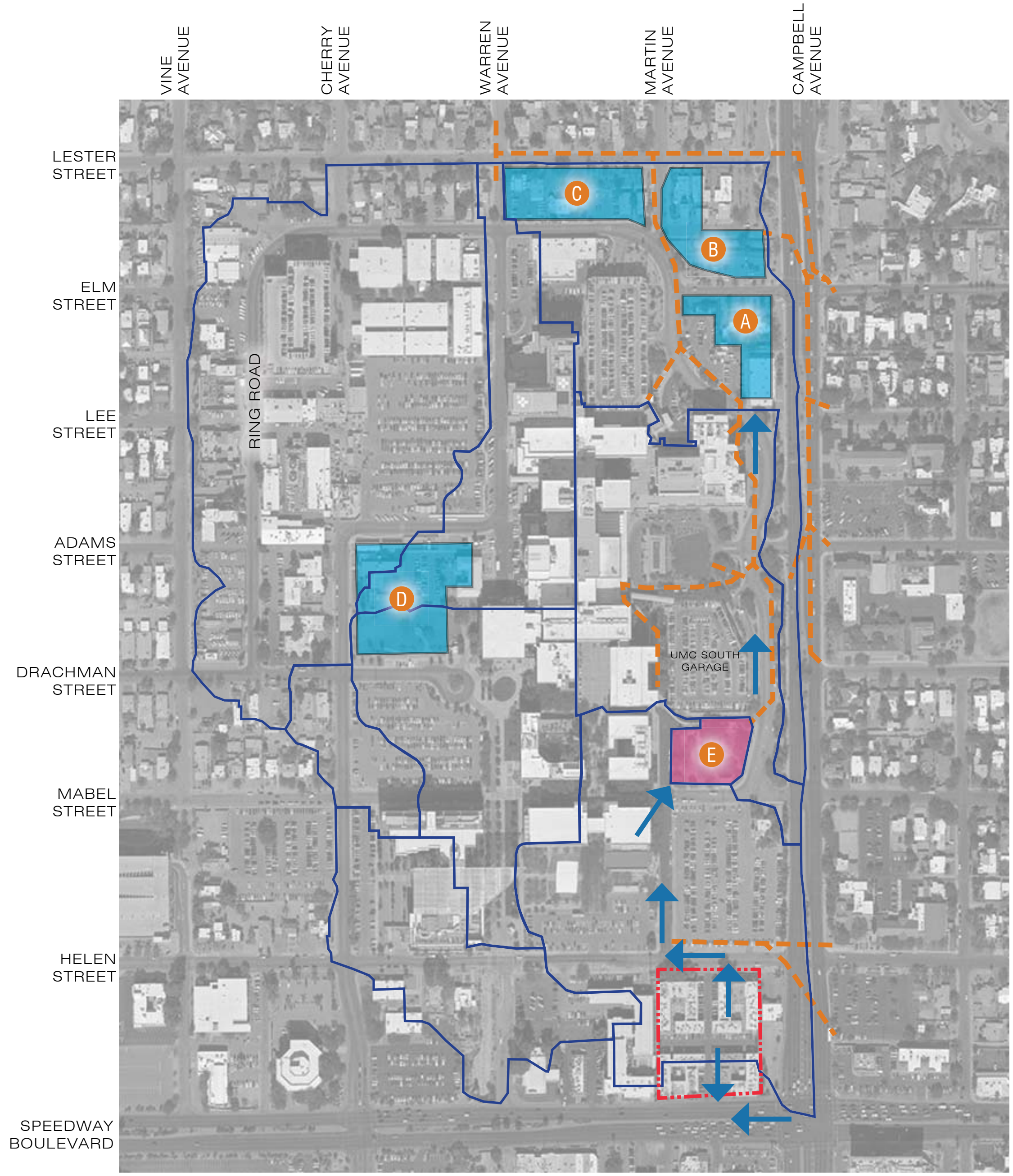
The runoff from the Site's northern portion discharges into Helen Street and therefrom flows westerly to Martin Street, where surface flows continue northerly to an existing detention basin at Mabel Street within the Banner-University Medical Center (BUMC) campus. Outflows from the Mabel Street basin are then discharged northerly and will ultimately be collected by two (2) new proposed Lester Street retention basins that are being constructed on the BUMC property in conjunction with its new hospital.

The existing and proposed drainage infrastructure located on the BUMC campus has been designed to capture and reduce the downstream 100-year storm flows that had historically plagued the Jefferson Park Neighborhood and caused significant flooding issues there. This BUMC infrastructure engineering has fully accounted for the anticipated surface run-off from the redeveloped PAD Property.

The southern one-third of the PAD Site lies within the Bronx Wash regional watershed. Stormwater runoff from this watershed flows westerly, through the existing surface street network, and ultimately outfalls into the Santa Cruz River.

Since the PAD Site is essentially located on the topographic divide between these two (2) existing regional watersheds, no incoming surface runoff from any off-site source impacts the Property.

Exhibit No. 18 | Off-Site Drainage



LEGEND

- PAD DISTRICT BOUNDARY
- PROPOSED BANNER-UMC RETENTION BASINS
- EXISTING BANNER-UMC DETENTION BASIN
- WATERSHED BOUNDARY
- EXISTING STORMDRAINS
- DIRECTION OF SURFACE FLOW
- PROPOSED LESTER RETENTION BASIN #1 — A
- PROPOSED LESTER RETENTION BASIN #2 — B
- PROPOSED LESTER RETENTION BASIN #3 — C
- PROPOSED DRACHMAN RETENTION BASIN — D
- EXISTING MABEL DETENTION BASIN — E

b. On-Site Characteristics

Exhibit No. 19 illustrates the previously discussed two-thirds/one-third split of the surface stormflows exiting the Property, along with their associated concentration points and 100-year volumes. Since the Site is a fully developed residential apartment complex with nearly one hundred percent (100%) impervious surface, it is generally anticipated that the post-development outflows from the redeveloped property will be essentially the same as those in the existing condition.

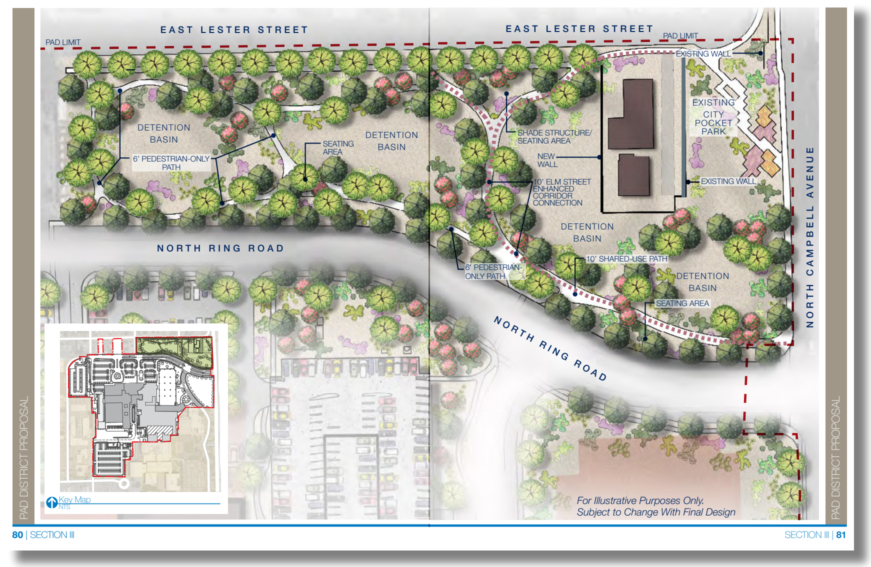
The existing stormwater discharges from the Property indicated on Exhibit No. 19 were calculated based upon the current apartment use and their ancillary on-site features (parking lots, driveways, etc.). The calculations were completed in conformance with adopted City of Tucson guidelines and policies and utilized 2015 topographic data, 2016 aerial photography, and supplemental field reconnaissance. Peak flows were derived using the City of Tucson Method (Chapter IV of the "Standards Manual for Drainage Design and Floodplain Management in Tucson, Arizona," April, 1998).

The hydrologic analysis presented in this PAD document is intended to provide a reliable basis for comprehensive stormwater planning. These hydrologic results will be further refined as part of a full Final Drainage Report provided at the time of final engineering and Development Package submittal to PDSD.

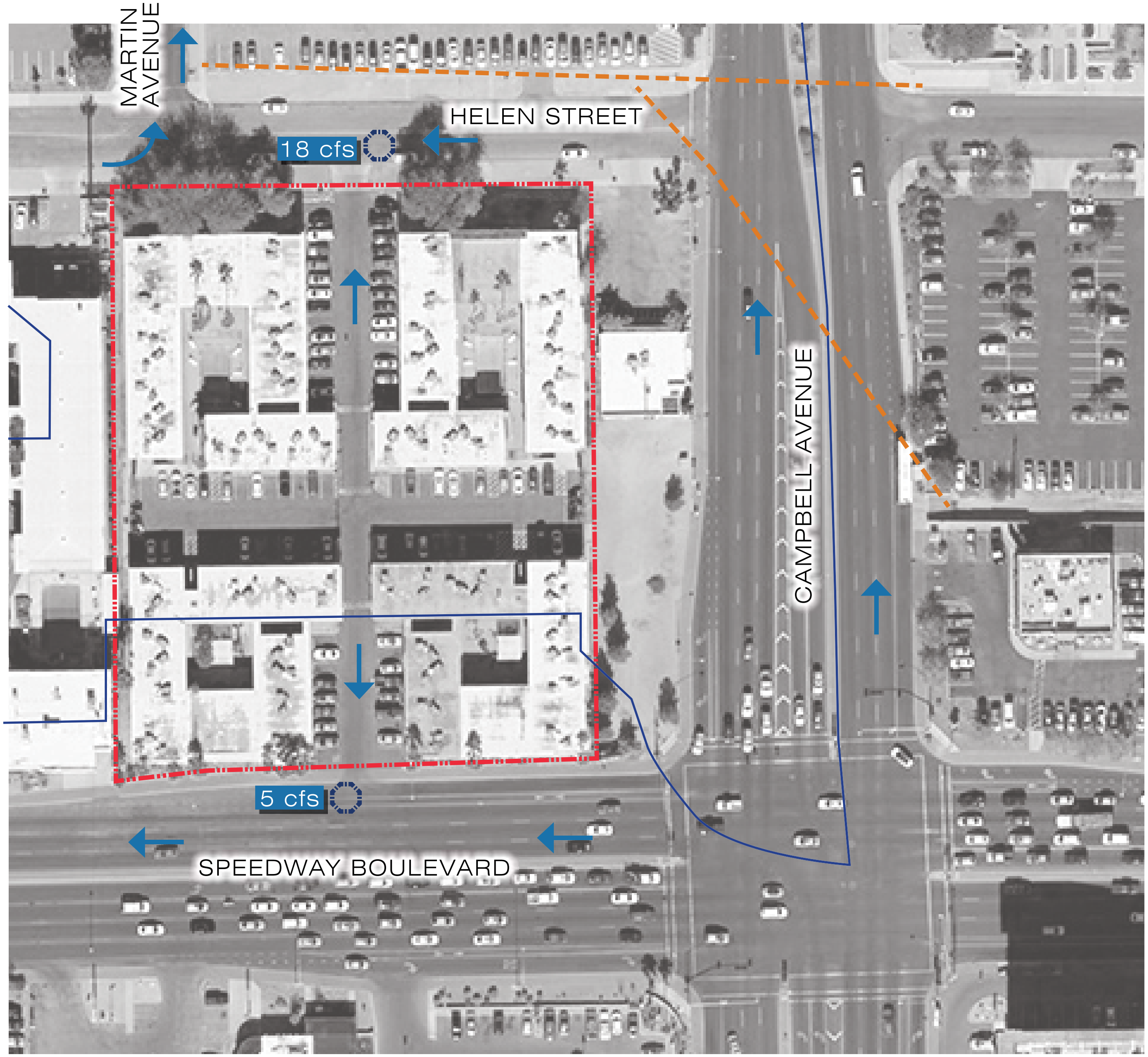
c. Solutions Effectuated by Prior Planning Efforts

Prior planning efforts by the University of Arizona and the City of Tucson have recognized the adverse impacts of runoff exiting the Arizona Health Sciences Center (AHSC) and BUMC campus into the downstream Jefferson Park Neighborhood. As a result, a multi-use greenway and retention/detention facility was integrated into the BUMC planning and engineering so as to provide a buffer and flood-control facility for Jefferson Park. This proposed series of basins within the greenway (refer to prior Exhibit No. 18) will collect 100% of the on-site runoff from the eastern portion of the BUMC campus (and upstream portion of the AHSC) and meter it into the downstream neighborhood in a volume that can be accommodated within its street prisms.

The upstream portion of watersheds contributing to these proposed basins includes most of the PAD Site. The 100-year runoff from the PAD Property has been wholly accounted for in the design and construction of the new BUMC flood-control greenway.



Excerpt from the Banner-UMC PAD document; a plan view of the proposed multi-use greenway and detention facility bordering the Jefferson Park Neighborhood



LEGEND

PAD DISTRICT BOUNDARY

WATERSHED BOUNDARY

EXISTING STORMDRAINS

DIRECTION OF SURFACE FLOW

100-YR CONCENTRATION POINT

II.F.2 Landscape Inventory

In practical terms, the existing landscaping and plant materials within the PAD Site are nominal at best. The existing Palm Shadows Apartment complex is comprised largely of buildings, parking areas, driveways, and hardscape. Landscape areas are limited to small portions of the interior building courtyards and to the project frontages along Helen Street and Speedway Boulevard. Nonetheless, an inventory of protected/native plants within the Property has been completed and is provided in the Table to the right. These inventory plants will be removed and included in the Development Package landscape plan as mitigation.

Native Plant Inventory

Botanical Name	Common Name	Quantity
Parkinsonia florida	Blue Palo Verde	2
Prosopis velutina	Velvet Mesquite	1
Yucca elata	Soaptree Yucca	2

Existing landscaping at the Palm Shadows Apartments

II.F.3 Underlying Geology, Soils and Geotechnical Considerations

The soil conditions underlying this wholly urbanized and developed Property are unremarkable (see Exhibit No. 20). The Site is underlain by a single soil type, namely Soil Group HSG Type "D" (Cave Soils & Urban Land). This Group is common throughout the Tucson metropolitan region. All geotechnical preparations necessary to facilitate the redevelopment of the PAD Site fall into the realm of routine.

Exhibit No. 20 | Soils Map

LEGEND

PAD DISTRICT BOUNDARY

CAVE SOILS AND URBAN LAND
0 TO 8 PERCENT SLOPES

MOHAVE SOILS AND URBAN LAND
1 TO 8 PERCENT SLOPES

II.G Visual Analysis

This Section discusses the visibility of the PAD Site from the immediately surrounding properties, as well as the primary outward vistas that are available from it.

A further viewshed analysis is also presented in Section IV.C.1 of this PAD document; that analysis provides views of the site from further-out neighborhood locations. The amended University Area Plan (UAP) mandated that this specialized viewshed study be conducted in conjunction with the rezoning and redevelopment of the PAD Property.

The study presented therein, replete with post-development photo-simulations from numerous residential vantage points around the Site, provides evidence as to the impact the new buildings will have on surrounding vistas. The study also addresses outward views from PAD Site itself, at various heights typical of the post-development Project.

II.G.1 Visibility from Surrounding Properties and Land Uses

The PAD Site is primarily visible from the numerous non-residential uses that abut it and which comprise its entire surrounding context. These include UA administrative offices and residence halls, the Arizona Health Sciences Center, the commercial/restaurant uses that populate the northeast and southwest corners of the Speedway/Campbell intersection, and the mid-rise hotel located at the intersection's southeast corner.

Exhibit No. 21 provides a photo key and pictorial survey of the PAD Site (and the existing Palm Shadows Apartments thereon) from all of these surrounding vantage points.

Exhibit No. 21 | Visual Analysis - Photo Locations and Directions

Palm Shadows Apartments (PSA) - Helen Street Frontage

PSA - Campbell Avenue Frontage

PSA - Looking South from Helen Street

PSA from SEC of Speedway Boulevard + Campbell Avenue

PSA - Looking North from Speedway Boulevard

PSA - Speedway Boulevard Frontage (Aloft Hotel on right)

View of PSA from NEC of Campbell Avenue + Helen Street; UA office building is in the foreground

PSA - Looking East to Campbell Avenue

II.G.2 Viewsheds

The primary viewsheds available from the Property are the distant Santa Catalina Mountains view to the north and the distant Rincon Mountains view to the east; these are illustrated in Exhibit No. 22. Due to the expansive area of non-residential uses that surround the PAD Site, these vistas are available primarily to the northbound motorists within the Campbell Avenue arterial corridor and, respectively, the eastbound motorists within the Speedway Boulevard corridor. Views of these distant vistas from the outlying residential neighborhoods lying to the north, northeast, and directly east of the PAD Site will not be impacted by the redevelopment of the PAD Property. From the outlying residential neighborhoods lying southeast of the PAD Site, there will be some minor impact upon the northern vista, but no impact upon the eastern one. The aforementioned viewshed analysis presented in Section IV.C.1 of this PAD document provides further illustration as to the post-development Project's impact upon surrounding viewsheds.

View of the distant Santa Catalina Mountains to the north of the PAD Site (right) and the distant Rincon Mountains to the east. (below)

Exhibit No. 22 | Viewsheds

LEGEND

PAD DISTRICT BOUNDARY
EXISTING BUILDINGS
PHOTO ORIGIN
PHOTO DIRECTION

II.H Site Analysis Findings and Conclusions

Exhibit No. 23 provides an illustrative depiction of the above Site Analysis primary findings, as well as the PAD Site's most salient opportunities and constraints. The items represented thereon are further amplified below.

II.H.1 Site Opportunities

The Speedway + Campbell Gateway PAD offers the following significant opportunities:

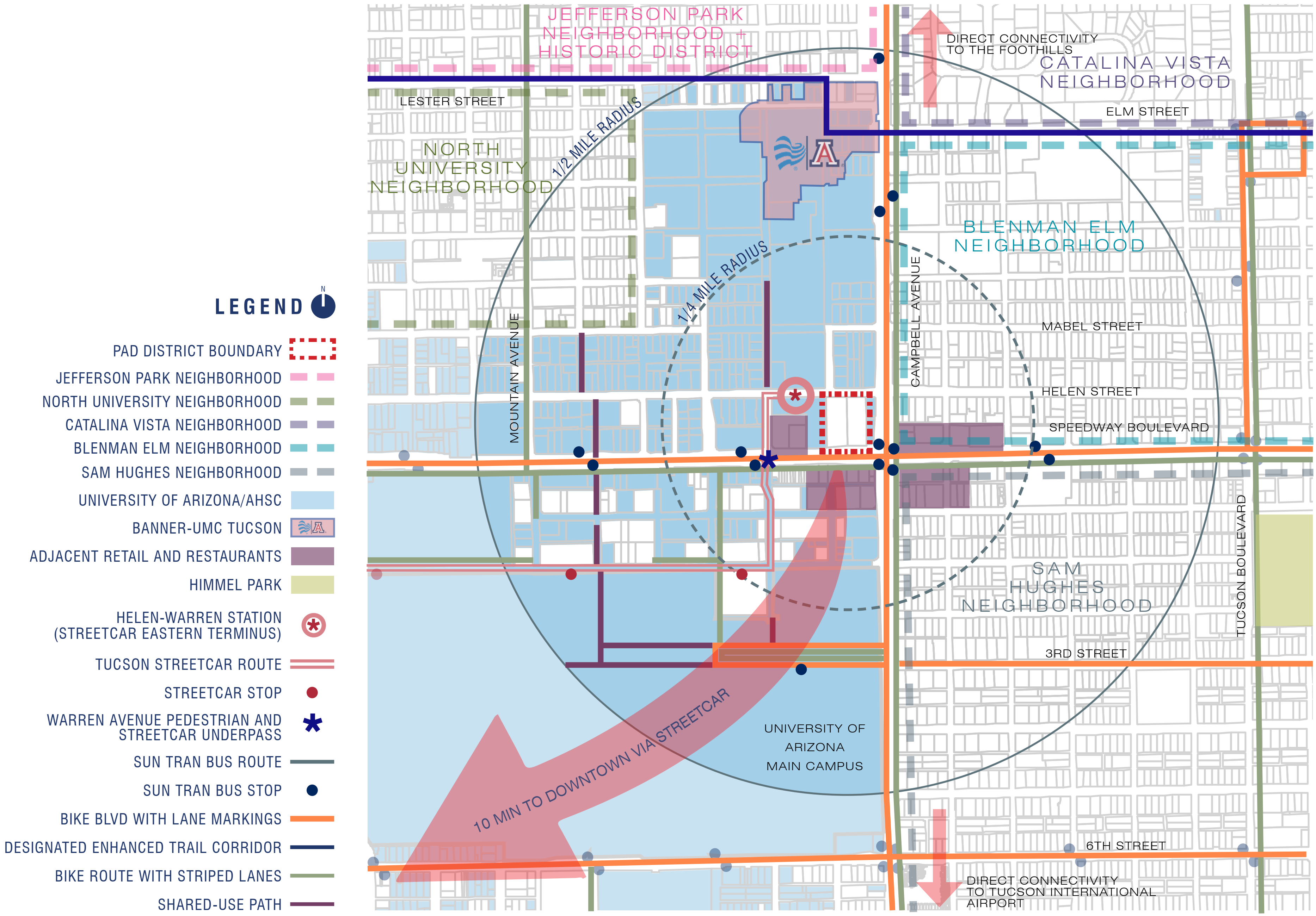
- The proximity of the Helen-Warren station of the Tucson Streetcar provides easy and direct connectivity to the downtown Tucson core and to all activity centers along the 4-mile streetcar route.
- The proposed PAD Project provides the precise type of high-intensity, high-density mixed-use development that is essential to energizing the Streetcar and to densifying its overall corridor, thereby ensuring the Streetcar's self-sustaining economic viability. Such development is especially critical in close proximity to existing streetcar stations.
- The proposed PAD Project helps further a new and more intelligent urban growth paradigm for Tucson, one that embraces height and density as acceptable, even preferred elements that further the efficiency and wise use of precious infrastructural resources and public services.
- The proposed PAD Project is served off of the existing framework of utility infrastructure and public services that is already in place and in no way requires or promotes the outward expansion same.
- The PAD Site is centrally located within a robust multi-modal environment, affording the proposed Project the opportunity to leverage these available modes into an integrated development that not only significantly furthers our community's transit-oriented goals, but also effectively provides a living laboratory for on-going TOD study and refinement.
- The proposed Project provides an exceptional opportunity to develop a true gateway statement for the University of Arizona's main campus, one that is appropriate for this strategic node and which provides a more appropriate and welcoming entry sequence for the UA visitor.
- The proposed Project embodies a true and vibrant urban activity center for its occupants, for the residents of the nearby neighborhoods, and for visitors from the entire metropolitan region.
- The proposed PAD Project provides the opportunity to demonstrate that bold, innovative and intelligent architecture is a positive addition to a community, one that can serve to significantly heighten the quality of its built environment and that can afford its citizenry a point of community pride.

II.H.2 Built and Environmental Constraints and Conceptual PAD Responses

The following constraints impacting the PAD Site's redevelopment are worthy of note:

- The 2.49-acre PAD Site, with its immediately adjacent urban development on all four (4) sides, provides the normal challenges that come with constructing a high-density, complicated project within an urban infill environment. That being said, such challenges have become commonplace in urbanized areas across the country. Those to be encountered with this Project, while complex, fall into the realm of routine construction management.
- The introduction of a significant traffic-generator within an already high-traffic environment requires the optimization of all modes of transportation, while still affording and ensuring the efficient movement of traditional vehicular traffic. The PAD's response to this issue is addressed in Section IV.D of this document.
- The siting of a 20-story high-rise element in an urbanized setting possessing outlying residential neighborhoods requires careful thought and sensitivity to balance Project needs against the goal of minimizing visual impacts upon existing residents. The PAD's consideration and response to this issue is addressed in Section IV.C of this document.

Exhibit No. 23 | Site Opportunities and Constraints



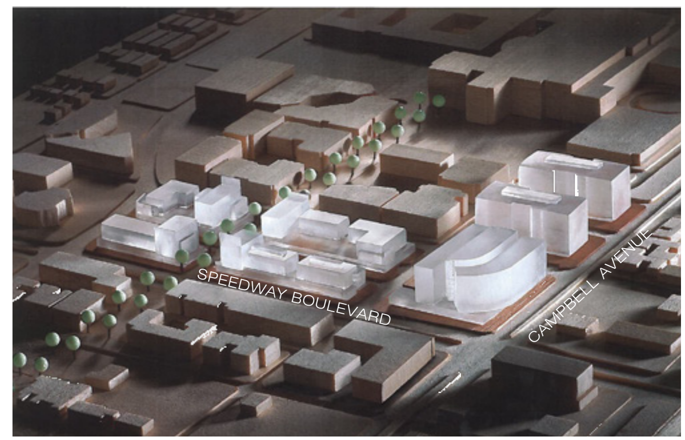
Section Three | Project Visioning, Site Redevelopment + Policy Compliance

III.A The Redevelopment of Palm Shadows - A Brief History

This proposed PAD is the culmination of many years of prior planning, visioning, and project conceptualization by the present owners. The intended development program for this PAD Site and all of its attendant regulatory particulars will be presented in Section IV, but a brief discussion of the Property's prior conceptualization efforts is helpful to gain a full appreciation of the proposed design and the manner in which it integrates with and promotes other larger community objectives.

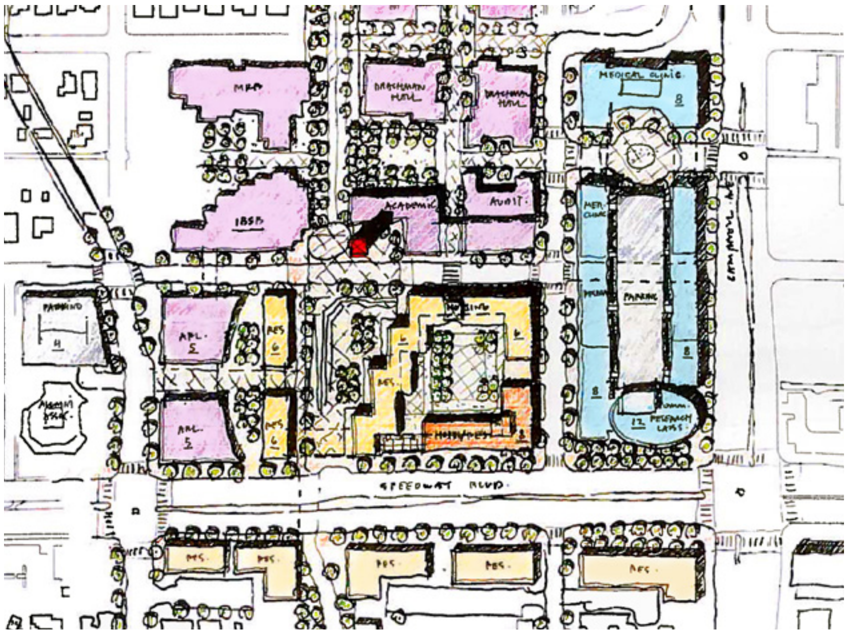
Shortly after the current owners acquired the Palm Shadows Apartments property in 1998, they initiated a series of discussions with the University of Arizona (UA) to explore the possibility of a public-private partnership that would potentially incorporate the Subject PAD property and the UA's adjacent holdings into a collaborative redevelopment effort. These exploratory conversations were coordinated through the UA's Office of Business Affairs and ultimately engaged the President's Office directly. The goal of this effort was to conceive a comprehensive redevelopment program that could create a fitting gateway and arrival experience for the UA main campus at the Speedway/ Campbell intersection.

In 2003, these discussions were formalized into a written narrative that contained alternative potential development scenarios for the combined UA and Palm Shadows properties, each of which exemplified a high-intensity, high-density mixed-use project to achieve the desired gateway function.

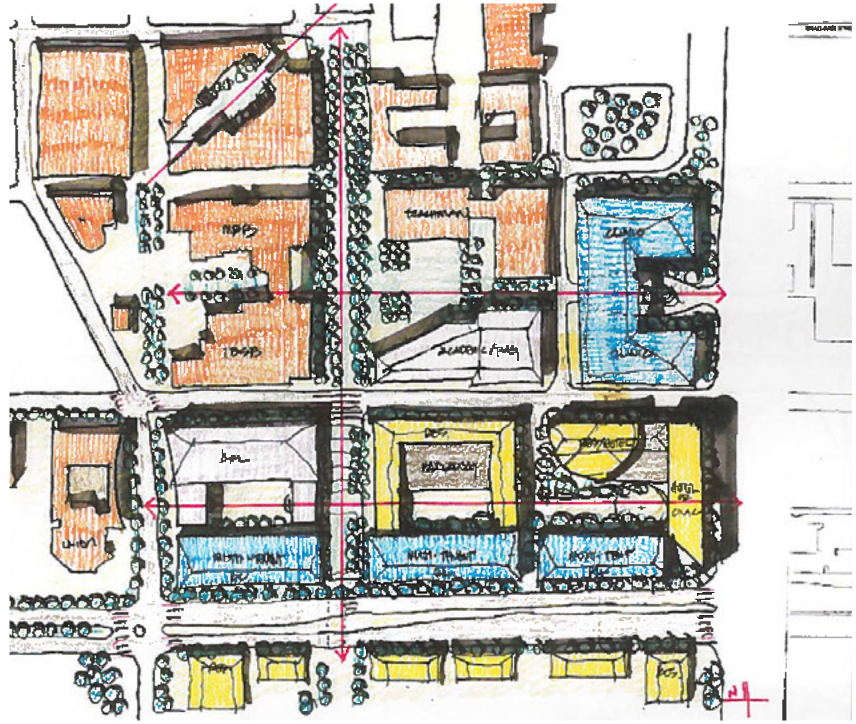


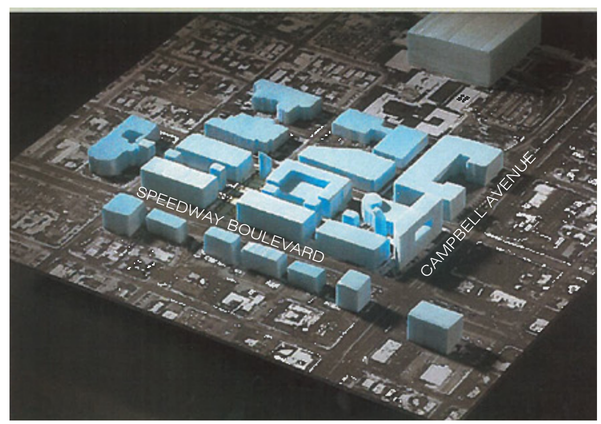
Development concept from the 2003 narrative presented to the University; concept sketch (above) and three-dimensional massing model (right)

In June, 2004, the same properties were the subject of an organized design charrette attended by representatives of Palm Shadows, UA, and the City of Tucson. Additional concepts were developed that envisioned the same type of high-intensity, mixed-use program for the entire northwest corner of the intersection. Major project elements included a hotel and conference center tower, multi-tenant professional offices and research laboratories, and multiple residential clusters.



Development Option 1 from the 2004 design charrette; concept sketch (above) and three-dimensional massing model looking northwest (right), Leo A. Daly Architects.





Development Option 2 from the 2004 design charette; concept sketch (above) and three-dimensional massing model looking north/ northwest (left), Leo A. Daly Architects

Project design efforts continued in 2010, wherein a new conceptual masterplan was developed for the PAD Site and its surroundings. This updated concept included the same hotel, restaurant/retail, office, clinic, and residential components of prior designs, but also incorporated the significant new element of a full-service grocer. The design reflected the then-proposed nearby station of the Tucson Streetcar system, Helen-Warren Station.

2010 conceptual masterplan (right) and architect's rendering of same looking eastward from the top floor of the UA Foundation Building (below).

In the ensuing years, the City of Tucson and the Regional Transit Authority (RTA) formalized its proposal for the modern streetcar; this major transit improvement was ultimately approved by the citizenry in 2006 as a formal element of the RTA Plan. The City and RTA subsequently undertook a series of studies, public workshops, and lengthy interactions with the Federal Transit Administration (FTA) in pursuit of more than sixty million dollars in grant funds from the FTA's Transportation Investments Generating Economic Recovery (TIGER) program. The FTA ultimately awarded the City a sixty-three million dollar ($63M) TIGER grant, which was combined with significant RTA and City funds to facilitate the final design and construction of the Streetcar's first phase.

In justifying the aforementioned TIGER funds, significant specific attention was paid to the Palm Shadows property by federal and local representatives, the intent being to confirm the owner's commitment to redevelop the Site in a high-intensity, multi-use manner. Such intense and high-density activity centers are generally accepted as being essential to the long-term success and viability of all modern streetcars, with it being especially critical that such activity centers be located near streetcar stops.

In 2013, the City of Tucson held its own design charrette and series of public meetings, all of which culminated in the Tucson Modern Streetcar Land Use and Development Implementation Plan (TMSLUDIP, or The Plan), a document that addressed the entire four-mile streetcar corridor. The charrette's vision statement for the Speedway/Campbell intersection recommended that, "the Speedway and Campbell area develops as a UA eastern gateway, providing a high-quality mixed-use urban environment that incorporates sustainable design elements, a network of urban open spaces, and access to a variety of transportation modes." The Plan goes on to recommend that the City's underlying regulatory area plans and nearby neighborhood plans for the Speedway/Campbell node be amended, incorporating appropriate special-area policies, to promote and encourage this type of high-intensity urban mixed-used redevelopment at the intersection.

In keeping with this recommendation, the owners of the PAD Site successfully completed their own formal amendment to the University Area Plan (UAP) in 2014. This amendment detailed a multi-use, transit-oriented development (TOD) project featuring a ground-level grocery, retail, and restaurant plaza, together with integrated above-ground and sub-surface parking structures, and upwards of a twenty-story tower providing first-class office space and higher-end residential units.

Visioning concept for the Speedway/Campbell eastern gateway; from the City of Tucson 2014 streetcar design charrette.

This approved plan amendment, together with the many years of prior work and visioning described above by the City of Tucson and UA, provide a clear foundation for the specific project proposed in this PAD document. A high-intensity, high-density urban mixed-used project at this location is clearly justified, and will serve to robustly energize the Tucson Streetcar and further our larger community goals for this key public transit improvement.

III.B Policy Compliance

As discussed in detail in Section I.C.2 of this PAD, the University Area Plan (UAP) designates the Palm Shadows Property as Sub-Area 1 of the Helen-Warren Station Area (HSWA) and, as such, specifies numerous policies and guidelines to govern the redevelopment of the Site. These policies and guidelines fall into four (4) categories: 1) Land Use and Compatibility; 2) Transportation: Vehicular Circulation and Access to Various Modes; 3) Coordination with and Protection of Surrounding Neighborhoods; and 4) Urban Design.

This Section provides a series of tables (Table Nos. 1 through 4) which detail the manner in which these policies and guidelines have been addressed with this PAD proposal and throughout this PAD document.

Table No. 1 | University Area Plan Land Use Compatibility Policies and Guidelines

UAP POLICIES/ GUIDELINES REGARDING LAND USE & COMPATIBILITY	POLICY/GUIDELINE DIRECTION	SPEEDWAY + CAMPBELL GATEWAY PAD DISTRICT RESPONSE
Policy No. 1	Provide for commercial/retail, restaurant, office, grocery and residential uses in a mixed-use, integrated mid-rise and high-rise building framework.	Section I.B of this PAD provides a description of the Project's guiding principles and general mixed-use nature. Section I.B.3 specifically provides the envisioned use mix of the Project at the time of this writing.
Policy No. 2	Allow for the inclusion of adjacent Arizona Board of Regents ("ABOR") lands into the project in the event that UA elects to participate. In this event, the UA's participation is considered in accordance with this Section and with the policies of this Sub-Area 1, such that incorporation of ABOR lands into the project can occur in conjunction with a rezoning/Planned Area Development application and shall not require a separate plan amendment to the UAP.	On-going coordination has occurred with UA prior to and during the preparation of this PAD. At this time, UA is not participating. However, should participation occur in the future, this PAD allows for same as a major amendment to this PAD. This provision is specifically mentioned in Section IV.I.2.b.
Guideline No. 1	In accordance with the spirit and intent of established policies within the University Area Plan (see Section 7), on-going coordination and interaction by the owner/developer of Sub-Area 1 is encouraged with University of Arizona regarding its adjacent properties, UA plans for same, and their potential incorporation into the project by way of a public-private partnership or appropriate alternative mechanism.	As mentioned above, coordination with UA has been on-going and will continue throughout the remainder of this PAD process and beyond. In the event UA elects to participate and the owner/developer come to an agreement as to a workable partnership, this PAD allows for UA's participation as a major amendment (see Section IV.I.2.b)
Guideline No. 2	Ensure coordination with the UA Comprehensive Campus Plan as it exists and as it is periodically updated by the University.	UA is in the incipient stage of its next update to the CCP (the last having occurred in 2009). They are well aware of this PAD's intentions; our efforts in coordinating with them on their update will remain on-going.

Table No. 2 | University Area Plan Transportation/Vehicular Circulation Policies and Guidelines

UAP POLICIES/ GUIDELINES REGARDING TRANSPORTATION, VEHICULAR CIRCULATION AND ACCESS TO VARIOUS MODES	POLICY/GUIDELINE DIRECTION	SPEEDWAY + CAMPBELL GATEWAY PAD DISTRICT RESPONSE
Policy No. 1	Principal vehicular access to and from the site shall occur via Helen Street; fire/emergency, disabled and grocery delivery access only shall be allowed to and from Speedway Boulevard.	See Exhibit No. 24 (PAD Master Site Plan). On-site Keynote 2 describes primary access from Helen Street. On-site Keynote 11 describes the limitations to Speedway Boulevard access. We assume that Environmental Services access will also be permitted from Speedway.
Policy No. 2	Traffic and transportation impacts of the proposed development, as well as provisions for alternative modes, shall be studied in detail; the proposed development shall proceed subject to a Traffic Impact Analysis (TIA) as reviewed and approved by the Department of Transportation.	The full TIA was provided for TDOT review in conjunction with the initial submittal of this PAD to the City (the full TIA is also included as Appendix D of the PAD). Section IV.D of the PAD summarizes the Transportation Infrastructure and the PAD's impacts upon it. Section IV.D.2.b specifically discusses alternative modes.
Policy No. 3	The developer shall pay its fair share cost of off-site transportation or traffic improvements necessary to serve the proposed development and address its impacts; the extent of the contribution shall be determined in conjunction with a TIA approved by the Department of Transportation.	The owner/developer will pay substantial City impacts fees (including transportation impact fees) in conjunction with this Project. Routine coordination and negotiations with TDOT will occur to finalize the developer's specific fair-share responsibilities.
Policy No. 4	Parking facilities as required to serve the proposed complement of land uses will be wholly accommodated on-site. Within the rezoning/Planned Area Development process, parking calculations and analyses shall be furnished to reflect the mixed-use nature of the project so as to insure that the parking provided is based upon actual usage, not upon a mere aggregation of the normal Unified Development Code (UDC) parking requirements for each individual use. The actual-usage calculations shall account for the varying demand times associated with the mix of uses, existing and planned transit facilities in the vicinity, existing bike routes, and other multi-modal opportunities.	Parking will be accommodated on-site. Section IV.B.3.d provides the applicable motor vehicle parking requirements for the Project; these account for its mixed-use construct. Section IV.I.2.a also allows for the modification of these parking requirements, as a minor amendment to the PAD, so as to accommodate the Project's final/ultimate land use mix and to reflect the shared-use reductions which may then become appropriate.
No UAP Guidelines Stipulated		

Table No. 3 | University Area Plan Neighborhood Coordination/Protection Policies and Guidelines

UAP POLICIES/ GUIDELINES REGARDING COORDINATION WITH AND PROTECTION OF SURROUNDING NEIGHBORHOODS	POLICY/GUIDELINE DIRECTION	SPEEDWAY + CAMPBELL GATEWAY PAD DISTRICT RESPONSE
Policy No. 1	Promote the creation of a neighborhood liaison group, with individuals from the surrounding neighborhood associations, to insure neighborhood input and feedback throughout the design and rezoning process. The specific membership structure, procedures and duties of the group will be detailed in the future Planned Area Development (PAD) document during the rezoning process. The liaison group and the developer shall work together in mutual good faith to reasonably address the specific issues outlined in the Guidelines below.	This assemblage of neighborhood leadership has been named the “Neighborhood Liaison Group” (NLG) by this PAD. Its structure and membership is described in Section IV.C.5. This Section also describes how the methodology and findings of the various special studies (outlined in the Guidelines below) have been discussed with the NLG in detail. This working meeting occurred on August 15, 2017. Minutes of this meeting are contained in Appendix E. Future NLG meetings will be similarly documented and included in Appendix E.
Guideline No. 1	An analysis will be provided that assesses viewshed impacts and illustrates project visibility from a variety of surrounding vantage points, most notably from those in the existing residential neighborhoods to the north, northeast, east, and southeast.	The methodology and findings of this Study are contained in Section IV.C.1. Supplemental materials pertaining to the Study are found in Appendix A.
Guideline No. 2	Sun-reflection and shade studies will be provided as necessary to understand the impacts of the development on the above residential neighborhoods. The results of the studies will be shared and discussed with the neighborhood liaison group during the rezoning/PAD process to determine associated mitigation measures, if any.	The methodology and findings of this Study are contained in Section IV.C.2.
Guideline No. 3	In recognition of existing drainage issues impacting neighborhood areas downstream of Sub-Area 1, a drainage analysis will be prepared at the time of rezoning. In addition to standard measures required by the Planning & Development Services Department (PDSD), additional methods of containment will be evaluated to accommodate run-off on-site, including water harvesting features, both passive and active. The results of this evaluation will be discussed with the neighborhood liaison group during the rezoning/PAD process as it relates to the mitigation of downstream drainage impacts attributable to Sub-Area 1, if any.	The post-development drainage study for the Project is found in Section IV.E. There are no downstream impacts, in part due to the fact that we are doing 5-year threshold retention on our Project, together with the fact that the Banner-University Medical Center (BUMC) is constructing a major set of flood-control basins to protect the downstream Jefferson Park Neighborhood. The post-development runoff from our Project was accounted for in the sizing of the BUMC basins. Section IV.E. also discusses water-harvesting and containment measures, with references to Section IV.G.3.b (Conservation Measures). In reality, such needed measures are minimal, in that the primary concern (i.e. the historical flooding of downstream neighborhoods) has been satisfactorily addressed by this and other projects (BUMC).
Guideline No. 4	Building windows and balconies are permitted to face in all directions, with the attendant understanding that consideration of, and provisions for, privacy protection will be given to those outlying neighborhood residents whose properties are visible from the high-rise portion of the project.	The special study in Section IV.C.1 also addresses privacy. Outward views into the neighborhoods from the proposed Project high-rise were assessed in detail from three different heights. The findings presented demonstrate no material visual intrusion into off-site private windows or outdoor spaces due to intervening buildings and significant mature vegetation. Supplemental materials documenting the outward views are contained in Appendix B.
Guideline No. 5	An assessment will be provided as to the impacts, if any, of the proposed high-rise building on the flight paths and associated noise of the helicopters serving the Arizona Health Sciences Center. The results of this assessment will be shared and discussed with the neighborhood liaison group during the rezoning/PAD process to determine associated mitigation measures, if any.	This Study is summarized in Section IV.C.3 and demonstrates no material change in off-site noise and reverberation compared to the existing condition. The full study methodology and findings are provided in Appendix C.

Table No. 4 | University Area Plan Urban Design Policies and Guidelines

URBAN DESIGN POLICIES AND GUIDELINES PER UNIVERSITY AREA PLAN	POLICY DIRECTION	SPEEDWAY + CAMPBELL GATEWAY PAD DISTRICT RESPONSE
Policy No. 1	Building massing and placement shall be organized so as to provide visual variety and create urban open spaces or plaza areas.	Building volumes and their orientation within the Site provide horizontal and vertical variety and provide for a ground-level central plaza, together with interior, open-air courtyards on select upper levels of the building base. See Section IV.H.1 of this PAD.
Policy No. 2	Building massing and placement shall be organized so as to provide view penetration into the project from perimeter vantage points.	The central plaza provides deep view penetration from Campbell Avenue; a north-south breezeway allows views into the central plaza from Helen Street; a north-south access drive parallels the Site's west boundary and provides pass-through views from Helen Street and Speedway Boulevard.
Policy No. 3	Efficient and easily-identifiable pedestrian and bicycle wayfinding shall be provided between principal building entrances and nearby transportation facilities, including the Helen-Warren streetcar station, Sun Tran bus stops, established bike routes, and existing pedestrian linkages to major nearby uses, such as the University of Arizona campus and Arizona Health Sciences Center.	Wayfinding signage to meet this policy shall be provided throughout the Project's central plaza and, as needed, along Site perimeter locations. It shall be visually integrated into the overall Project aesthetic and use the same design and materials vocabulary as other plaza features and amenities. Section IV.B.3.k of this PAD.
Policy No. 4	Building heights, number of stories, and massing envelopes shall be in accordance with Exhibit 3.G.2 of the UAP. The twenty-story, 250' building height allowance illustrated on the Exhibit shall be limited as follows: 1) it shall comprise no more than 33% of the 20-story building envelope's ground area as delineated on the Exhibit, and 2) it shall comprise no more than 25% of the entire property's ground area.	The proposed Project architecture is in full conformance with the height limitations and massing envelopes stipulated by the University Area Plan. The "tower" component has been positioned within the southern portion of the UAP overall/allowed 20-story building envelope, as this positioning was determined to best minimize this element's off-site visibility, privacy considerations, etc.
Policy No. 5	In the event that adjacent ABOR parcels are incorporated into Sub-Area 1 during the rezoning/PAD process as allowed for under Land Use and Compatibility Policy #2, building placement, massing and heights shall be in keeping with the spirit and intent of the relevant Urban Design Policies and Guidelines herein and shall be finalized in conjunction with the neighborhood liaison group as part of the rezoning/PAD process.	ABOR is not participating in this PAD/rezoning process.
Guideline No. 1	The project will demonstrate an architecture that recognizes and respects the Sonoran Desert environment by addressing climate, consideration of sun angles and shading, and incorporation of energy and water conservation building principles on a high-rise scale.	The Project architecture and site planning have been extensively driven by an understanding and recognition of the prevailing desert environmental and climatic factors. Section IV.G.1 of the PAD addresses this Guideline in detail.
Guideline No. 2	Building design and organization will ensure appropriate transitions (in terms of height and massing), recognize existing project perimeters, interface well with adjacent streets, and generally demonstrate a sense of proportion with the project's surroundings.	The maximum height and massing envelopes mandated by the University Area Plan intentionally contemplated the transitions necessary to ensure conformance with this Guideline. The Project architecture conforms fully with these UAP height/stepping provisions. In fact, the proposed 7-story and 6-story elements along the project's Speedway Boulevard, Campbell Avenue and Helen Street perimeters are significantly less than the 12-story and 10-story heights allowed under the UAP, thereby ensuring an even more sensitive transition to street level. Section IV.H.1 of this PAD further discusses this issue and describes the proposed ground-level interface of the Project with its adjacent streets.

Table No. 4 | University Area Plan Urban Design Policies and Guidelines [Continued]

URBAN DESIGN POLICIES AND GUIDELINES PER UNIVERSITY AREA PLAN	POLICY DIRECTION	SPEEDWAY + CAMPBELL GATEWAY PAD DISTRICT RESPONSE
Guideline No. 3	The project design will demonstrate a recognition of the specific site conditions, both existing and planned, and represent a building profile and form that integrates with this context.	Significant new construction and building massing is already underway at Banner-UMC and the Arizona Health Sciences Center. The UA Comprehensive Campus Plan indicates a build-out that further expands this massing. The Speedway/Campbell intersection is recognized as an underdeveloped set of properties that is more appropriate for high-intensity and high-density uses to promote transit-oriented development and feed the nearby Helen-Warren streetcar station. The proposed PAD is in keeping with all of the above.
Guideline No. 4	The project will generally provide for a pedestrian-friendly environment that facilitates both the active and passive pedestrian enjoyment of functional and well-designed outdoor spaces and which provide for a comfortable and interesting pedestrian experience that complements the mix of land uses provided.	This Guideline is a fundamental driver of the Project's entire vision and design. Sections I.A, I.B.3, I.B.4 and IV.A of this PAD provide full detail on how this Guideline has been satisfied.
Guideline No. 5	Principal building entrances will be provided from the interior pedestrian spaces or plazas, and not solely from the exterior/perimeter sidewalk locations.	The Project is designed for the free flow of visitors and patrons between the main plaza and all of the retail, restaurant/café, commercial, and grocery uses that adjoin it. This porosity is described in more detail in Section IV.A.1.a of this PAD.
Guideline No. 6	The design of building facades will foster a streetscape setting that is enjoyable and interesting for the pedestrian. The perimeter sidewalks along the site's Speedway Boulevard frontage should be a comfortable pedestrian environment.	The Project design incorporates several material elements to ensure that the streetscape interface is a comfortable, vibrant, and enjoyable one for the pedestrian. Sections IV.A.1.d and IV.H.1 of the PAD provide further detail on this aspect.
Guideline No. 7	The design of all pedestrian areas and outdoor spaces shall incorporate design elements, street furniture, and landscaping materials that complement the building designs and which demonstrate a coordinated, cohesive design statement and plan for the entire project.	All outdoor spaces and pedestrian areas will receive intensive treatment in terms of active and passive design elements and be highly vibrant and interesting environments for human activity. See Sections IV.A.1.a, IV.A.1.d and IV.B.3.c of this PAD document for more detail.
Guideline No. 8	The project shall recognize the potential need for pedestrian and bicycle connectivity to the other three corners of the Speedway Boulevard/ Campbell Avenue intersection as all four of these corners redevelop over time in more dense and intensive ways. As part of the rezoning/ PAD process, a conceptual projection of redevelopment massing for the four corners shall be developed and shall identify appropriate points of pedestrian and bicycle linkage between the developments.	A massing study of the potential four-corner build-out of the Speedway/ Campbell intersection has been prepared in conjunction with this PAD. It is anticipated that this potential massing diagram will initiate a larger, community-wide discussion amongst the City, UA and private-development community to begin addressing this node in a more comprehensive fashion that addresses inter-connectivity between developments, as well as pedestrian, bicycle, and transit linkages. See Section IV.C.4 of this PAD for more detail.

Section Four | PAD District Proposal

IV.A Proposed PAD Conceptual Overview

The redevelopment project presented in this PAD document is in complete conformance with the 2014 amendment to the University Area Plan as procured by the property owners. That amendment described a transit-oriented development that would feature a mix of residential, commercial, grocery, restaurant/retail, and office uses, together with integrated above-ground and/or sub-surface parking structures, all of which would proceed under a detailed set of development restrictions, policies, guidelines, and performance standards. Exhibit 24 provides the Master Site Plan for this PAD Site. The particulars of the Project, and its adherence to the applicable policies and guidelines, are detailed throughout this Section IV.

At present, the Project is envisioned as having a land use mix that breaks down as follows, with the understanding that this mix will be refined over time, based upon market forces, as the Project nears actual site development and construction:

- 30,000 to 40,000 square feet (SF) of retail space
- 20,000 to 30,000 SF of grocery (food & beverage sales)
- 100,000 SF of residential or hospitality (approximately 80 units)
- 250,000 SF of professional offices and/or medical outpatient services, including medical offices and health clinics

OFF-SITE KEYNOTES

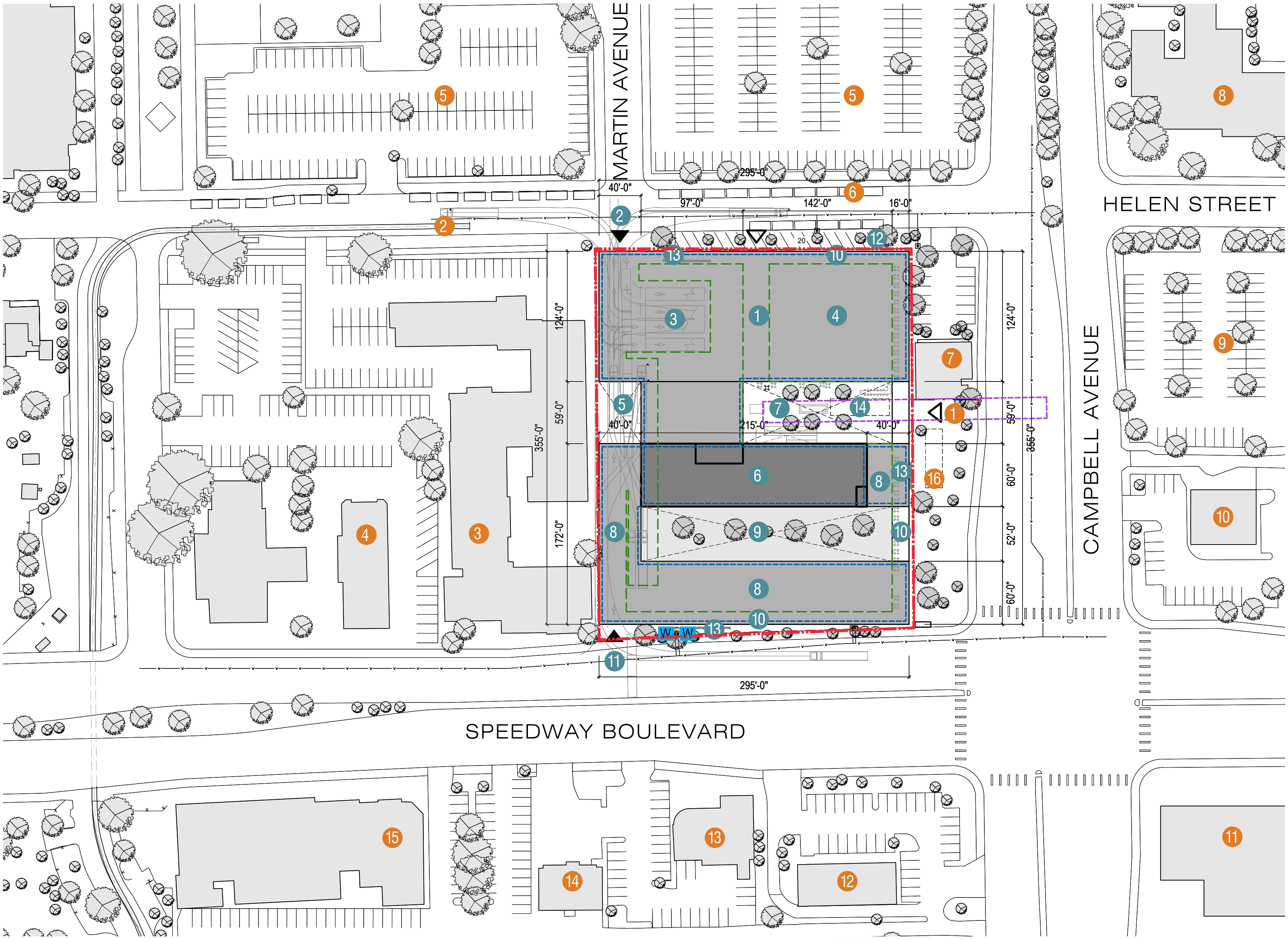
1. STREET-LEVEL PEDESTRIAN ACCESS TO CENTRAL PLAZA FROM CAMPBELL AVENUE
2. HELEN-WARREN STREETCAR STATION
3. UA BABCOCK RESIDENCE HALL & ADMINISTRATIVE OFFICES (R-3, C-1 ZONING)
4. MCDONALD'S RESTAURANT (C-1 ZONING)
5. ARIZONA HEALTH SCIENCES CENTER (AHSC) PARKING LOTS (R-1 ZONING)
6. ON-STREET PARALLEL PARKING ALONG HELEN STREET (R-1 ZONING)
7. UA OFFICE BUILDING AND CAMPBELL FRONTAGE (O-3, C-1 ZONING)
8. OUR SAVIOUR'S LUTHERAN CHURCH (R-1 ZONING)
9. OUR SAVIOUR'S LUTHERAN CHURCH PARKING LOT (R-1 ZONING)
10. BOSTON MARKET RESTAURANT (C-3 ZONING)
11. ALOFT TUCSON/UNIVERSITY HOTEL (C-1 ZONING)
12. TACO BELL RESTAURANT (C-1 ZONING)
13. DIRTBAG'S SPORTS BAR (C-2 ZONING)
14. 7-ELEVEN CONVENIENCE STORE (C-1 ZONING)
15. STRIP COMMERCIAL CENTER (C-1 ZONING)
16. FIRE TRUCK ACCESSIBILITY CLEARANCE

ON-SITE KEYNOTES

1. PEDESTRIAN BREEZEWAY FOR ACCESS TO CENTRAL PLAZA FROM HELEN STREET
2. PRIMARY PRIVATE-VEHICLE ACCESS TO/ FROM PROJECT
3. VEHICLE ACCESS RAMPS TO ABOVE-GROUND & SUB-SURFACE PARKING
4. COMMERCIAL/RETAIL SPACE WITH PARKING STRUCTURE ABOVE; MAXIMUM 6 STORIES, MAXIMUM HEIGHT = 90'
5. PROJECT SERVICE DRIVE, LOADING/ DELIVERY AREA, SEMI-TRACTOR TRAILER DOCKS, AND TRASH ENCLOSURE AREA (MINIMUM OVERHEAD CLEARANCE = 25')
6. 20-STORY MIXED-USE HIGH RISE; MAXIMUM HEIGHT = 250'
7. CENTRAL PLAZA ON GROUND LEVEL
8. 7-STORY BUILDING BASE; MAXIMUM HEIGHT = 104'
9. OPEN-AIR COURTYARD ON SECOND LEVEL
10. PEDESTRIAN ARCADES/PERIMETER STREETSCAPES
11. PROJECT ACCESS FOR DELIVERY, EMERGENCY AND DISABLED ONLY
12. NEW ON-STREET ANGLED PARKING FOR PAD PROJECT
13. BICYCLE PARKING AREA
14. FIRE TRUCK ACCESSIBILITY CLEARANCE

LEGEND

- PAD DISTRICT BOUNDARY
- GROUND FLOOR BUILDING PERIMETER
- PERIMETER SHADING LOUVERS (2ND - 20TH FLOOR)
- OPEN TO ABOVE
- ABANDONED PUBLIC LAND - TBD W COT.
- WATER SUPPLY MAIN W — W
- WATER SUPPLY TIE-IN W
- HIGH RISE
- BUILDING BASE
- SURROUNDING BUILDINGS



NOTE: This PAD Master Site Plan is conceptual in nature and subject to change within the parameters of this PAD document. It is understood that minor changes in horizontal dimensions and other plan elements may occur in final design, but that the overall final Project design shall be in substantial conformance with that shown hereon.

0 20' 100'

IV.A.1 Primary Project Components and Land Uses

What follows below is a general description of the major elements that comprise the proposed PAD Project. While specific development standards and regulatory requirements are provided in detail for all project elements within Section IV.B (Land Use Regulations) of this PAD, this Section provides an overview of the Project's basic development framework and design construct. Section IV.H (Architectural Standards and Design Guidelines) provides a graphic vocabulary of the Project's proposed architectural character.

a. Ground Level and Activity Center/Plaza

The ground-level interior plaza of the proposed PAD represents one of the most fundamental and important components of the Project. This plaza will be an exciting, active public space which is energized by the restaurant/cafe, grocery, and retail venues that frame it. These businesses will open onto the plaza to clearly showcase the attractions available, while also allowing their sights, sounds, and smells to permeate the plaza space and foster the constant movement of people. This porosity encourages a lively atmosphere that serves to energize the entire Project. The space is intended to not only serve the occupants of the Project itself, but to also function as a year-round destination and activity center for those residing outside of the Project, providing a comfortable and vibrant place for socializing with friends, enjoying unique restaurant and retail experiences, or simply partaking in passive people watching.

This Section presents one (1) potential design concept for this main plaza. While not intended to be a representation of the final constructed version, it embodies many of the primary elements that will likely comprise the finished product, including a lounging area with cushioned furniture, fixed and movable seating, outdoor dining patios, a potential water feature or reflecting pool, a small performance area, a lively hardscape paving pattern, accent lighting, and vertical components such as vined trellises or an overhead fabric shade structure. All of these elements foster a decidedly human-scale environment that possesses the character of an intimate "urban room". The hardscape geometrics and materials of the space will complement those of the predominant building architecture, ensuring that the building facades and plaza effectively knit together both functionally and aesthetically.

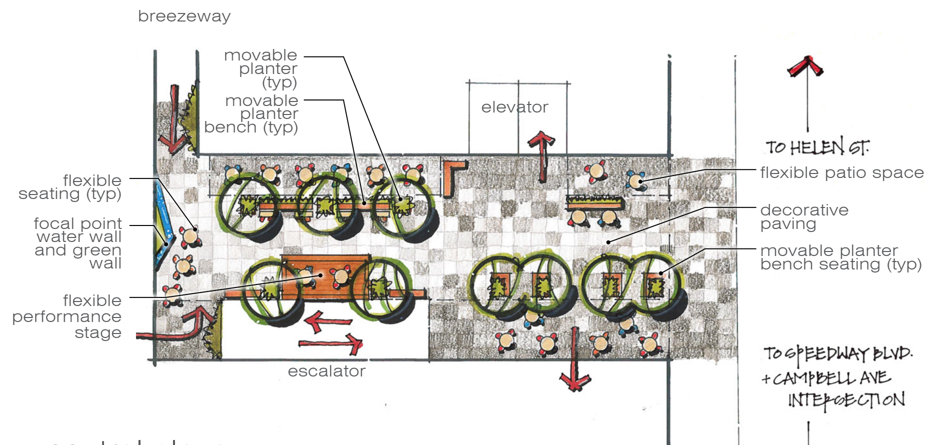
It must be emphasized that this space has never been envisioned as one for primarily passive uses. It will also possess a programming element to accommodate special events and/or small-scale activities such as artist/musical displays and performances, community or group gatherings, or a weekend farmer's market. Such activities provide yet another draw for communal involvement and participation by nearby neighborhood residents, streetcar riders, or by those from the City's more outlying areas. The basic design framework for the space must ensure that this programming element is easily accommodated. A second plan view for the plaza concept has also been included in this Section to demonstrate how these kinds of active elements can be easily incorporated into the primary design framework, while still accommodating general pedestrian circulation and other more passive uses within the space.

Lacarno Film Festival - Locarno, Switzerland

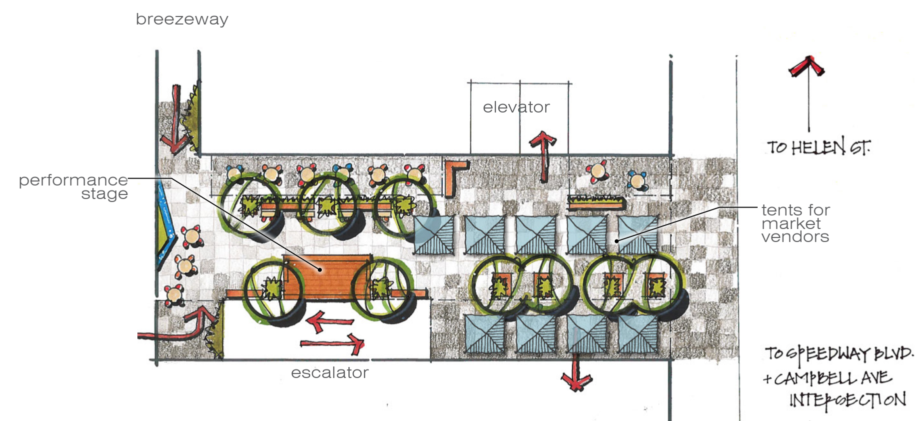
Shopping Area - Granada, Spain (left) The Stradun in Dubrovink, Croatia (above)

To ensure strong transit and pedestrian connectivity to the larger community, the plaza design will provide for easy, direct and shaded linkages to both the Helen-Warren streetcar station (through a designated pedestrian breezeway framed with commercial/retail store frontage), as well as to the nearby Speedway/Campbell intersection.

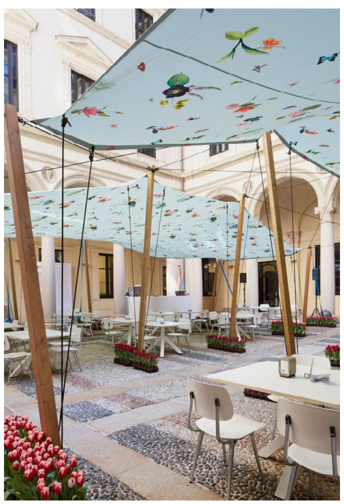
Section IV.B.3.C later in this document provides the actual regulatory development standards for the plaza. This Section affords some preliminary concepts and thematic representations to illustrate the dominant character and feel of this important project element. The plaza's ultimate final design will be contained within the Project's future Development Package as submitted to the Planning and Development Services Department (PDSD). While the specifics of the final design will surely evolve, there are manifold possible combinations that can ensure the desired excitement, vibrancy, and aesthetic of this space is successfully achieved in the finished product.

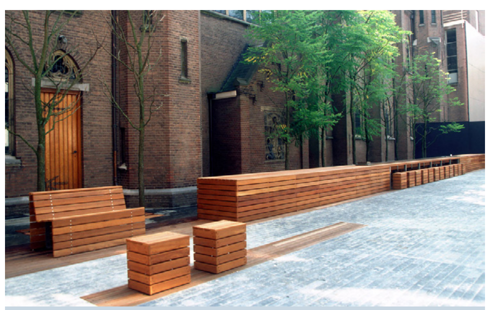


central plaza
concept (daily use scenario)



central plaza
concept (weekend market scenario)





Paley Park, New York , NY (top right) Choorstraat-Papenhuls in Hertogenbosch,Netherlands (bottom right)

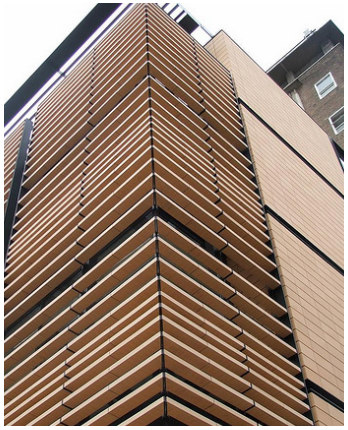
b. Underground and Above-Ground Integrated Parking Structures

The very limited area of the PAD Site (2.49 acres), together with the magnitude and intensity of the proposed mix of vertical uses, places a high premium on literally every square foot of ground plane. With this in mind, there is almost no opportunity, nor wisdom, in relying upon conventional surface parking. The Project parking options include a multi-story above-ground parking structure (up to five [5] levels of parking above a street-level commercial/retail floor), as well as two (2) to four (4) levels of sub-surface parking that will lie beneath the entire Property. Direct access from the sub-surface parking to all upper-story uses will be provided via integrated elevator cores. Any above-ground parking structure will be located within the northern sector of the PAD Site and will be visually screened from Speedway Boulevard; it will take its primary vehicular access from the Project's private driveway off of Helen Street. In order to ensure that the structure is not seen or perceived as a distinct parking facility, but as a geometric portion of larger, cohesive architectural whole, the structure's four-sided façade will incorporate the same design aesthetic and building materials that characterize the Project's buildings (i.e. exterior shading louvers; more below).

c. Upper-Story Elements

The Project architecture features a building base of lower stories, together with a slender high-rise of significant height above the base structure. The base building along Speedway Boulevard and the southern portion of the site's Campbell Avenue frontage will be a maximum of seven (7) stories tall, while the base along the northern portion of Campbell Avenue and along Helen Street will be no more than six (6) stories. These bases will contain restaurant, retail, grocery and various commercial uses on their street levels (and perhaps on certain select portions of their second floors), above which they will be primarily comprised of professional offices and/ or clinics. The upper stories of the aforementioned 6-story base will be a parking structure. The high-rise element is limited to a maximum of twenty (20) stories and will contain a mix of professional offices, together with residences and a potential hospitality component on its highest floors.

All buildings will feature a double-layered façade, the outer element of which will be a face of terracotta, metal or composite resin shade louvers that will not only provide shadowing and stack ventilation cooling of the inner building face, but will also minimize sun reflection onto off-site areas and nearby neighborhoods. To help ensure privacy of outlying residences, projected balconies will not be an element of the design, only loggias and terraces integrated within the building volume. For the best protection from summer sun and the best harvesting of winter solar energy, the louvers will be oriented horizontally on the southern faces of the buildings, vertically on the east and west faces (with the option of making these louvers operable), and vertically fixed (with wider spacing) on the northern facades.

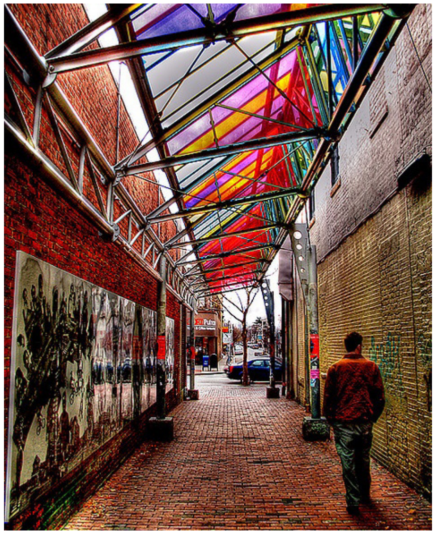


d. Street-Level Pedestrian Interface

The PAD proposes significant building massing immediately adjacent to the Site's perimeter streets. With this in mind, the street-level interface must foster a comfortable pedestrian environment and feature appropriate design elements that ensure a proper human scale for the user. Seating elements (both fixed and movable) will be located along the perimeter building street frontages. The interior building spaces adjoining these seating areas will be populated by retailers and restaurants/cafes, thereby allowing customers and patrons to populate and activate the perimeters of the PAD Site. The Speedway Boulevard, Campbell Avenue, and Helen Street ground-level façades will all feature significant transparency. With all of the above being the case, visitors to the Project will be presented with a lively, porous urban environment along the Project perimeter before they ever enter the buildings themselves or the main internal plaza. The Site's night-time experience will utilize understated urban lighting elements, with a focus on the activities taking place rather than the building, so as to create a soft, warm and inviting atmosphere.

More detail on this element is also provided in Section IV.B.3.I (Landscape Requirements) and Section IV.H (Architectural Standards and Design Guidelines).

Sidewalk Cafes in Cape Cod, Massachusetts



Places des Vosges, Paris (top)
Podium Isles, Amsterdam (middle left)
Boulevard 9 de Julio, Buenos Aires (lower right)
Urban alleyway (bottom left)

e. Transit-Oriented Focus and Design Elements

The proposed PAD has a decidedly transit-heavy focus. Not only is the Helen-Warren Streetcar Station located within a few hundred feet of the Site, but its location at the intersection of two (2) major arterials also ties it directly to myriad public transit routes, designated bikeways, and major pedestrian linkages. While the private vehicle will still, by necessity, play a major role in transportation to and from the Site, there is also heavy reliance on multi-modal forms of transportation and the significant reduction in private-vehicle trips and required parking that will result from these multiple modes. The Project will feature clear, simple and intuitive wayfinding signage to ensure that access is well facilitated to all nearby transit opportunities, bikeways, and pedestrian routes to and from the Site. These wayfinding elements will echo the same design vocabulary and feel of the Project's architecture and landscape design. More detail on the transit-oriented aspects of the project is also provided in Section IV.D (Transportation Infrastructure).

IV.A.2 Compatibility with Adjoining Land Uses and Neighbor Coordination

To assist with the development and preparation of this PAD, the owners and their consultant team interacted extensively with a group of leaders from the immediate surrounding neighborhood associations, including representatives from the Jefferson Park, North University, Blenman-Elm, Catalina Vista, Campus Farms, Feldman's, Miramonte, West University, and Sam Hughes Neighborhood Associations. The creation of this leadership group was incorporated by the owners into their amendment of the University Area Plan approved in 2014. The neighborhood liaison group and the owners worked in mutual good faith to discuss and reasonably address all specific issues raised by the group during their review of the Project and this PAD document. A total of two (2) working meetings were held over the course of developing and finalizing this PAD prior to its formal submittal and rezoning filing with the City of Tucson. Specific issues discussed with the group include the following:

- The applicable requirements of the University Area Plan (UAP) for Sub-Area 1 (the Project Site) of the Helen-Warren Special Area (HWSA).
- The particulars of the proposed Site Plan and redevelopment effort presented in this PAD document, including the street-level and upper-story design elements of the Project, access provisions, outdoor plaza, anticipated land-use mix, etc.
- The applicable building height restrictions of the UAP and the manner in which the anticipated/ultimate building massing and heights will comply with same.
- Transportation considerations of the Project, including its traffic impacts upon the existing street system, associated/needed street improvements, and multi-modal/transit-oriented development provisions.
- A review of the various special studies (post-development visibility, shade and shadow, privacy impacts, etc.) as prescribed by the UAP; these are presented in detail in Section IV.C of this PAD document.
- The established flight paths of emergency helicopters servicing the Banner-University Medical Center trauma helipad, including an acoustic study of the impacts on nearby residential noise levels and whether reverberation can be expected from the proposed project's high-rise.
- Project architectural concepts, double-façade design, and sustainability features.
- A review of post-development architectural renderings depicting the proposed Project within the existing Speedway Boulevard, Helen Street, and Campbell Avenue streetscape corridors.

In addition to the above interactions, the neighborhood-association leadership, the owner and their consultant team have also been in on-going contact with representatives of the University of Arizona (UA) so as to keep them informed of Project progress, discuss coordination issues that might pertain to UA's adjacent property holdings, and to ensure necessary interactions vis-à-vis UA's Comprehensive Campus Plan (CCP). The latter was last updated in 2009 and a new update effort is in its early stages as of this writing. Continued interactions with UA will occur throughout the CCP update process.

IV.B. Land Use Regulations

This Section of the document details the specific regulations and parameters that will govern the Speedway + Campbell Gateway Planned Area Development. Whenever a conflict arises between the PAD and the Unified Development Code (UDC), the PAD shall control. When the PAD does not specifically address, or is otherwise silent on a particular topic, it is understood that the UDC and Administrative Manual shall control. This Section IV.B details the various PAD-specific regulations and standards that will govern the Project.

IV.B.1 Establishment of UDC Base Zoning Designation for the PAD District

The Unified Development Code (UDC) base zoning for the Speedway + Campbell Gateway PAD is OCR-2 (Office, Commercial, Residential), in accordance with UDC Article 4.7.27 and related UDC Section 4.8.6, Use Table 4.8-4 (Commercial and Mixed Use Zones). PAD-specific modifications to the permitted uses and development standards contained therein are provided in Sections IV.B.2 and IV.B.3 below.

IV.B.2 Proposed Uses

a. Restatement of Overall Proposed Mix of Uses + Improvements

This PAD proposes a Project and a mix of uses that is consistent with the 2014 amendment to the University Area Plan (Mayor and Council Resolution No. 22310) as procured by the property owners. As such, this PAD describes a transit-oriented development that will feature a mix of residential and potential hotel (travelers' accommodations, lodging) component, retail trade, grocery (food and beverage sales), restaurant/cafe, and professional offices and clinic space, together with integrated above-ground and sub-surface parking structures, all of which are organized around a central public plaza space.

b. List of Permitted Uses per the Designated Base Zone

Permitted uses for the PAD Site are those uses as allowed per UDC Article 4.7.27 (OCR-2 Zone) and related UDC Section 4.8.6, Use Table 4.8-4 (Commercial and Mixed Use Zones), except for those uses expressly prohibited in Section IV.B.2.e below.

c. Special Exception Uses Allowed by Right

The following uses that are listed as Special Exception uses in UDC Section 4.8.6 and Use Table 4.8-4 are expressly authorized as permitted uses within this PAD District, without the need for any separate Special-Exception application or public hearing process:

- Micro-brewery
- Wireless Communication Antennas (including supporting equipment; this use limited to roof-top locations only). See Section IV.B.3.a for use-specific standards.

d. Supplemental Permitted Uses within the PAD District

The following supplemental uses are permitted within the Project beyond those specifically authorized in UDC Section 4.8.6, Use Table 4.8-4:

- Research and Product Development

This additional use is expressly authorized to accommodate potential occupancy of the Project's building space by any University of Arizona department, or by any private research entity, that may pursue research and development activities in conjunction with its work.

e. Prohibited Uses

The following uses from UDC Section 4.8.6, Use Table 4.8-4 are expressly prohibited within the PAD District:

- Group Dwellings
- Commercial and Personal Storage
- Correctional Facility (Custodial or Supervision)
- Animal Service
- Automotive Service, Major or Minor
- Billboards
- Large Bars
- Dance Halls
- Large Retail Establishment
- General Manufacturing
- Hazardous Material Storage
- Heavy Equipment Manufacturing
- Maintenance and Environmental Services
- Renewable Energy Generation
- Salvaging and Recycling Center

IV.B.3 Development Standards

a. Building Criteria

The following standards apply specifically to the above-ground building structures on the Site; these include both the occupied buildings, as well as, where appropriate, the proposed above-ground parking structure.

1. Building Setbacks

The PAD Site will have a building setback distance of zero feet (0') on all four (4) boundaries. The Project is urban in nature and form. It will recognize the ultimate build-out and redevelopment of the properties to the immediate west owned by the Arizona Board of Regents (ABOR). The ABOR-owned property to the immediate east is anticipated to be ultimately recast by UA as some manner of gateway feature, potentially containing campus entry signage and/or landscaping.

2.Building Heights

Building heights will be in conformance with the University Area Plan (UAP), as amended, per Mayor and Council Resolution No. 22310. The UAP prescribes the following:

Building heights, number of stories, and massing envelopes shall be in accordance with Exhibit No. 25 (inserted here directly from the UAP). The twenty-story, two hundred fifty feet (250') building height allowance illustrated on this Exhibit shall be limited as follows: 1) it shall comprise no more than 33% of the 20-story building envelope's ground area as delineated on the Exhibit, and 2) it shall comprise no more than 25% of the entire property's ground area.

Exhibit No. 26 conceptually illustrates the anticipated building volume for the Project and demonstrates accordance with the above UAP parameters. The proposed high-rise element complies with the UAP's 33%/25% special requirements, while the proposed perimeter building bases (7-stories and 6-stories, respectively) are significantly less than the 12-story and 10-story allowances prescribed in the UAP.

Exhibit 26 integrates the PAD's proposed building envelope within a matrix of both the existing and future anticipated building massing. As is evident, significant massing and height already exist north of Speedway Boulevard in the form of current UA buildings and those within the Arizona Health Sciences Center. Further north (beyond the exhibit's frame), within the Banner-University Medical Center, a new eleven-story hospital is under construction at the time of this writing.

Exhibit No. 25 | UAP Allowable Building Envelopes and Heights

UNIVERSITY AREA PLAN | EXHIBIT 3.G.2
HELEN-WARREN STATION AREA
ALLOWABLE BUILDING ENVELOPES + HEIGHTS
SUB-AREA 1 LOCATION

LEGEND

20 STORIES: MAX HEIGHT = 250'* (20)
12 STORIES: MAX HEIGHT = 154' (12)
10 STORIES: MAX HEIGHT = 130' (10)
UA 2009 COMPREHENSIVE PLAN PROPOSED MASSING
STREET CAR ROUTE + HELEN-WARREN STATION

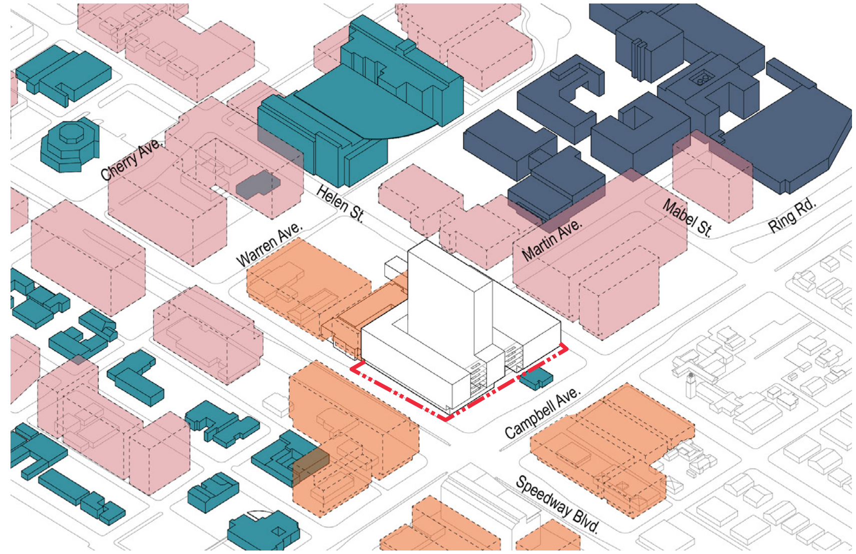
In addition, Exhibit No. 26 visually depicts a reasonable projection of future build-out massing at the immediate Speedway/Campbell intersection when these presently underutilized sites are redeveloped and intensified over time. More discussion on this lattermost topic can be found in Section IV.C.4 of this PAD (Potential Build-out at Speedway/Campbell Intersection).

The Project's 20-story component depicted in Exhibit No. 26 is positioned nearer to the southernmost portion of the 20-story envelope allowed in the UAP. This positioning was found to appropriately address the overall visibility of the tower from the surrounding neighborhoods, as well as balance privacy considerations and shadow/sun-reflection considerations for all concerned. The proposed 7-story and 6-story perimeter building bases then provide a sensitive and effective transition to street level.

The following parameters of this PAD further define the maximum building heights and enumerate certain permitted rooftop features and appurtenances:

- Building heights shall be measured from the finished floor elevation (FFE) of the ground floor to the top of the finished roof deck.
- Building parapets or the building's outer façade of shading louvers shall be allowed to extend above the top of the finished roof deck by a maximum of ten feet (10').
- Roof-top appurtenances are allowed to extend above the top of finished roof deck a maximum of eighteen feet (18').
- Roof-top appurtenance include: elevator over-runs, architectural accent features, solar panels, solar water heaters, building mechanical equipment, wireless communications antennas, and any visual screening structures associated with the above.
- The following use-specific height standards apply to roof-top wireless communications antennas and shall supersede those found in UDC Section 4.9.4.I.4.a(1-3): a) wireless antennas and their support structures are permitted on roof-top locations only; b) wireless antennas are limited to a height of no more than six feet (6') above the top of the building parapet, c) wireless antennas may extend to a height of up to fifteen feet (15') above the top of the building parapet, subject to the building roof-deck height being a minimum of sixty feet (60') and no more than six feet (6') of the antennae can be seen, above the top of the building parapet, from any vantage point on a public street that is a distance away equal to the height at the top of the building parapet.
- Roof-top appurtenances shall cover no more than fifty percent (50%) of the total roof-top surface area.

Exhibit No. 26 | Anticipated Project Building Volume in Conformance with UAP Height Limitations



LEGEND

- PAD DISTRICT BOUNDARY
- PROPOSED SPEEDWAY + CAMPBELL GATEWAY PROJECT
- UNIVERSITY OF ARIZONA, EXISTING BUILDINGS
- ARIZONA HEALTH SCIENCES/ABOR, EXISTING BUILDINGS
- POTENTIAL/FUTURE UA MASSING*
- POTENTIAL FUTURE BUILD-OUT AT SPEEDWAY/ CAMPBELL INTERSECTION

* UA 2009 COMPREHENSIVE CAMPUS PLAN; PROPOSED MASSING.

3. Perimeter Height/Stepping Standards

Standards for the appropriate stepping in building heights, from the Project's high-rise element to the shorter building bases at its perimeters, were contemplated in the above height limitations and in the associated building envelopes prescribed under the amended UAP. The proposed PAD will actually exceed these stepping parameters in final design.

While the UAP allows for upwards of twelve-story massing along Speedway Boulevard and a ten-story massing along Campbell Avenue, the Project proposes much shorter 7-story and 6-story perimeter elements. These reduced perimeter heights provide for a more sensitive and effective transition from the high-rise to street level and fully mirror the height standard established by the nearby Aloft Hotel.

In the end, the Project's final form and proportions will be determined by the overall amount of interior building square footage that it must achieve to ensure economic viability, the final land-use mix being housed, and the physical ability to provide required parking for this mix in a cost-effective manner. This is a highly fluid equation that mandates flexibility within this PAD document. Under any scenario, however, the above 20-story high-rise, combined with the aforementioned 7-story and 6-story perimeter elements, will ensure the appropriate fit of the Project into its existing context.

Exhibit 24 (PAD Master Site Plan) indicates horizontal dimensions attendant to the perimeter building bases, as well as for the proposed high-rise element and its setbacks in relationship to both Speedway Boulevard and Campbell Avenue. Reasonable modifications to these dimensions are acceptable at the time of future Development Package and building-permit submittals, with the understanding that the dimensions and the proportions they achieve shall be in substantial conformance with that depicted on the Exhibit and as discussed above.

b. Above-Ground Parking Structure

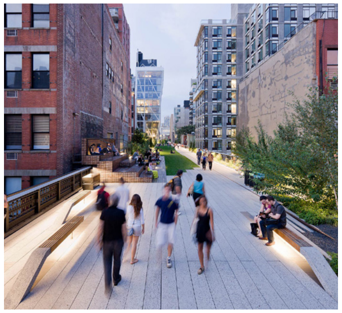
Any above-ground parking structure will be subject to the following design considerations and requirements:

- Private-vehicle access to the parking structure for Project occupants (residents, office and retail/restaurant employees) and visitors shall occur via the Project's private drive off of Helen Street.
- The east façade of the parking structure shall comprise a linear distance that is no more than one-third (33%) of the Site's total Campbell Avenue frontage.
- The total height of the structure shall not exceed six (6) stories or ninety feet (90').
- The structure's external facades will receive the same treatment, in style and materials, as the Project's occupied buildings, i.e. feature terracotta shading louvers, with the intent being that the parking structure seamlessly integrates into the Project in a holistic fashion and maintains a consistent, pure architectural elevation.

c. Central Plaza Component

The central plaza will conform to the following requirements:

- The minimum overall ground area of the plaza will be seven thousand five hundred (7,500) square feet. This total area includes that which is necessary to accommodate up and down escalators to the sub-surface parking structure.
- The plaza shall have open access to its east side; the adjacent ABOR property along Campbell Avenue shall be considered as a streetscape frontage (in anticipation of the UA's future build-out of the property) and the PAD's landscape design shall attempt to best integrate with UA's ultimate plans.
- The plaza shall be open to the sky and not be an air-conditioned "mall-type" space. Partial shading through plant materials or fabric, etc. structures is permissible, but shall not wholly eclipse skyward visibility.
- The final design of the plaza will be provided in the formal Development Package as submitted to the Planning and Development Services Department (PDSD). The plaza must include a minimum of ten (10) programmatic elements/ amenities from the menu presented to the right, the satisfaction of which will be confirmed by PDSD at the time of Development Package review:



High Line - New York, NY (above)
Eduardo Chillida Sculpture (left)

- Flexible seating
- Flexible group space (e.g. Bali beds)
- Fixed seating
- Community tables
- Stage/Performance space
- Water element
- Green/living wall
- Landscape containers; raised or at-grade planters
- Shade elements
- Art or sculpture
- Accent lighting
- Movie screen/wall
- Audio-visual/speakers for music
- Outdoor fireplace or feature
- Passive recreation elements (e.g. chess table)
- Misters/fans
- Pop-up shops, kiosks, street vendor spaces
- Skateboard parking
- Splash pad

Exhibit No. 27 provides a series of schematic representations to illustrate how these various programmatic elements can integrate in a single, holistic design.

MOMA Sculptural Garden- New York (above) Jardin de la Noria, France (far right) Dilworth Park- Philadelphia, PA(right)

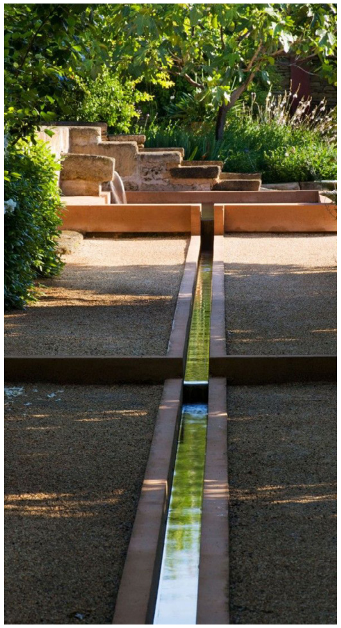
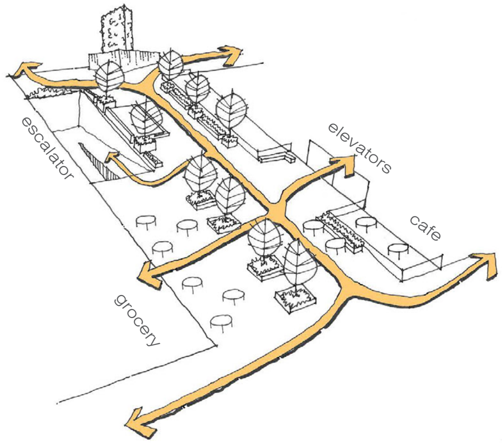
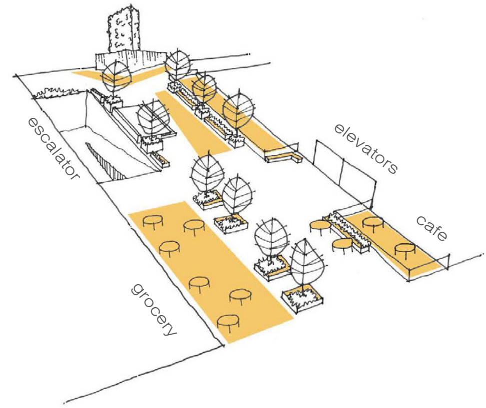


Exhibit No. 27 | Central Plaza Programmatic Elements

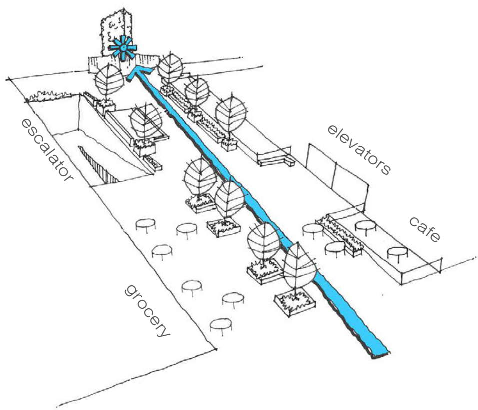
CIRCULATION



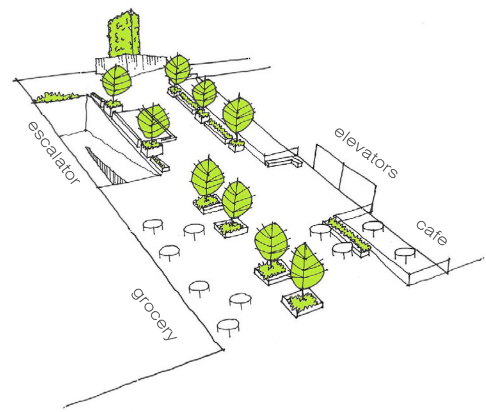
GATHERING + SEATING



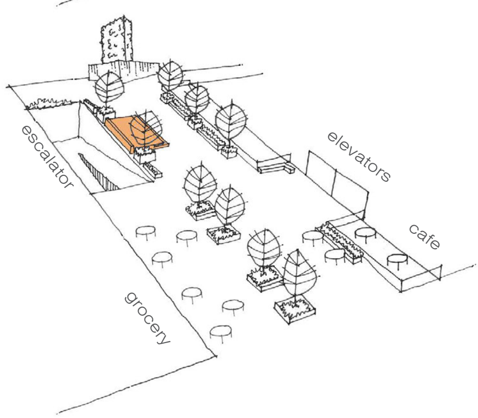
FOCAL ELEMENT



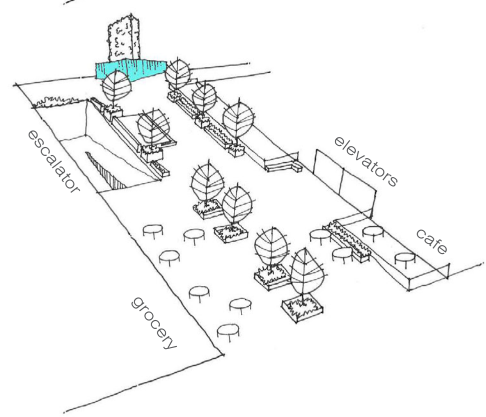
VEGETATION



PERFORMANCE SPACE



WATER



d. Individualized Vehicle Parking Requirements

This PAD will not be subject to standard UDC parking requirements (as found in UDC Section 7.4.4 and attendant Table 7.4.4-1) and will instead be governed by specialized parking requirements that are reflective of its multi-use nature, TOD characteristics, and the shared-parking realities that will define it.

The vehicular parking calculations and requirements for this PAD are presented in Table 5. These parking requirements employ the Urban Land Institute's (ULI's) standard parking generation rates, while further considering certain established ULI shared-parking methodologies and reductions for mixed-use projects.

ULI's Time-of-Day Parking Demand Reduction was applied to the parking requirements shown in Table 5. This is the primary reduction mechanism within ULI and recognizes how specific land uses peak at different times during the day within a mixture of uses.

In order to ensure a conservative approach to the parking equation for this Project, the following two (2) ULI reduction mechanisms were not employed in Table 5, but may be appropriate in the future:

1. Internal Capture Reduction – This reduction identifies trends where on-site users might frequent another use (or uses) without generating new parking demand.

2. Multi-modal Reduction – This reduction assumes a percentage of trips that are generated not necessarily by automobile, but rather by walking, biking, or transit. The location of the proposed PAD is likely to generate multi-modal trips, as it is within the UA area and also adjacent to the streetcar's Helen-Warren station.

The parking requirements presented in Table 5 are based upon the currently envisioned land use mix for the Project. The ultimate use mix will, of course, be more accurately known at the time of actual development and will be driven by market forces then in play. At that time, the above Internal Capture and Multi-modal reduction mechanisms may become relevant.

With this in mind, Section IV.I.2.a of this document specifically authorizes the owner/developer to modify the parking calculations presented in Table 5 as a minor amendment to this PAD.

Table No. 5 | Vehicular Parking Requirements

LAND USES	PARKING REQUIREMENT PER 1,000 SF (KSF) OF GROSS FLOOR AREA (GFA)
COMMUNITY SHOPPING CENTER (UDC LAND USES: RETAIL TRADE, FOOD & BEVERAGE SALES)	3.60 SPACES PER KSF OF GFA
FINE DINING, RESTAURANT OR CAFÉ (UDC LAND USE: FOOD SERVICES)	18.00 SPACES PER KSF OF GFA
HOTEL/HOSPITALITY (UDC LAND USE: TRAVELERS' ACCOMMODATIONS, LODGING)	1.25 SPACES PER KSF OF GFA
RESIDENTIAL CONDOMINIUMS OR APARTMENTS (UDC LAND USE: MULTI-FAMILY DWELLINGS)	1.85 SPACES PER KSF OF GFA
OFFICE (UDC LAND USE: ADMINISTRATIVE & PROFESSIONAL OFFICES)	3.64 SPACES PER KSF OF GFA
MEDICAL/DENTAL OFFICE OR CLINIC (UDC LAND USE: MEDICAL OUTPATIENT)	4.50 SPACES PER KSF OF GFA

e. Individualized Bike Parking Requirements

Given the mixed-use and transit-oriented development (TOD) aspects of the Project, specialized bicycle parking requirements are herein established for the PAD which attempt to right-size parking provisions for the PAD's proposed mix of land uses. These specialized requirements recognize that the PAD Site is located in close proximity to several designated bicycle routes, together with the fact that the arrival and departure of many Project occupants, employees and visitors to and from the Site will occur by foot, private vehicle, or via the Tucson Streetcar. With all of the above in mind, the PAD will be subject to the specific bicycle parking requirements presented in Table No. 6, which supersede UDC Section 7.4.8. The particular areas where these specialized requirements diverge from Section 7.4.8 are also indicated in the Table. The final bicycle-parking calculations and provisions for the Project will be detailed within the future Development Package (DP) provided to PDSD; these final calculations will be reflective of the Project's final use breakdown at the time of actual development.

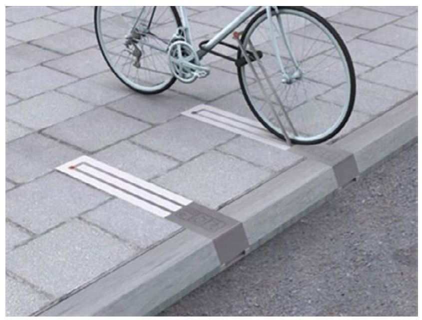
Beyond the PAD's specialized bike parking provisions as shown in Table No. 6, the following additional bike-parking specifics apply to the Project:

- All long-term bicycle parking spaces will be provided within secured areas within the Project's parking structures or buildings. Project residents, occupants, and employees will be afforded individual access to these secured areas via keycard or similar mechanism. Secured areas include rooms and offices for long term spaces.
- All short-term bicycle parking spaces will be integrated into the Project's perimeter street frontages.
- Bicycle storage lockers are prohibited along the public street façades of all Project buildings.
- Bicycle parking is prohibited within the Project's central plaza.
- The total number of long-term bicycle parking spaces provided by the Project may be reduced from the specific requirements in Table No. 6 through a formal Bicycle Share program, subject to the review and acceptance of same by the Director of PDSD at the time of formal Development Package (DP) review. Input on any such Bicycle Share program may be sought from the TDOT Bicycle/Pedestrian Coordinator at the PDSD Director's discretion.

Table No. 6 | Bicycle Parking Requirements

LAND USES	LONG-TERM REQUIRED PER PAD	SHORT TERM REQUIRED PER PAD
COMMUNITY SHOPPING CENTER (RETAIL) (UDC LAND USE: RETAIL TRADE)	1 SPACE / 10,000 SF	PER UDC
GROCERY STORE (UDC LAND USE: FOOD AND BEVERAGE SALES)	1 SPACE / 10,000 SF	1 SPACE / 12,000 SF OF GFA, MIN. 2
RESTAURANT OR CAFÉ (UDC LAND USE: FOOD SERVICES)	1 SPACE / 5,000 SF	PER UDC
HOSPITALITY/HOTEL (UDC LAND USE: TRAVELERS' ACCOMMODATIONS, LODGING)	PER UDC	1 SPACE / 50 GUEST ROOMS, MIN 2
RESIDENTIAL (CONDOMINIUMS OR APARTMENTS) (UDC LAND USE: MULTIFAMILY DWELLINGS)	PER UDC	.15 SPACE / BEDROOM
OFFICE (UDC LAND USE: ADMINISTRATIVE AND PROFESSIONAL OFFICE)	PER UDC	1 SPACE / 15,000 SF OF GFA
MEDICAL/DENTAL OFFICE OR CLINIC (UDC LAND USE: MEDICAL OUTPATIENT)	1 SPACE / 10,000 SF	1 SPACE / 15,000 SF OF GFA

Examples of secured bicycle parking. Princeton University Bike Storage-Princeton, New Jersey (right) Short-term (below).



f. Individualized Loading Zone Requirements

Loading zone requirements for the Project shall be deemed fully satisfied by the following facilities (please also refer to Exhibit No. 24, PAD Master Site Plan on p. 70 and 71 of this document):

- Two (2) loading bays of sufficient size to accommodate full-sized semi-tractor trailer vehicles, each with a depressed loading dock.
- A large, unstriped area in front of the above semi-tractor trailer loading dock, which shall be deemed available for smaller delivery vehicles to park as they see fit to service the Project's restaurant, retail, office, etc. functions.
- Delivery vehicle access to the Site and to the above loading-zone areas is permitted directly from Speedway Boulevard only.

g. Site Lighting

The PAD District will adhere to the requirements of the 2012 City of Tucson/ Pima County Outdoor Lighting Code (OLC). In general, the Project's lighting design will focus on soft and atmospheric illumination, with lesser emphasis on building lighting and a primary focus on human activity in a human-scale environment.

h. Privacy Considerations for Outlying Areas

Concerns with respect to privacy are materially addressed with the Project's double-façade architectural design (see Section IV.A.1.c, p.74). The outer façades of the buildings feature exterior shade louvers, which not only shield the inner building face, but also serve to limit outward lines of sight and prevent unfettered views into outlying neighborhoods. In addition, the building design shall incorporate the following elements to further respect and address privacy concerns:

- No protruding balconies are permitted; only loggias and terraces integrated within the building volume are permitted.
- The permitted loggias and terraces are allowed primarily on the north and south-facing elevations of the buildings, respectively. Such features are permitted on the east and west-facing elevations only in corner offices or residential/hospitality units.
- In accordance with the University Area Plan, visibility and privacy factors were specifically studied in detail in conjunction with this PAD. The results and findings of this work are presented in Section IV.C.1 of this document.

i. Sun-reflection Considerations

The Project's double-façade design, as referenced in the prior Section and elsewhere in this document, effectively mitigates impacts with respect to sun reflection onto adjacent properties. The exterior façade of louvers shields the inner façade from direct sunlight, while also obstructing the outward reflection of whatever limited direct light may have penetrated the outer façade. This issue is discussed within a special study presented in Section IV.C.2 of this PAD document.

j. Pedestrian Circulation and Connectivity to Adjacent Properties

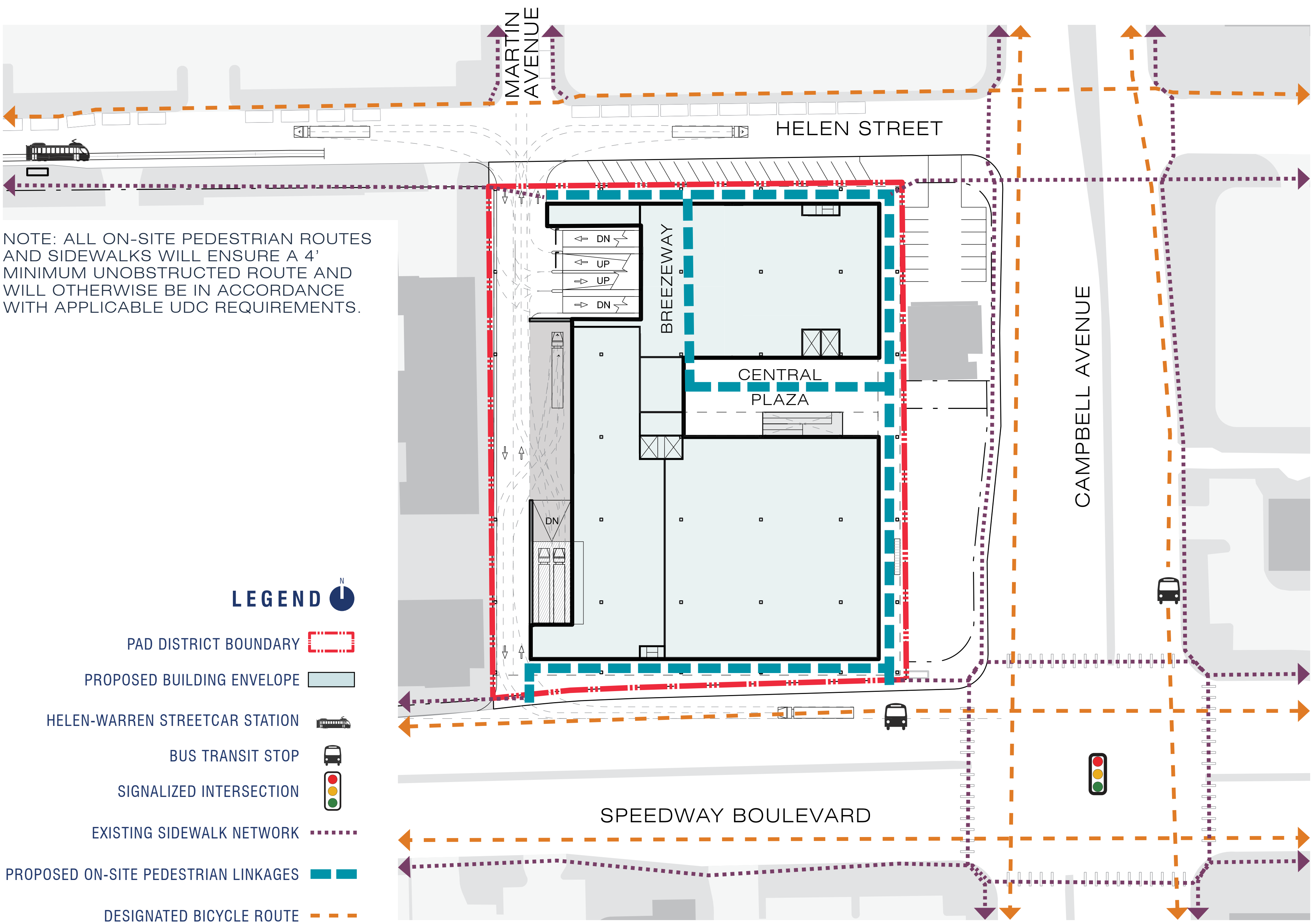
Pedestrian connectivity throughout the PAD Site and with all adjacent properties is a fundamental component of the Project. Direct linkages will be provided from the Site and its interior plaza to all of the following:

- The Helen-Warren streetcar station
- Helen Street sidewalk network
- Campbell Avenue sidewalk network
- Speedway Boulevard sidewalk network
- By extension of the above, access is assured to all adjacent bus transit stops, designated bicycle routes, pedestrian street crossings, Cat Tran stops, and the like.

These linkages shall be incorporated as inherent components of an overall project design, such that their availability and ease-of-use for the pedestrian is clear. These linkages are intended to provide far more than basic physical walking routes. For example, the connection to the Helen-Warren streetcar station will be via a dedicated breezeway/corridor that extends north/south from the central plaza and which is flanked by retail/store frontage to draw the pedestrian into the Project from Helen Street.

The connections along the respective Campbell Avenue and Speedway Boulevard frontages will be similarly vibrant, incorporating seating areas, highly transparent store-fronts, and street landscape elements that create a perimeter project energy to similarly invite visitors into the Site. These street elements not withstanding, the sidewalks along these two (2) streetscape frontages will ensure a minimum four foot (4’) wide unobstructed pedestrian route and otherwise meet applicable UDC standards. Overall pedestrian connectivity is illustrated in Exhibit No. 28.

Exhibit No. 28 | Pedestrian Connectivity



NOTE: ALL ON-SITE PEDESTRIAN ROUTES AND SIDEWALKS WILL ENSURE A 4' MINIMUM UNOBSTRUCTED ROUTE AND WILL OTHERWISE BE IN ACCORDANCE WITH APPLICABLE UDC REQUIREMENTS.

LEGEND

- PAD DISTRICT BOUNDARY
- PROPOSED BUILDING ENVELOPE
- HELEN-WARREN STREETCAR STATION
- BUS TRANSIT STOP
- SIGNALIZED INTERSECTION
- EXISTING SIDEWALK NETWORK
- PROPOSED ON-SITE PEDESTRIAN LINKAGES
- DESIGNATED BICYCLE ROUTE

k. Transit-Oriented Wayfinding and Associated Signage

The Project will feature clear, simple and intuitive wayfinding signage to ensure that access is well facilitated to the Helen-Warren streetcar station and to all off-site bus-transit routes, bikeways, and pedestrian connections near the Property (as depicted on Exhibit No. 28, p. 87). These wayfinding elements will reflect the same design vocabulary and feel of the Project's architecture and landscape design. As such, it is the specific intent of the Project that this wayfinding signage will not appear overly formal or "institutional", but instead integrate aesthetically with its surroundings as one element in an overall holistic and consistent design theme.

I. Landscape Requirements

The following landscape and screening requirements for the Speedway + Campbell Gateway PAD District supersede Section 7.6 (Landscape and Screening) of the UDC. The PAD District is expected to meet or exceed the base performance criteria established below. These performance criteria include certain modifications of standard UDC requirements so as to better accommodate the specialized constraints, opportunities, and needs for flexibility that address urban mixed-use developments. This design flexibility will best promote and achieve the high-intensity, high-density and high-quality vision that is intended for the Project.

1. Landscape Concept and Plant Palette

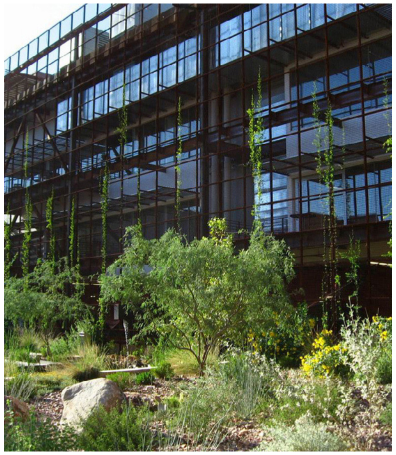
The PAD District will implement a regionally adapted and native plant palette that will feature varying textures and colors to create a welcoming, comfortable and pedestrian-scale environment for users of the Project. The landscape design will help highlight pedestrian circulation routes and the primary entries into the central plaza, while creating shaded pedestrian paths and gathering places along the streetscape building frontages.

The landscape design generally focuses on maximizing shade in all landscape areas through the integrated use of building overhangs, shading elements/structures, and/or the concentrated placement of street trees to establish an urban canopy. Plant selection and placement will be key to minimize any heat island effects of the small on-street parking area along Helen Street and within all hardscape areas throughout the Project. Canopy trees, planted within and adjacent to the Helen Street vehicular use area, should be sited in a manner that, upon maturity, affords the greatest amount of shade to the parking spaces.

A low-water use irrigation system will be utilized for all landscape areas within the PAD Property. The system will incorporate an automatic controller, flow sensing valves, rain shut-off capability, and will be metered separately to monitor water usage thought the Project. Site lighting will be incorporated as an essential landscape element, not only to create a soft and warm aesthetic, but also to ensure visitor safety, security monitoring, and to visually aid all pedestrian circulation routes and gathering spaces.







2. Perimeter Landscape Borders and Screening Requirements and Standards

The Project is entirely urban in its nature and form, with two of the four Project boundaries being defined by public streets (Helen Street to the north, Speedway Boulevard to the south).

As such, and given the other adjacent uses further described below, none of the normal screening requirements of the UDC to visually protect adjacent properties (per UDC Section 7.6.5) shall apply to any boundary of the PAD Site.

Exhibit No. 29 presents a Landscape Framework Plan (see p. 93) illustrating the various perimeter landscape areas that comprise the Project. The development standards for each of these areas are as follows:

<u>Speedway Boulevard Streetscape Area</u>

The Speedway Boulevard frontage is perhaps the most challenging from a design standpoint, given its south-facing exposure and the relatively narrow width available between the PAD Site's boundary and the existing edge of curb. With these factors in mind:

- The street landscape border adjacent to Speedway Boulevard shall be a minimum of ten feet (10') in width, as measured from the edge of the public right-of-way (which also constitutes the PAD's southern boundary) to the Project's street-level building face.
- A specific Design Zone is hereby established along the Project's Speedway Boulevard frontage. This Design Zone is comprised of the above ten foot (10') landscape border, together with that portion of the adjacent Speedway Boulevard public right-of-way that extends to the street's existing back of curb.
- This Design Zone establishes that which is necessary to create the type of vibrant, pedestrian-friendly environment and storefront experience that is envisioned for the Project, the intended feel and character of which has been previously described in Section IV.A.1.d.
- The owner/developer of the PAD Site will be responsible for the design, construction and maintenance of the streetscape improvements within the Speedway Boulevard Design Zone, to include all landscape plantings, street furniture elements, specialty paving, and shade structures. A formal license agreement will be executed with the City to allow the owner/developer's attention to these duties.
- The second-story and upper building floors are permitted to overhang the ten foot (10') street landscape border so as to facilitate a pedestrian refuge corridor and shaded gathering areas within the Design Zone.
- The final details of the Speedway Boulevard Design Zone, illustrating all hardscape, landscape, and street furniture elements, shall be provided in the formal Development Package (DP) submitted to PDSD. Prior to actual DP submittal, the Project landscape architect shall conduct pre-coordination with PDSD and TDOT representatives to review the design and allow for appropriate input regarding that portion of the improvements which lies within the Speedway Boulevard public right-of-way.
- In conjunction with the above Design Zone pre-coordination effort, the owner/developer and their consultant representatives shall specifically meet with TDOT Transit to effectuate the westward relocation of the existing Sun Tran bus stop on Speedway Boulevard, as well as the siting of a new saguaro-style bus shelter and associated amenities. While there is ample room for these improvements to be accommodated within the existing City right-of-way, this pre-coordination work will ensure that the Project's other proposed streetscape elements along Speedway Boulevard (landscaping, street furniture, etc.) are designed harmoniously with the new bus shelter.
- Within the Design Zone, a minimum total number of trees shall be provided, calculated as one (1) canopy tree for every forty (40) linear feet of landscape border or fraction thereof, excluding vehicular ingress or egress points.
- Canopy trees provided per the above will be a minimum of 24" box in size.
- The distance between the required canopy trees may vary within the Design Zone and they may be clustered in final design.
- Plantings within the Design Zone will ensure all visual clearances mandated by applicable sight visibility triangles at the Project's driveway/intersection locations.
- The Project's service drive and loading/delivery area will be visually screened from Speedway Boulevard by the intervening building mass and the above plantings within the design zone.

Helen Street Streetscape Area

The Helen Street frontage is a very constrained area presently containing only a narrow sidewalk that is in significant disrepair and in need of replacement. This entire frontage must be redeveloped to properly integrate with the proposed Project. With these factors in mind:

- The street landscape border adjacent to Helen Street shall be a minimum of ten feet (10') in width, as measured from the edge of the public right-of-way (which also constitutes the PAD's northern boundary) to the Project's street-level building face.
- A specific Design Zone is hereby established along the Project's Helen Street frontage. This Design Zone is comprised of the above ten foot (10') landscape border, together with that portion of the adjacent Helen Street public street right-of-way that wholly includes the proposed row of on-street parking spaces (see Exhibit No. 24; PAD Master Site Plan) located along the Project's northern boundary.
- This Design Zone establishes the minimum area that is necessary to create an appropriate pedestrian-friendly environment, storefront experience, and Project edge within this highly constrained area. It also affords the opportunity to properly design and integrate the proposed row of on-street parking spaces, landscape elements, and sidewalk corridor in holistic fashion.
- The owner/developer of the PAD Site will be responsible for the design, construction and maintenance of the streetscape improvements within the Helen Street Design Zone, to include all landscape plantings, parking spaces (and their curbing and pavement), street furniture elements, specialty paving, etc.. A formal license agreement will be executed with the City to allow the owner/developer's attention of these duties.
- The second-story and upper building floors are permitted to overhang the ten foot (10') street landscape border so as to facilitate a pedestrian refuge corridor and shaded gathering areas within the Design Zone.
- The final details of the Helen Street Design Zone, illustrating all hardscape, landscape, street furniture, and parking elements shall be provided in the formal Development Package (DP) submitted to PDSD. Prior to actual DP submittal, the Project landscape architect shall conduct pre-coordination with PDSD and TDOT representatives to review the design and allow for appropriate input regarding that portion of the improvements which lies within the Helen Street public right-of-way.
- Within the Design Zone, a minimum total number of trees shall be provided, calculated as one (1) canopy tree for every forty (40) linear feet of landscape border or fraction thereof, excluding vehicular ingress or egress points.
- Canopy trees provided per the above will be a minimum of 24" box in size.
- The distance between the required canopy trees may vary within the Design Zone and may be clustered in final design.
- Plantings within the Design Zone will ensure all visual clearances mandated by applicable sight visibility triangles at the Project's driveway/intersection location.

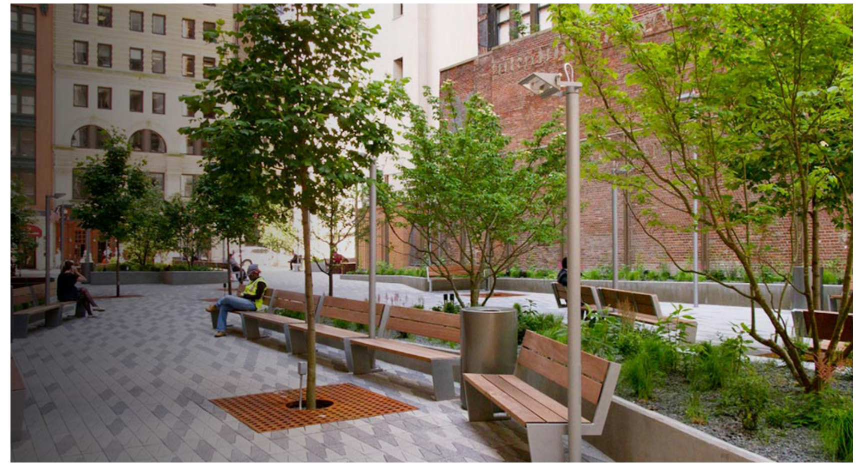
Project Eastern Boundary

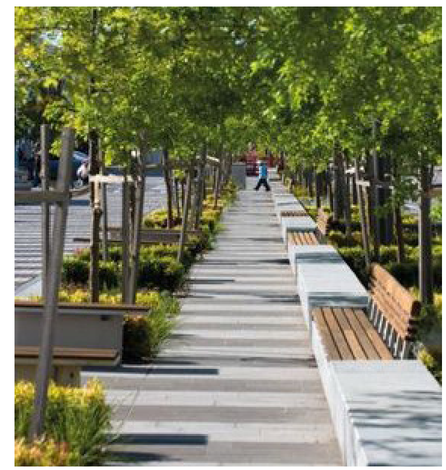
The PAD Site's eastern boundary adjoins property owned by the Arizona Board of Regents (ABOR) and which contains a single UA administrative office building. It is anticipated that this ABOR property will ultimately be repurposed by UA as a landscaped area or gateway feature containing some manner of campus entry signage or monumentation. With these factors in mind:

- No formal landscape border is required along the PAD's eastern boundary.
- A continuous pedestrian connection will be provided along the PAD's entire east boundary, providing a direct linkage between the Project's central plaza, Helen Street, and Speedway Boulevard.
- This pedestrian connection will feature a decorative hardscape that complements that of the central plaza, and may integrate tree wells, landscape planters (raised or at-grade), and seat walls.
- Within the pedestrian connection, a minimum total number of trees shall be provided, calculated as one (1) canopy tree for every fifty (50) linear feet of building frontage or fraction thereof.
- Canopy trees provided per the above will be a minimum of 24" box in size.
- The distance between the required canopy trees may vary within the pedestrian connection and they may be clustered in final design.

Project Western Boundary

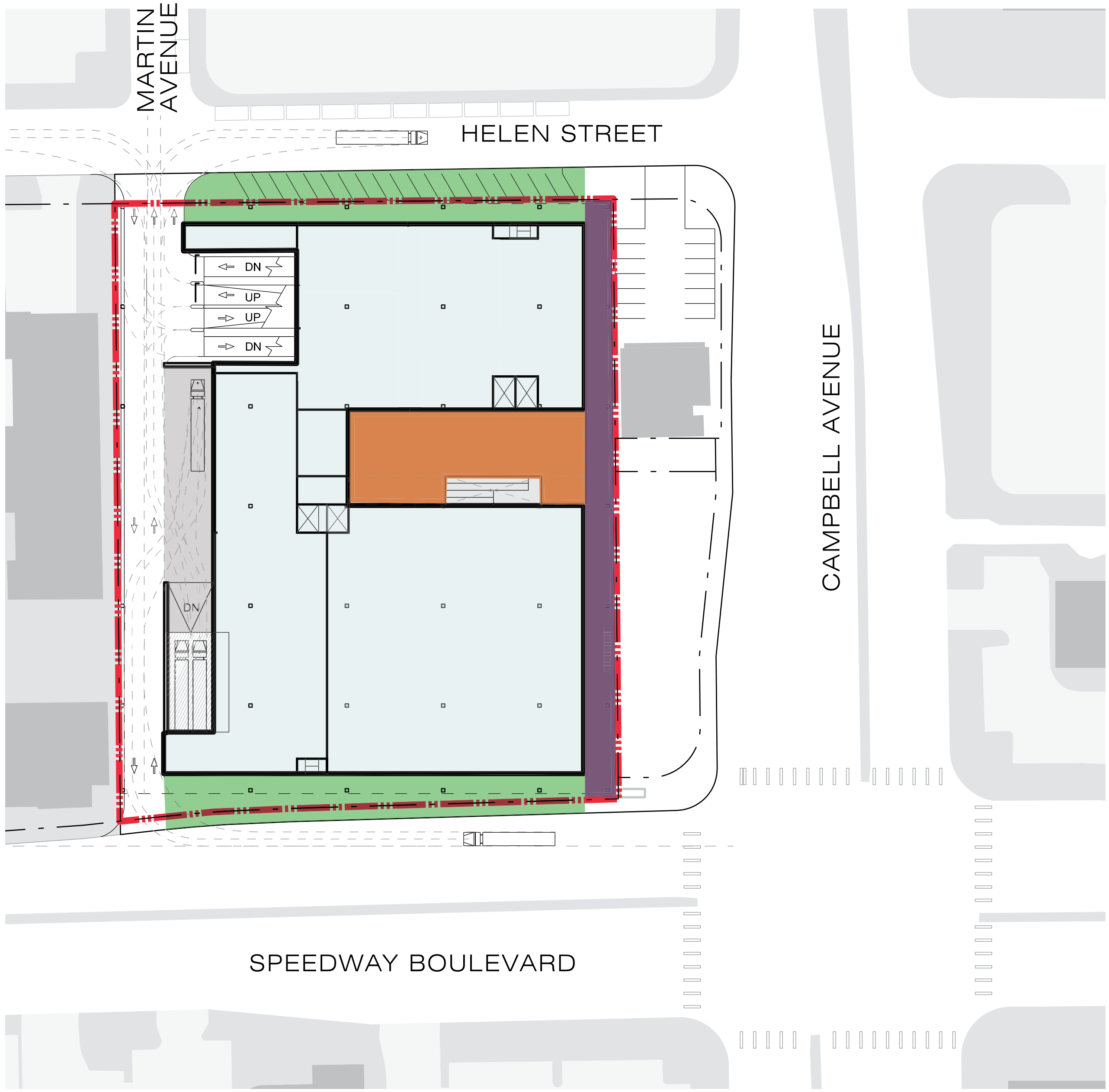
The property to the immediate west of the PAD Site is also owned by ABOR and contains the UA Babcock Hall administrative and residence hall buildings. A new on-site private entry drive will parallel this western boundary of the PAD and will function as the service drive for the Project, provide delivery and emergency access, as well as private-vehicle ingress and egress to the new above-ground and sub-surface parking structures. No landscape border is required along the PAD's entire west boundary. Instead, a continuous vined trellis will be provided along the entire western property line to visually screen the ABOR property from the Project's service drive and loading area.





m. Environmental Services

Centralized trash collection and pick-up facilities, in accordance with the prescriptions of Technical Services Manual Section 8, will be provided within the project's identified joint-use area that contains its service drive, loading/delivery zone, and semi-tractor/trailer loading docks (refer to On-site Keynote 5 on Exhibit No. 24; PAD Master Site Plan). A minimum twenty-five foot (25') vertical/overhead clearance will be provided throughout this area. Access to this area by Environmental Services (ES) is expressly allowed from Speedway Boulevard; ES shall be permitted to utilize both the Speedway and Helen Street project entrances for ingress and egress, as it sees fit, as necessary to ensure a safe and maneuverable route for entering, servicing, and exiting the site.



LEGEND

- PAD DISTRICT BOUNDARY
- PROPOSED BUILDING ENVELOPE
- HELEN / SPEEDWAY STREETSCAPE DESIGN ZONE
- PROJECT EASTERN BOUNDARY
- CENTRAL PLAZA LANDSCAPE AREA

IV.C Specialized Requirements and Studies Per The University Area Plan

In accordance with the amended University Area Plan (UAP), this PAD Site constitutes Sub-Area 1 of the UAP's designated Helen Warren Station Area (HWSA) and is therefore subject to a series of special requirements and studies to be addressed at the time of rezoning. These special studies are individually addressed in the Sub-sections that follow.

IV.C.1 Viewshed Impacts, Project Visibility and Privacy Study

During the UAP amendment process, some residents expressed questions and concerns as to the overall visibility of the proposed Project (especially from the taller high-rise element) from their respective neighborhoods, together with the extent to which occupants of the high-rise might impact the privacy of outlying neighborhood residents. This Section addresses the analyses that were undertaken to address these issues and the findings which resulted.

a. Study Methodologies

Viewshed Impacts and Project Visibility Methodology

To assess these parameters, the PAD Site was used as a centerpoint from which concentric circles were established at outward distances of ¼ mile, ½ mile and ¾ mile. The outermost ¾-mile circle captured all pertinent surrounding residential neighborhoods. A series of radial lines (ten-degree spacing) was then extended outward from the centerpoint at the PAD Site. Specific photo points were randomly established at those locations where the radial lines and the aforementioned concentric circles intersected in closest proximity to local street rights-of-way or at street intersections within the neighborhoods. Photographs were then taken toward the PAD Site from each specific photo point. A three-dimensional massing model of the proposed PAD Site's building outline was then spatially aligned and inserted into the photographs using 3D graphic and rendering software, providing a simulation of the future building volume within each photographic panorama.

In those locations where the proposed PAD buildings were wholly obscured by intervening obstacles, the outline of the building volume was nonetheless integrated into the photograph so as to communicate the spatial positioning of the buildings within the larger panorama.

This systematic, random methodology fostered a representative sampling of visibility from the surroundings and ensured that the proposed PAD Site and its building improvements were objectively portrayed from every direction and from essentially every surrounding neighborhood (giving appropriate consideration to existing intervening structures and landscaping), and done so in a manner that was unbiased toward any individual residence or neighborhood.

Privacy Impacts Methodology

Drone photos were taken in all compass directions from respective heights of eighty-five feet (85'), one hundred sixty-five feet (165'), and two hundred fifty feet (250'), the maximum permitted height of the proposed tower. These photos document the clear, unobstructed views that would be available from these various heights.

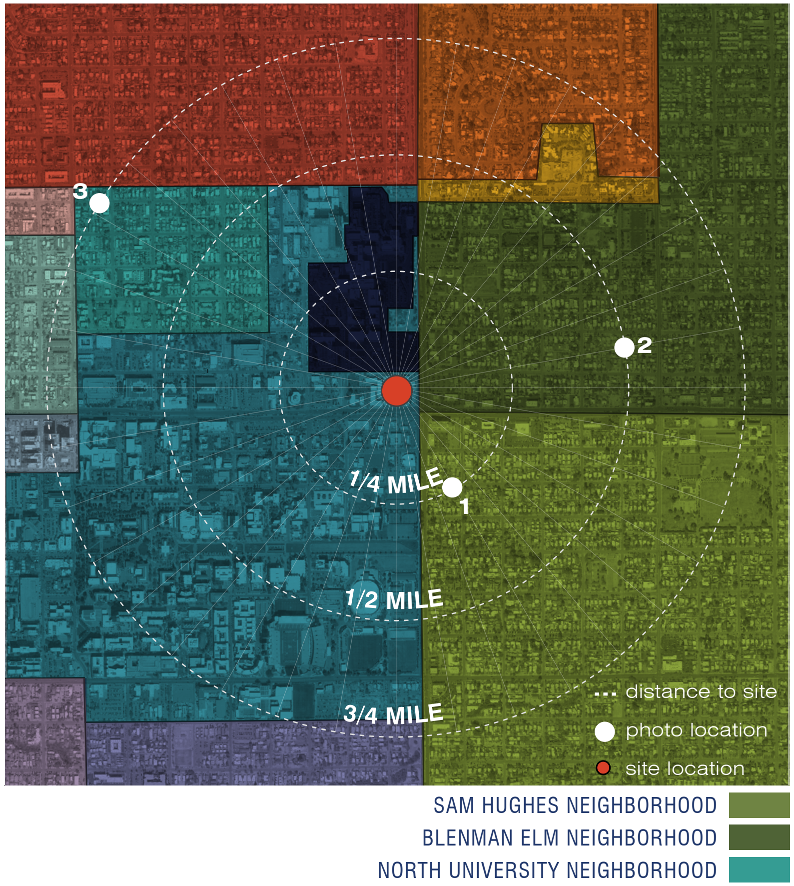
b. Results

Viewshed Impacts and Project Visibility Results

In general, due to the distance of the surrounding neighborhoods from the PAD Site, together with the substantial non-residential development that surrounds and intervenes between it and the single-family residential areas, the overall visibility of the future PAD buildings is marginal and, in many cases, not visible at all.

Exhibit No. 30 is a one-page representative summary of the photo-simulation results. The photo location with the greatest visibility is at the intersection of E. 2nd Street at N. Norris Avenue, within the Sam Hughes neighborhood. This point is ¼ mile from the PAD Site and the upper portion of the proposed tower's volume is visible above the tree canopy and just to the west of the ALoft Hotel.

For those wishing to review the complete array of photo-simulations prepared, together with a breakdown of all the photo locations from within all of the respective surrounding neighborhoods, these items have been included as Appendix A of this PAD document.



1. Sam Hughes - E 2nd St & N Norris Ave — 1/4 mile

2. Blenman Elm - E Mabel & N Norton Ave — 1/2 mile

3. North University - E Elm St & N Fremont Ave — 3/4 mile

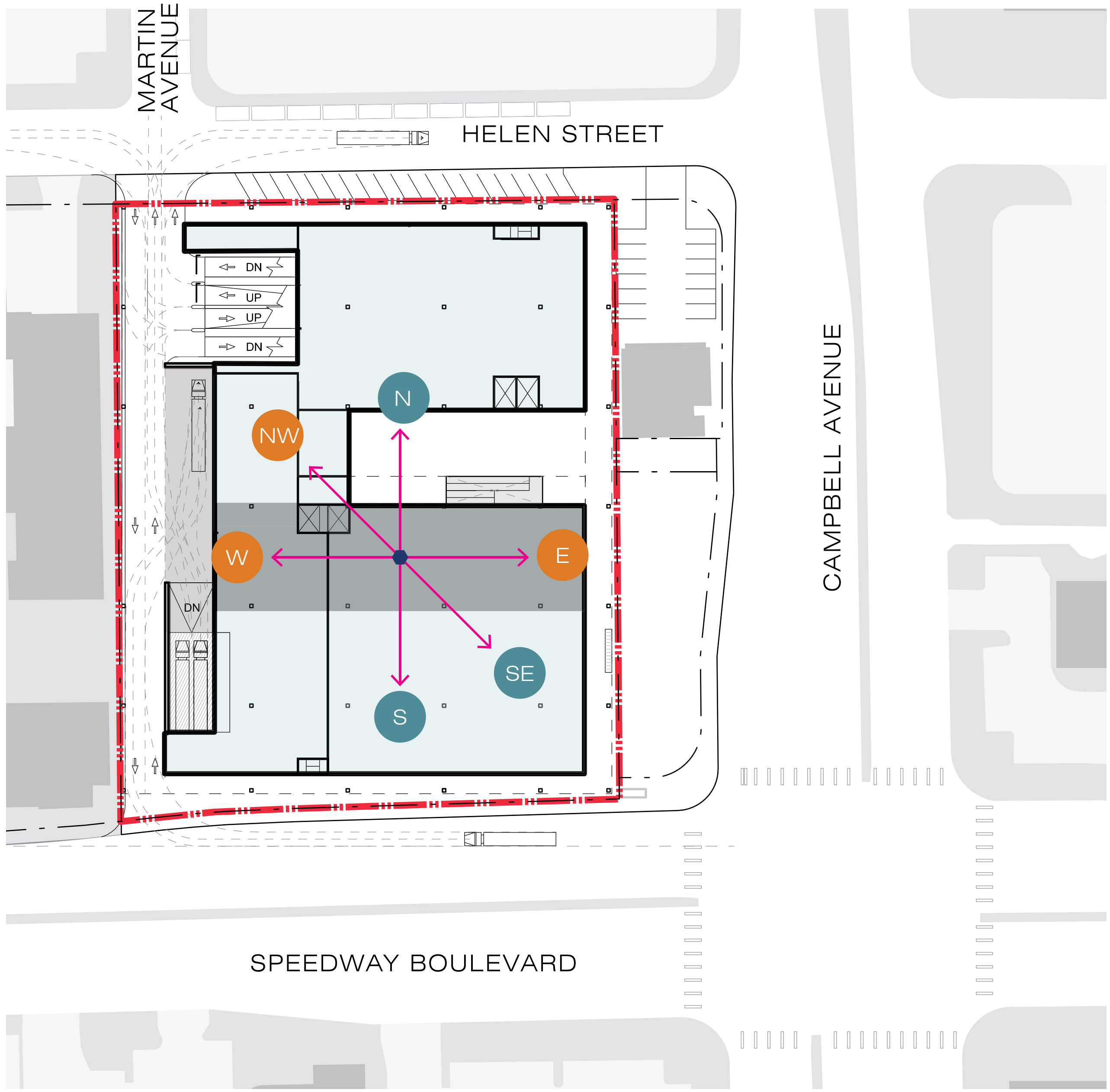
<u>Privacy Impact Results</u>

As mentioned above, the drone photos taken in all compass directions represent clear and unobstructed lines of sight. It should be emphasized that such unfettered views will not be available from the tower due to the outer façade of louvers that will intervene in the outward lines of sight from the building high-rise.

Even with that being the case, the representative drone photos provided in Exhibit No. 31 illustrate the extent to which existing mature vegetation throughout the outlying neighborhoods serves to already significantly screen the majority of residential windows and outdoor private spaces therein. In material terms, the level of potential privacy invasion from the PAD tower is minimal even in the unfettered views portrayed in the drone photos. Visibility of the residential areas and individual residences from the proposed tower will be even further reduced by: 1) the aforementioned outer building façade comprised of horizontal and vertical louvers; and 2) the fact that outward views are primarily available only from the north and south elevations of the tower, with only corner units having views from its east or west elevations.

The drone photos in Exhibit No. 31 below were chosen as a representative sample of outward views into the most visible residential areas. For those desiring to review the entire set of photos in all directions and at all three (3) of the prescribed heights, they are provided as Appendix B of this PAD.

Exhibit No. 31 | Privacy Study Summary Representative Views From Varying Building Heights



LEGEND

PAD DISTRICT BOUNDARY

PROPOSED BUILDING ENVELOPE

HIGH-RISE ELEMENT

PHOTO TAKEN FROM 165' HEIGHT

PHOTO TAKEN FROM 250' HEIGHT

DRONE PHOTO ORIGIN AND DIRECTION

Exhibit No. 31 | Privacy Study Summary Representative Views From Varying Building Heights [continued]

Looking North
(from ~165' height)

Looking East
(from ~250' height)

Looking Southeast
(from ~165' height)

Looking South
(from ~165' height)

Looking West
(from ~250' height)

Looking Northwest
(from ~250' height)

IV.C.2 Sun Reflection and Shadow Study

The UAP amendment process also raised concerns in the minds of some regarding the shadow impacts resulting from the proposed building volume, as well as the potential for the reflection of sunlight into the nearby residential areas. This Section addresses the analysis that was undertaken to address these matters and the resultant findings.

a. Methodology

With respect to the matter of shading, the shadow envelope of the proposed building volume for the entire calendar year was plotted on a rectified aerial photograph using Google SketchUp and Rhino software. The northern and southern limits of the overall shadow envelope are defined by the winter (21 December) and summer (21 June) solstices, respectively. The east-west "center" of the envelope is reflective of the Spring and Fall equinoxes (21 March, 20 September). For these four defining dates, shadow patterns were calculated and mapped for every hour, from approximately thirty (30) minutes after sunrise to approximately thirty (30) minutes before sunset.

With respect to reflectivity, the extent of reflection from the structure was calculated and plotted for the same winter/summer solstices and the Spring/Fall equinoxes. The reflection envelopes were promulgated under two circumstances for each date: 1) that reflection which would emanate from the building without an outer façade of vertical/horizontal shade louvers; and 2) that which would emanate with the proposed façade of building louvers in place.

b. Results

Shadow Study Results

Exhibit No. 32 provides a graphic summary of findings under the winter solstice, summer solstice, and equinox conditions. These three illustrations outline the total extent of the shadow envelope occurring under each condition. Also provided are duration times for the shade occurring throughout the day as the sun travels across the sky. It must be emphasized that the overall shadow envelopes depicted here are just that: the boundaries of the total area that will receive shade at some point in the day during the winter/summer solstice or equinox condition.

As the sun is always in continual movement, the shade impact of the proposed Project at any point in time will be that of a narrow sliver that migrates through the overall shade envelope over the course of the day. The duration times indicated on the exhibits (e.g. 2 hours, 1 hour, 15 minutes) communicate the maximum length of time shade will be sustained within a given area.

The practical shade and shadow effects of the PAD's building volume are clear: the most significant shading and longest duration times all affect that area which is in immediate proximity to the proposed buildings, all of which is comprised of non-residential uses. Outlying residential neighborhoods experience the weakest shadowing and shortest duration times.

Reflectivity Study Results

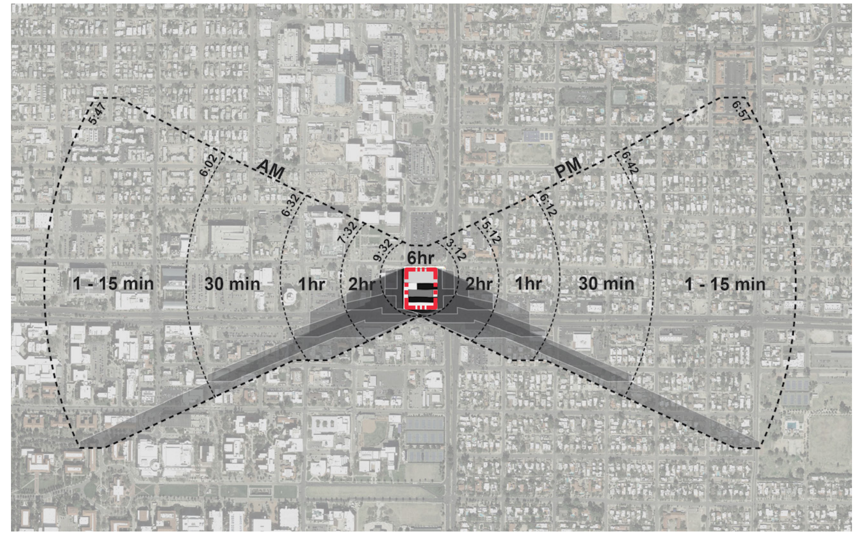
Exhibit Nos. 33, 34 and 35 respectively provide graphic summaries of the reflections occurring during the winter/summer solstices and the equinox. Two reflectivity envelopes are illustrated for each of these three conditions: one without any exterior façade of louvers on the proposed building, and one with the proposed exterior louvers in place. Duration times of the reflection are also provided.

In reviewing these various plots, it is clear that sun reflectivity off of the proposed building face is significantly reduced by the proposed double-façade architecture. The overall geographic extent of the area receiving reflection, as well as the duration times associated with it, are both markedly diminished (upwards of a 50% reduction) over that which would occur with a more traditional building face.

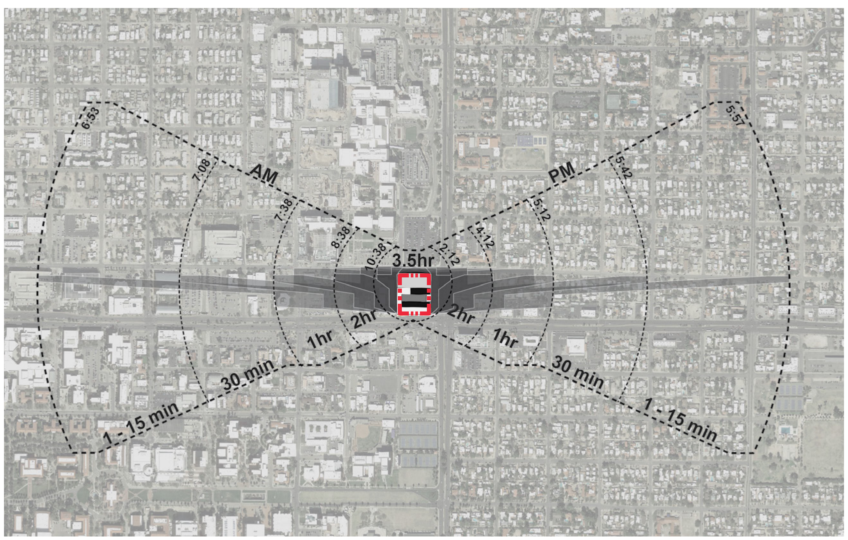
As was also the case with shade and shadow, the most intense reflectivity and longest duration times all affect that geographic area which is in closest proximity to the proposed Project (all of which is comprised of non-residential uses). Outlying residential neighborhoods experience the weakest reflectivity and shortest duration times.

Winter Solstice , December 21

Summer Solstice, June 21



Equinox, March 21 and September 20



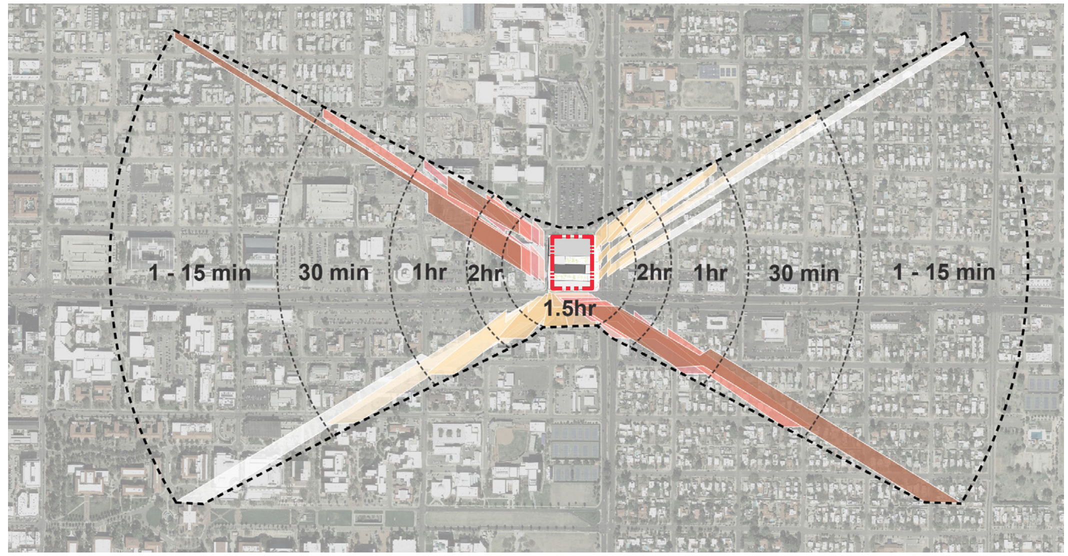
LEGEND

N

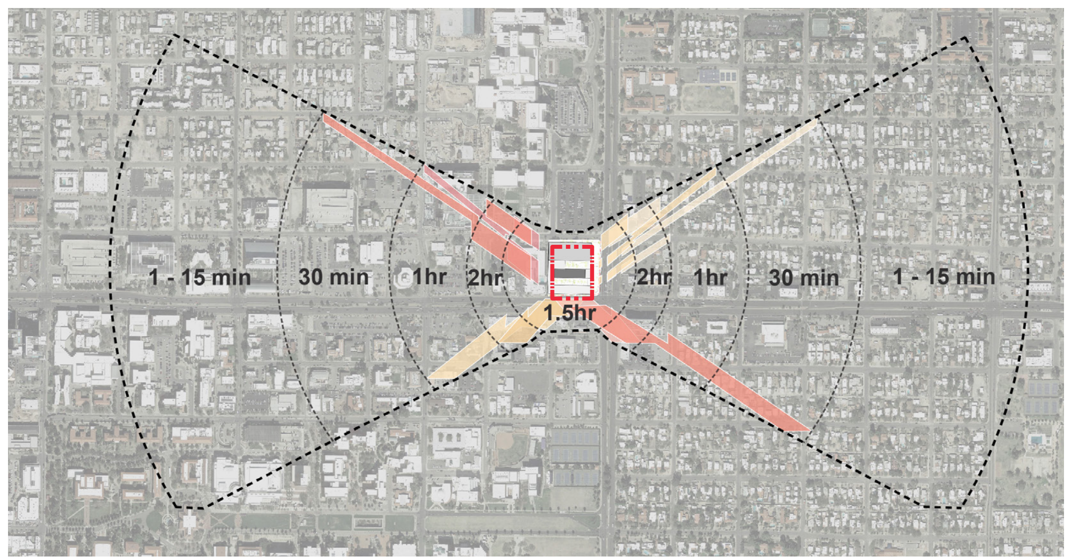
- PAD DISTRICT BOUNDARY
- TOTAL AREA OF SHADOW OVER THE COURSE OF THE ENTIRE DAY
- MAXIMUM YEARLY SHADOW RANGE
- TIME OF DAY MARKER

Exhibit No. 33 | Reflection Study: Winter Solstice, With and Without Louvers

Extent of Reflection Without Exterior Louvers



Reduced Reflection With Exterior Louvers In Place



LEGEND

N

PAD DISTRICT BOUNDARY

TOTAL ANNUAL LIMIT OF REFLECTION

6:55 AM

7:10 AM

7:40 AM

8:40 AM

10:40 AM

2:22 PM

4:22 PM

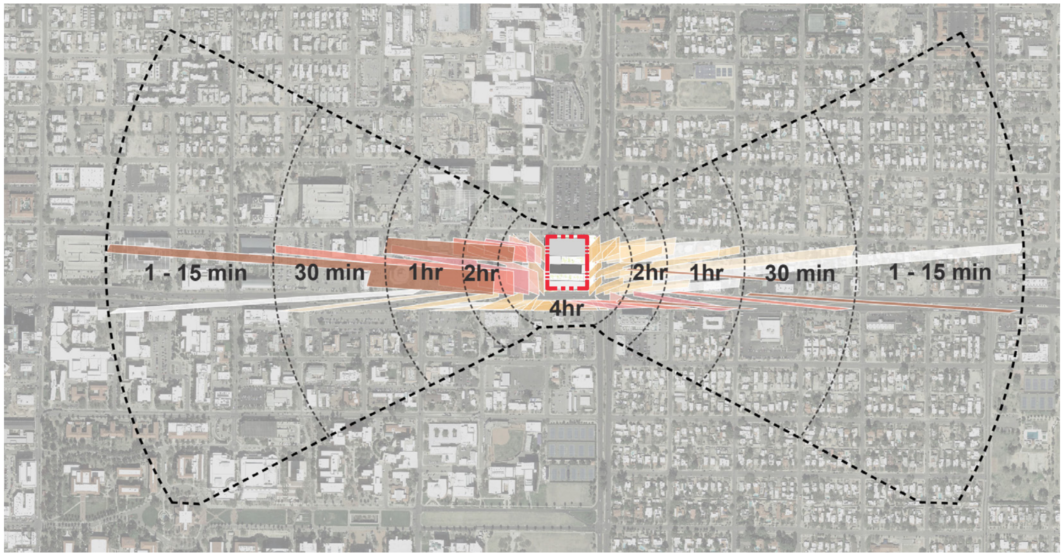
5:22 PM

5:52 PM

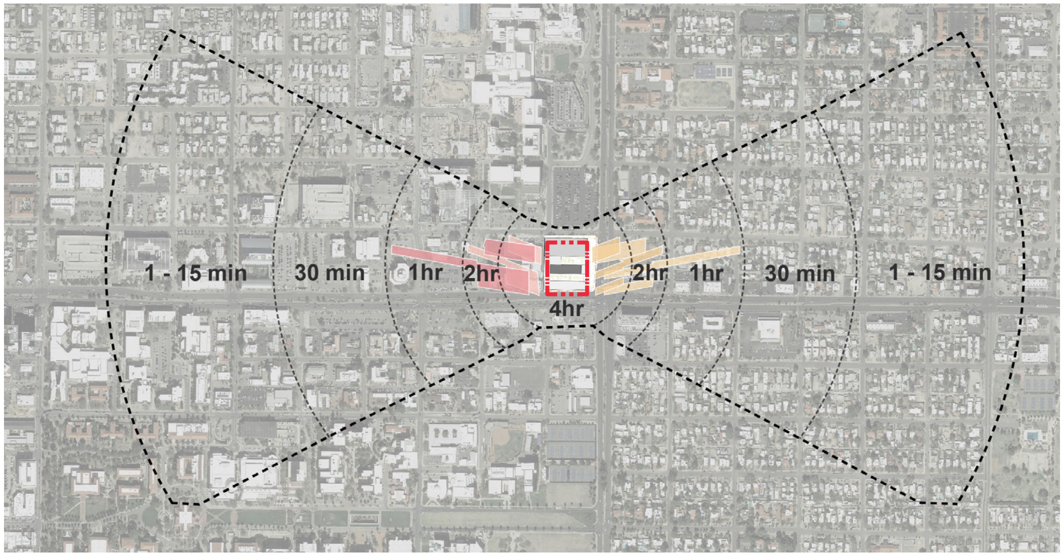
6:07 PM

Exhibit No. 34 | Reflection Study: Equinox, With and Without Louvers

Extent of Reflection Without Exterior Louvers



Reduced Reflection With Exterior Louvers In Place

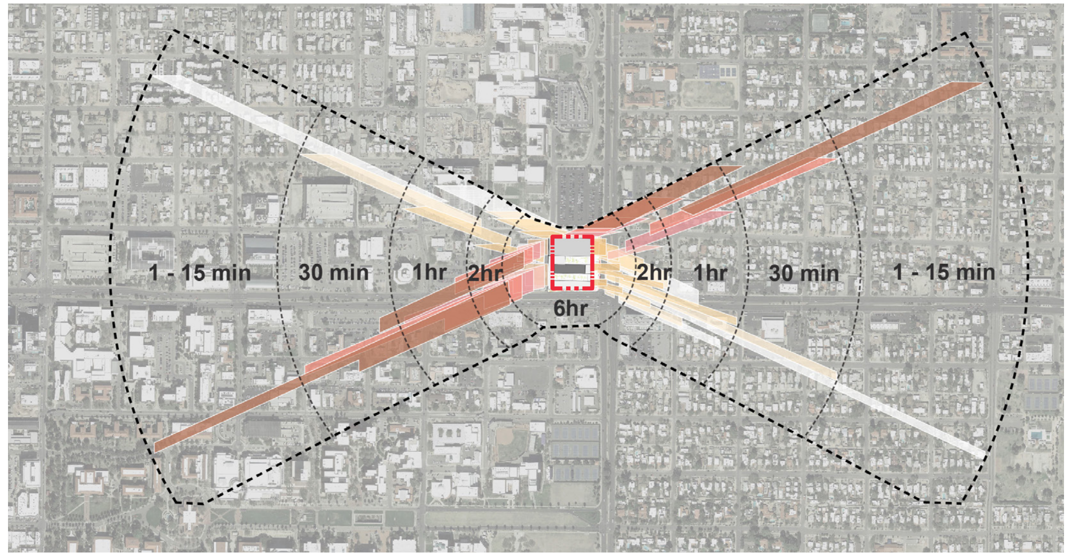


LEGEND N

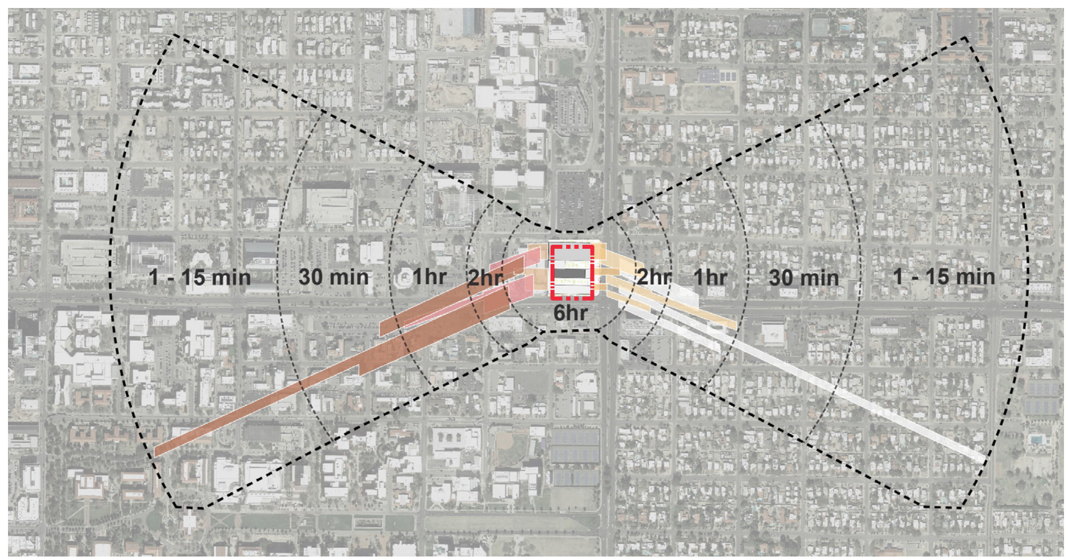
- PAD DISTRICT BOUNDARY
- TOTAL ANNUAL LIMIT OF REFLECTION
- 6:55 AM
- 7:10 AM
- 7:40 AM
- 8:40 AM
- 10:40 AM
- 2:22 PM
- 4:22 PM
- 5:22 PM
- 5:52 PM
- 6:07 PM

Exhibit No. 35 | Reflection Study: Summer Solstice, With and Without Louvers

Extent of Reflection Without Exterior Louvers



Reduced Reflection With Exterior Louvers In Place



LEGEND

N

- PAD DISTRICT BOUNDARY
- TOTAL ANNUAL LIMIT OF REFLECTION
- 5:45 AM
- 6:00 AM
- 6:30 AM
- 7:30 AM
- 9:30 AM
- 3:15 PM
- 5:15 PM
- 6:15 PM
- 6:45 PM
- 7:00 PM

IV.C.3 Helicopter Flight Path Impacts Study

The proposed PAD will have no impact on the routing or flight path of medical transport helicopters to and from the Banner-University Medical Center (BUMC) hospital.

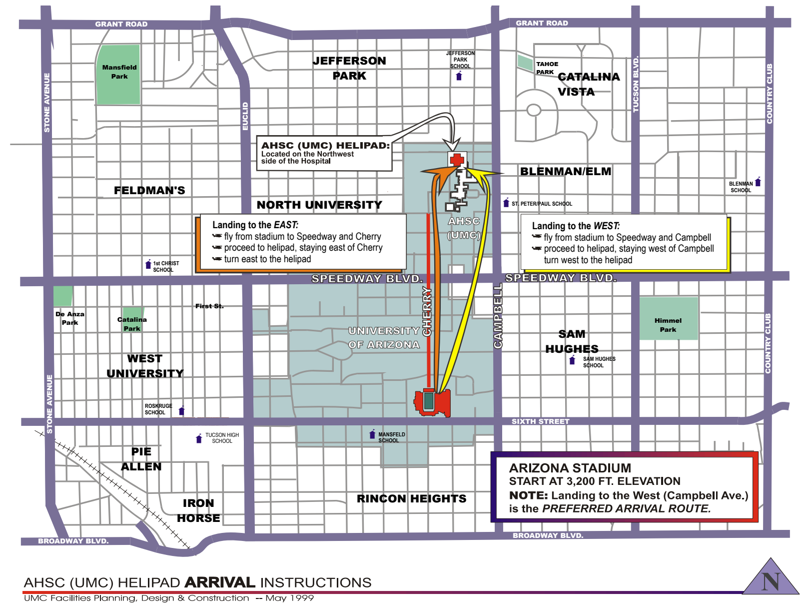
a. Existing Routing Per Approved MOU

During the PAD process for Banner-University Medical Center (BUMC), that developer pledged to honor and operate in full accordance with the existing Memorandum of Understanding (MOU) that was already in place between University Medical Center and the Jefferson Park Neighborhood to the immediate north.

Exhibit No. 36 is taken directly from the aforementioned MOU. The proposed PAD Project and its associated vertical elements will not disrupt the established arrival and departure routes as depicted thereon. While the arrival route for "Landing to the West" depicted on the exhibit graphically appears to be near the proposed PAD Site, there is more than sufficient horizontal separation between the arrival route and the PAD's proposed high-rise element to ensure avoidance by incoming helicopters.

More recently, a temporary flight path has been established, in coordination with the Jefferson Park Neighborhood Association, to address the significant on-going construction that is occurring with the Banner-University Medical Center (BUMC) Hospital, as well as with the new Health Sciences Innovation Building and the Bioscience Research Laboratory on the Arizona Health Sciences Center (AHSC) campus. The numerous construction cranes and active vertical elements associated with this construction have yielded the new, temporary flight pattern that is illustrated in Exhibit No. 37. This temporary routing may also stay in force beyond the completion of construction, until such time that the new helipad location is in place atop the new BUMC Hospital. The proposed PAD Project will have no impact on these revised arrival and departure paths.

Exhibit No. 36 | Existing Helicopter Flight Patterns (Excerpt from MOU)



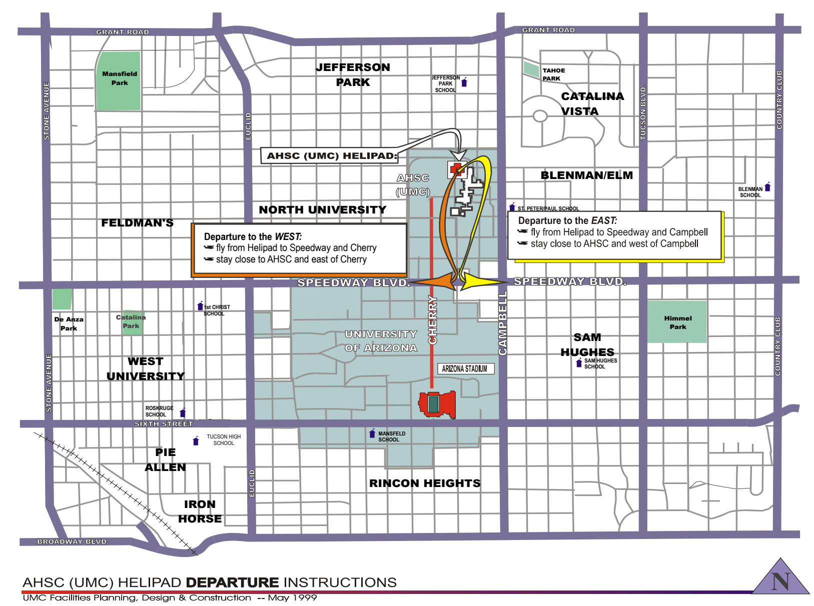
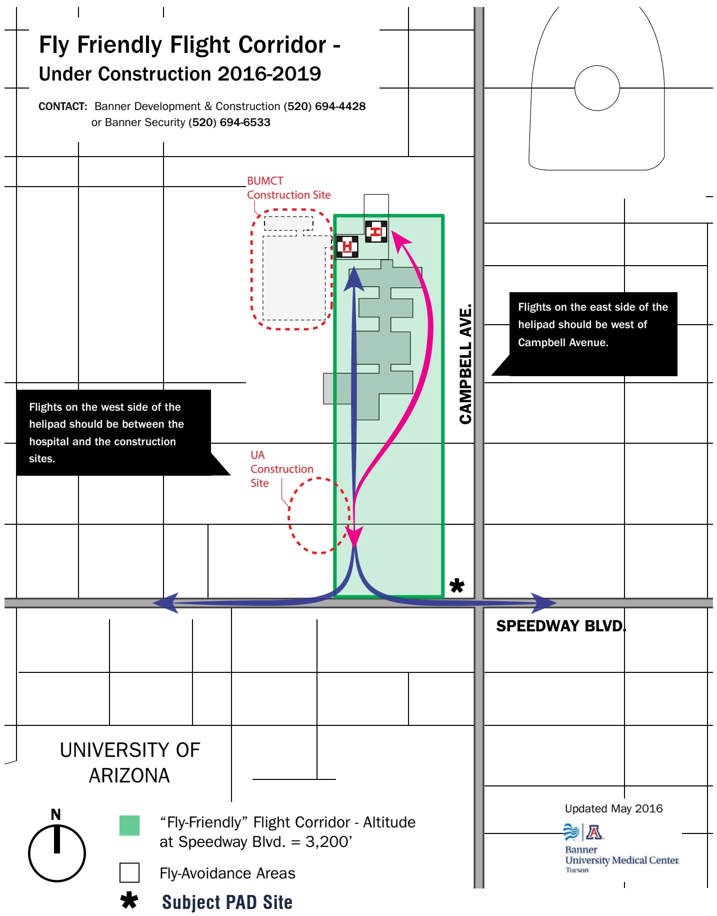


Exhibit No. 37 | Temporary Helicopter Flight Patterns During Construction



b. Noise Reflectivity/Reverberation Upon Neighborhoods

An independent acoustical analysis was completed to address neighbor concerns regarding the potential for increase in helicopter noise and/or reverberation upon residential areas. These concerns pertained to the introduction of a twenty-story high-rise building near the flight paths of the incoming and outgoing helicopters.

The basic orientation of the proposed high-rise is such that its predominant elevations face north and south, with only a narrow face oriented eastward in the direction of the nearest residential areas. Given this orientation and the slender nature of the east facade, only the north and south building faces afford any potential for significant sound reflection.

In addition, the helicopter's flying altitude/elevation at Speedway Boulevard must be kept in mind. The prescribed flying altitude is 3,200 feet. The ground elevation of the PAD Site is approximately 2,500 feet and its high-rise is limited to a height of 250 feet, placing its top at an elevation of approximately 2,750 feet. With this in mind, any incoming helicopter, even if directly overhead, will pass the high-rise significantly above its highest point when in compliance with the prescribed flying altitude.

To ensure a worst-case analysis with the acoustical study, the proposed high-rise has been analyzed as a perfect reflector of sound and no atmospheric sound absorption has been contemplated. The basic flight paths used in the analysis are the incoming and outgoing ones under the existing Memorandum of Understanding (MOU), as the incoming path therein traverses closest to the proposed high-rise element. To even further ensure maximum sound potential, the incoming flight was routed and analyzed as proceeding directly over the proposed high-rise (see Exhibit No. 38).

The following points summarize the methodology and findings of the acoustical analysis:

- Four (4) ground-level field points were analyzed for impacts (labeled G1 through G4 on Exhibit No. 38), representing the closest residential properties to the east. Two (2) of the field points are located north of Speedway Boulevard within the Blenman-Elm neighborhood, while the other two (2) are located south of Speedway within Sam Hughes.
- At the prescribed 8.0-degree angle of descent, the helicopters would pass the proposed high-rise significantly above the building's highest point. This relationship ensures that any helicopter noise will be reflected downward, impinging upon the properties nearest to the building base. Exhibit No. 38 depicts this incoming flight scenario and illustrates that the primary receiver of reflected sound will be the A-Loft Hotel at the southeast corner of the Speedway/Campbell intersection.
- In the incoming flight condition, the resultant change in sound pressure level (SPL) at the four (4) analysis field points is insignificant, with the worst-case increase at any of the field

points being 1.1 decibels (field point G4) over the existing flight/noise condition. This increase is imperceptible to the unaided ear.

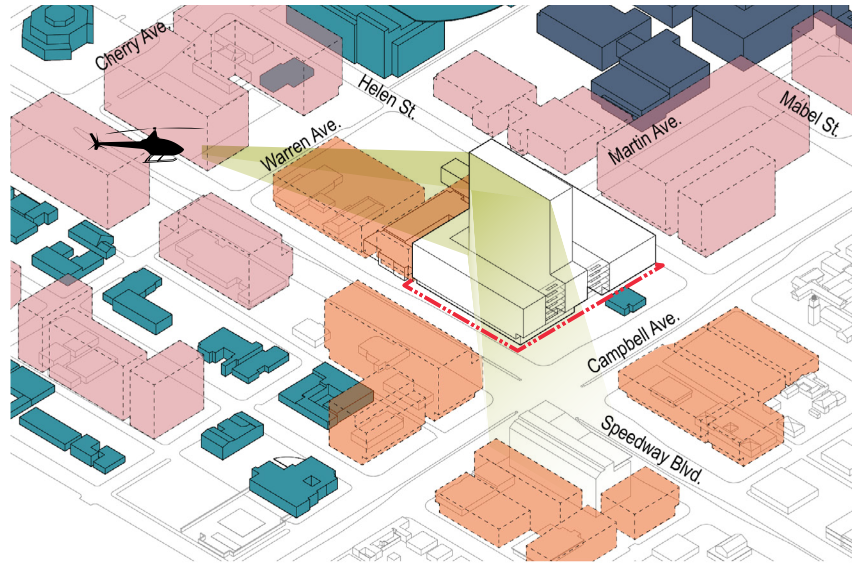
- The same basic result is true of the departure flight. Given its traverse further to the west, the worst-case increase at the four (4) analysis field points is 0.8 decibels (field point G2) over the existing flight/noise condition.

With respect to reverberation, the acoustic study indicates that there is no potential for same given the lack of sufficient other structures in the immediate area of similar height or mass as that of the proposed high-rise. Reverberation requires a "canyon" or other form of contained sound environment necessary for reverberation to occur. No such condition will be created with the new high-rise.

For those readers desiring more detail, the entire acoustical study summarized above has been included in Appendix C of this PAD.

Exhibit No. 38 | Acoustic Study Particulars

SOUND REFLECTION



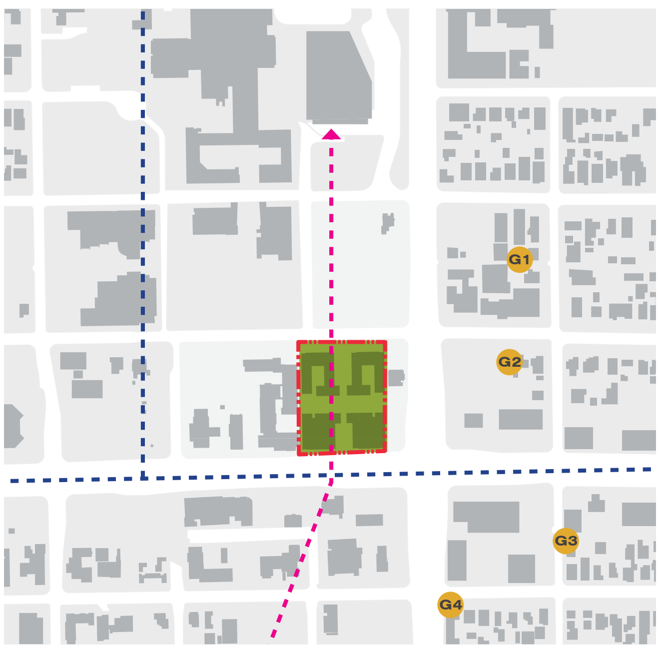
Downward Sound Reflection from the Incoming Flight Scenario

LEGEND

PAD DISTRICT BOUNDARY
PROPOSED SPEEDWAY + CAMPBELL GATEWAY PROJECT
HELICOPTER SOUND REFLECTION
UNIVERSITY OF ARIZONA, EXISTING BUILDINGS
ARIZONA HEALTH SCIENCES/ABOR, EXISTING BUILDINGS
POTENTIAL FUTURE BUILD-OUT AT SPEEDWAY/ CAMPBELL INTERSECTION

* UA 2009 COMPREHENSIVE CAMPUS PLAN; PROPOSED MASSING.

FLIGHT PATHS



Incoming/Outgoing Flight Paths for Acoustical Analysis and Location of Ground-Level Field Points

LEGEND

PAD DISTRICT BOUNDARY
SOUTHERN DEPARTURE
EASTERN APPROACH
FIELD POINTS ANALYZED

IV.C.4 Potential Build-out at Speedway/Campbell Intersection

It became apparent during the UAP amendment process that some manner of build-out visioning for the larger Speedway/Campbell intersection should commence. Given the nodal significance, key gateway location, and sheer traffic volume that characterizes the Speedway/Campbell location, it is commonly held that this is one of the most underutilized set of properties anywhere in the Tucson metropolitan region. The reality of this sentiment was further reinforced at the time the City of Tucson underwent its extensive efforts in visioning and planning for the Tucson Streetcar, wherein this intersection was highlighted as a prime location for the kind of intensive redevelopment that would robustly feed and support the streetcar's long-term viability.

The City's *Tucson Modern Streetcar Land Use and Development Implementation Plan* took things one step further, formally recommending that the City's underlying regulatory area plans and nearby neighborhood plans for the Speedway/Campbell node be amended and incorporate appropriate special-area policies that would promote and encourage high-intensity, urban mixed-used redevelopment at the intersection.

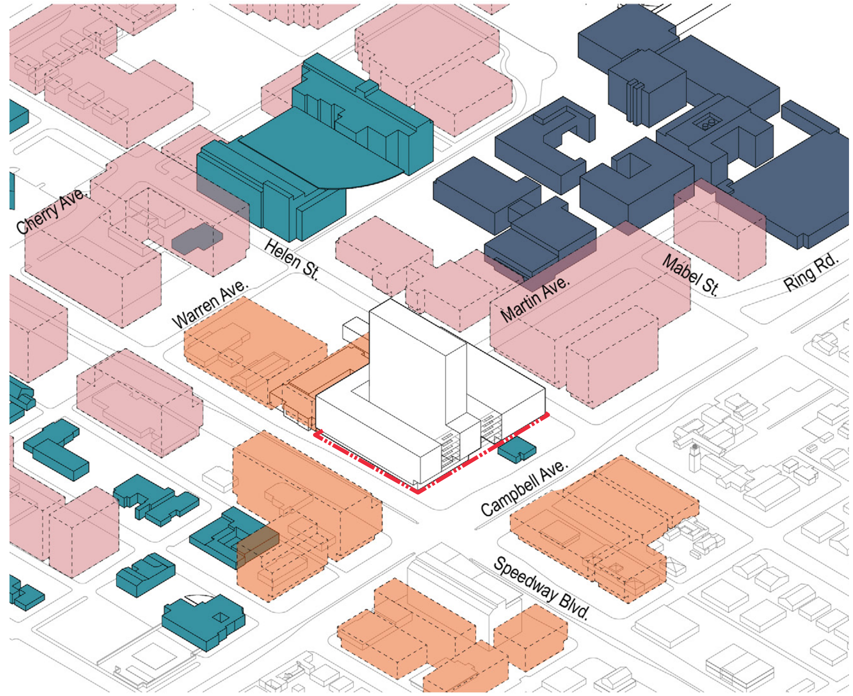
a. Future/Potential Four-Corner Building Massing

Exhibit No. 39 provides a depiction of one potential massing vision for the intersection at build-out. While the ultimate redevelopment of the intersection will obviously depend upon the assembly of multiple parcels by private developers, as well as significant integration with UA's long-term plans for its own holdings, this graphic illustrates reasonable ultimate building volumes and heights for a transportation node of this major import.

In addition to depicting the potential massing/build-out of the intersection itself, this Exhibit also graphically integrates the projected massing from the most recent version of the UA's Comprehensive Campus Plan. This integration provides a sense of the longer-term context that may ultimately characterize the larger surroundings.

At the very least, it is hoped that this massing and build-out visioning acknowledges the importance of this major intersection and spurs productive discussions between City, UA, and the development community. Such interactions can be of great mutual benefit to all concerned and ensure that larger issues such as pedestrian circulation, neighborhood connectivity, and multi-modal functioning are optimized and addressed in comprehensive rather than piecemeal fashion.

Exhibit No. 39 | Speedway/Campbell Intersection Potential Build-out Massing Study



LEGEND

PAD DISTRICT BOUNDARY
PROPOSED SPEEDWAY + CAMPBELL GATEWAY PROJECT
UNIVERSITY OF ARIZONA, EXISTING BUILDINGS
ARIZONA HEALTH SCIENCES/ABOR, EXISTING BUILDINGS
POTENTIAL/FUTURE UA MASSING*
POTENTIAL FUTURE BUILD-OUT AT SPEEDWAY/ CAMPBELL INTERSECTION

* UA 2009 COMPREHENSIVE CAMPUS PLAN; PROPOSED MASSING.

b. Potential Points of Pedestrian/Bike Connectivity

Strong consideration should be given to the notion that the safest and most efficient places for primary neighborhood linkages and arterial crossings may not be at the intersection proper, but at off-corner locations. Multiple factors must be balanced in the overall pedestrian/bike equation for the ultimate intersection; successfully addressing the matter will require input from all affected stakeholders, including the City, UA, private developers, and residents of the nearby residential neighborhoods.

IV.C.5 Neighborhood Liaison Group Interactions on the Above Special Studies

The University Area Plan, as amended in 2014 to include the PAD Site as Sub-Area 1 of the Helen-Warren Station Area (HWSA), expressly required the establishment of a neighborhood liaison group (NLG) comprised of selected representatives from the Jefferson Park, North University, Blenman Elm, Catalina Vista, Sam Hughes, Feldman's, West University, and Campus Farms neighborhood associations. One of the NLG's primary prescribed duties was to review and provide input on the special studies discussed in this Section.

a. Group Structure and Participation in PAD Process

As a result of direct coordination with the leadership of the above neighborhood associations, the NLG is comprised of the following individuals:

- Alice Roe (Blenman-Elm NA)
- Dan Schnoll and/or Alison Hughes (Catalina Vista NA)
- Minette Burgess and/or Joan Hall (Jefferson Park NA)
- Diana Lett (Feldman's NA)
- Grace Rich (North University NA)
- Bill Craig (Sam Hughes NA)
- Chris Gans and/or Richard Mayer (West University NA)
- Bonnie Poulos (Campus Farms NA)
- Ruth Beeker (Miramonte NA)

b. Group Review Regarding The Special Studies

In keeping with the prescriptions and the spirit of the UAP, the owner/developer and their consultant team held a series of formal meetings with the Neighborhood Liaison Group (NLG) to comprehensively discuss the proposed Project and to review the various special studies presented above.

The first NLG meeting was held prior to submittal of the PAD document to PDSD for its required pre-formal review process. Subsequent meetings were held during the pre-formal review as staff's comments became available and were being addressed. To ensure on-going input, dialogue, and sharing of all content with the NLG throughout the PAD preparation process, representatives were provided with a download link for all in-progress draft versions of the PAD document leading up to its final/formal filing in conjunction with the project's rezoning application package.

The initial NLG meeting (held prior to initiating the PDSD pre-formal staff review) provided a comprehensive presentation on the entire Project, as well as a review of the applicable requirements of the UAP. A detailed explanation of each of the above special studies was also presented, including the methodologies employed and the resultant findings. The NLG was free to ask questions on the studies throughout their explanation, of which there were relatively few.

Those wishing to gain a fuller understanding of the specific content and points of discussion at each NLG meeting are referred to Appendix E of this PAD document, wherein a detailed summary of every meeting is provided.

The owner/developer and consultant team also extended the offer to meet with individual neighborhood associations, at their discretion, to further discuss the Project and present it to their individual membership constituencies.

IV.D Transportation Infrastructure

This Section contains substantial detail as to the findings and recommendations of the Traffic Impact Analysis (TIA) that has been prepared in conjunction with this PAD. Nonetheless, this material should be viewed only as a summarization rather than a comprehensive presentation. For those readers desiring complete detail and all of the study's supporting material, the entire TIA is included as Appendix D of this PAD document.

IV.D.1 TIA Scope of Study and Summary of Existing Conditions

As a basis for this TIA, the proposed multi-use development of the PAD Site is projected to contain more than 360,000 square feet of total gross floor area on approximately 2.5 acres. The total square footage will be comprised of a variety of potential uses, including retail shops, a grocery store, residential units, a potential hospitality/hotel component, professional offices, and clinic spaces. Above-ground and sub-surface parking structures will serve the Project.

The scope of the TIA analysis completed for the Project includes the following tasks:

- Develop trip-generation estimates for the proposed development to promulgate an "Analysis Scenario". The Analysis Scenario represents an assumed, best-guess land-use breakdown that is reasonably likely to ultimately comprise the project. It should be emphasized that the exact tenant breakdown and intensity of each proposed use cannot be known at this time, as the final use breakdown will also be driven by market conditions at the time of actual development. Nonetheless, the Analysis Scenario employed herein represents a conservative, yet realistic set of land use assumptions that is a reliable basis for the accurate assessment of post-development impacts.
- Distribute and assign generated post-development traffic to adjacent roadway network.
- Analyze the traffic impacts of the proposed development on surrounding transportation infrastructure. The following signalized intersections are analyzed:
  -Speedway Boulevard at Cherry Avenue
  -Speedway Boulevard at Campbell Avenue
  -Campbell Avenue at Elm Street
- Document transportation improvements and recommendations for each study area intersection and roadway segments.
- Calculate parking requirements considering the various uses and their peak demands.

a. Relevant Public Street Network

The following public streets are within the immediate vicinity of the Project and provide access and circulation to and from it:

<u>Campbell Avenue</u>

Campbell Avenue is the major north-south arterial roadway that lies directly east of the PAD Site. It is a six-lane arterial with raised medians and has a 35 MPH posted speed limit. The road is constructed to the maximum cross-section supported by the City of Tucson Major Streets and Routes Plan.

<u>Speedway Boulevard</u>

Speedway Boulevard is a major east-west arterial roadway that abuts the south boundary of the PAD Site. It is a six-lane arterial roadway with raised medians and has a 35 MPH posted speed limit. The road is constructed to the maximum cross-section supported by the City of Tucson Major Streets and Routes Plan. Delivery, emergency, and handicapped access to the PAD Site will occur to and from this major arterial.

<u>Local Public Streets</u>

- Helen Street serves as a minor east-west collector street that provides access to not only the PAD Site, but to numerous buildings and parking facilities owned by the University of Arizona (UA) and the Arizona Health Sciences Center (AHSC). Helen Street defines the Site's north boundary and will serve as the primary access point for private vehicular traffic to and from the PAD Site.

- Cherry Avenue serves as a minor north-south collector street providing access to the main University of Arizona campus (to the south of Speedway), and to the Banner University Medical Center (north of Speedway). It lies approximately 1/4 mile west of the Site. The intersection of Cherry Avenue and Speedway Boulevard is signalized.
- The 0.8 mile Ring Road within the AHSC (to the immediate north) is a low speed, two-lane corridor with a speed limit of approximately 20 MPH. It essentially forms a loop through AHSC and the Banner-UMC (BUMC) property to the adjacent north. The Road extends from Cherry Avenue, at Drachman Street, then north to Elm Street, and ultimately south to Mabel Street. As part of BUMC's construction of a new hospital (currently in progress), the Ring Road will be realigned with Elm Street to create a new, primary access point and signalized intersection for the hospital and for users within AHSC.

b. Summary of Existing Traffic Conditions

The existing traffic control configurations at the primary intersections within the study area are illustrated in Exhibit No. 40. The signalized intersections of greatest importance to the proposed Project are located at Campbell Avenue/Elm Street, Campbell Avenue/Speedway Boulevard and Speedway Boulevard /Cherry Avenue.

Traffic volume data was previously collected in 2012 as part of studies completed for AHSC and for the Banner University Medical Center (BUMC). Table No. 7 provides a comparison of those 2012 traffic volumes with 2015 and 2016 traffic volumes procured from the Pima Association of Governments' Transportation Data Management System. This comparison shows that the 2015/2016 peak-hour traffic volumes for both the AM and PM period at the study intersections are lower than those collected in 2012. It should be noted, however, that several new buildings are presently under construction nearby, including the new BUMC hospital and two (2) new teaching and research buildings on the AHSC campus. These may ultimately alter traffic patterns within the study area. As such, the more conservative 2012 peak-hour traffic volumes were used as the existing-condition volumes for this TIA.

Exhibit No. 40 | Existing Traffic Control Configuration at Nearby Intersections

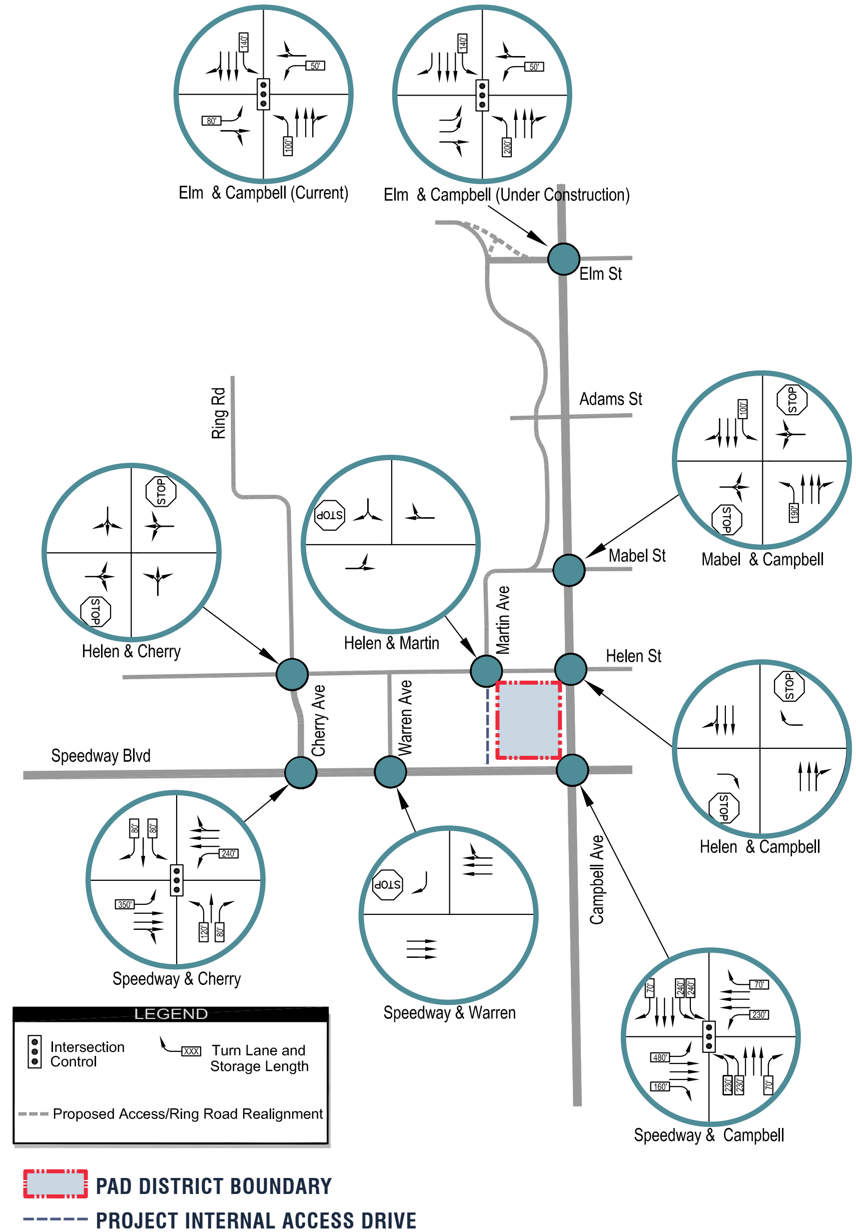


TABLE No. 7 | Comparison Of 2012 and 2015/2016 Traffic Volumes

CAMPBELL AVENUE/ SPEEDWAY BOULEVARD

2012 (APRIL) AND 2016 (OCTOBER) TRAFFIC VOLUMES (INTERSECTION ENTERING VEHICLES)

AM

2012:	6,024 VPH	
2016:	5,521 VPH	8.3% DECREASE

PM

2012:	6,946 VPH	
2016:	6,428 VPH	8.1% DECREASE

CHERRY AVENUE/ SPEEDWAY BOULEVARD

2012 (APRIL) AND 2015 (SEPTEMBER) TRAFFIC VOLUMES (INTERSECTION ENTERING VEHICLES)

AM

2012:	4,061 VPH	
2015:	3,539 VPH	14.7% DECREASE

PM

2012:	4,276 VPH	
2015:	4,306 VPH	~1% DECREASE

CAMPBELL AVENUE/ ELM STREET

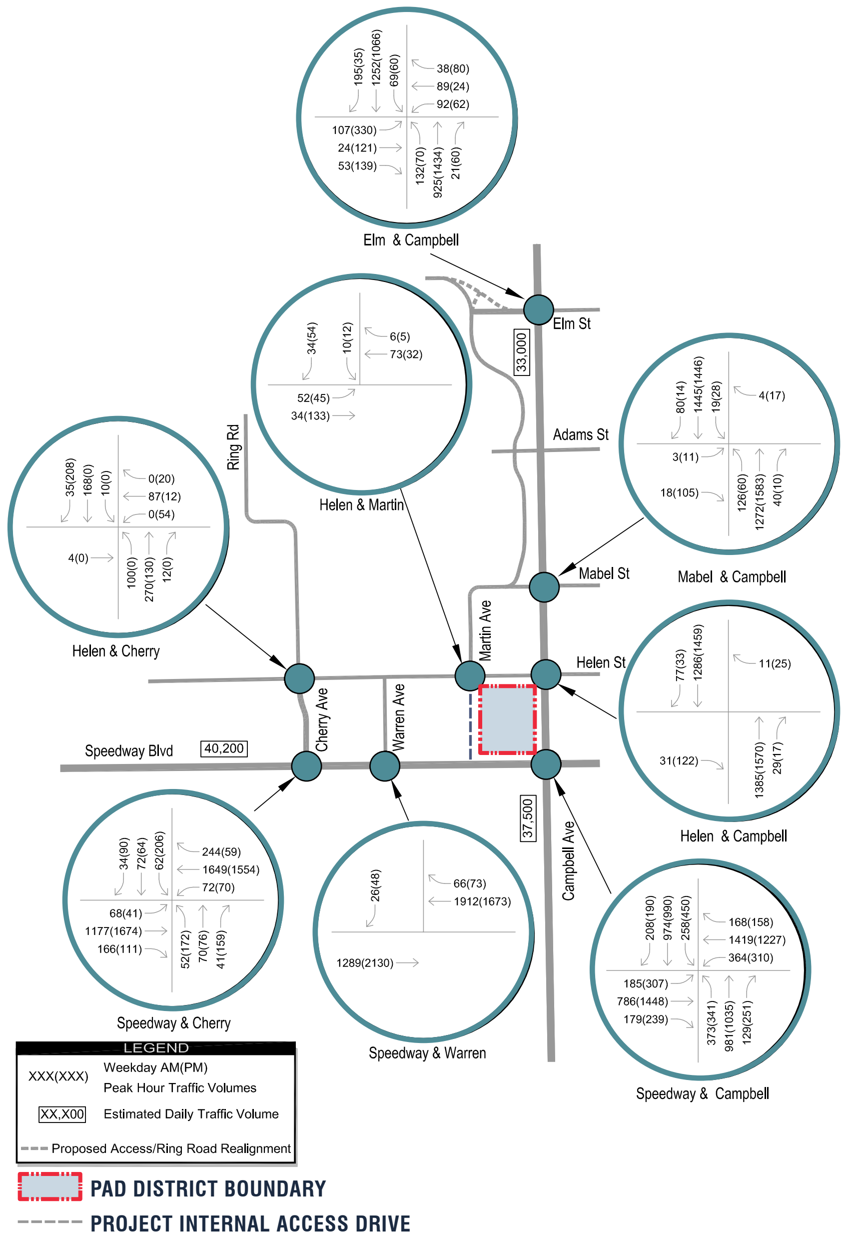
2012 (APRIL) AND 2015 (SEPTEMBER) TRAFFIC VOLUMES (INTERSECTION ENTERING VEHICLES)

PM

2012:	3,481 VPH	12.3% DECREASE
2015:	3,052 VPH	

Exhibit No. 41 below graphically illustrates the existing peak-hour traffic volumes for all through traffic and turning movements at all of the intersections, both major and minor, within the study area.

Exhibit No. 41 | Existing Peak-Hour Traffic Volumes



A capacity analysis of the study area's public streets and intersections was also conducted consistent with the methodologies outlined in the Highway Capacity Manual (HCM) from the Transportation Research Board (2010 version). The HCM employs methodologies to calculate intersection Level of Service (LOS), which is a qualitative assessment of the quantitative effect of factors such as intersection geometry, lane configuration, and traffic volumes. Operating conditions are categorized as "A" through "F," with "A" representing the most favorable conditions and "F" representing the least favorable. The City of Tucson requires that traffic impact upon streets/intersections from all new development be mitigated to a Level of Service "D" or better.

Intersection LOS is computed as a weighted average of vehicle delay. An intersection may have an acceptable overall LOS, but may also have individual movements (through traffic or turning movements) with an unacceptable LOS. As a result, all movements are analyzed individually, and recommendations are made to reduce delay and increase capacity on the critical ones. A summary of the resulting capacity analysis for the peak-hour existing conditions is found in Table No. 8.

The stop-controlled intersection of Mabel Street/Campbell Avenue is the only intersection within the study area that operates at an LOS of "F" in the existing condition. This is due to the delay incurred by vehicles attempting to make a left turn from eastbound Mabel Street onto northbound Campbell Avenue. An LOS of "F" on a minor street that is stop-controlled at an intersection with a major arterial is a common condition in busy urban environments.

c. Public Transit and Multi-Modal Considerations

The PAD Site's location at the intersection of two (2) major arterials provides for a rich alternative-modes environment. The various transit and transportation options available in close proximity to the Site are described below. The Project is designed to ensure direct pedestrian connectivity to this vibrant multi-modal framework.

Sun Tran Bus Routes

Sun Tran provides transit service bordering the PAD Site, with bus stops on both Campbell Avenue and Speedway Boulevard. Routes on Speedway Boulevard include Nos. 4, 5, 102X, 103X, 105X, and 109X. Routes on Campbell Avenue include Nos. 9, 15, 20, and 103X (see Exhibit No. 42).

TABLE No. 8 | Existing Peak-Hour Intersection LOS Summary

LOCAL INTERSECTION	INTERSECTION LOS	INTERSECTION DELAY (S)	TRAFFIC CONTROL
ELM STREET/ CAMPBELL AVENUE			
AM PEAK HOUR	B	18.4	SIGNALIZED
PM PEAK HOUR	C	28.5	
MABEL STREET/ CAMPBELL AVENUE*			
AM PEAK HOUR	F	86.0	UNSIGNALIZED
PM PEAK HOUR	F	147.2	
SPEEDWAY BOULEVARD/ CAMPBELL AVENUE			
AM PEAK HOUR	D	45.8	SIGNALIZED
PM PEAK HOUR	D	52.7	
CHERRY AVENUE/ SPEEDWAY BOULEVARD			
AM PEAK HOUR	C	20.2	SIGNALIZED
PM PEAK HOUR	C	26.9	
HELEN STREET/ CHERRY AVENUE*			
AM PEAK HOUR	C	22.4	UNSIGNALIZED
PM PEAK HOUR	B	10.8	
HELEN STREET/ MARTIN STREET*			
AM PEAK HOUR	A	9.2	UNSIGNALIZED
PM PEAK HOUR	A	9.1	
WARREN AVENUE/ SPEEDWAY BOULEVARD*			
AM PEAK HOUR	D	27.9	UNSIGNALIZED
PM PEAK HOUR	D	25.9	
HELEN STREET/ CAMPBELL AVENUE*			
AM PEAK HOUR	C	18.1	UNSIGNALIZED
PM PEAK HOUR	D	29.4	

*INTERSECTION LOS AND DELAY FOR UNSIGNALIZED INTERSECTIONS IS REPORTED AS "WORST-MOVEMENT LOS"

Exhibit No. 42 | SunTran Bus Service and Nearby Routes

http://www.sunlinkstreetcar.com

Cat Tran Shuttle Service

The University of Arizona Cat Tran system circulates within the UA campus and near the proposed PAD Site. The Green, Yellow, and Purple routes run along Cherry Avenue, approximately 1/4 mile west of the Site (see Exhibit No. 43).

Tucson Streetcar Facilities

Phase I of the City of Tucson's 3.9-mile modern streetcar system was completed in the summer of 2014. The streetcar line begins at Warren Avenue and Helen Street, within a few hundred feet of the PAD Site, and provides direct access to the University of Arizona campus and to the downtown Tucson core, terminating on the west side of I-10 (see Exhibit No. 44). The Streetcar provides 10-15 minute service frequency during the weekday and weekend peak periods, and 20-30 minute frequency during off-peak periods. The system operates from 7:00 am to 10:00 pm on Monday to Thursday, from 7:00 am to 12:00 am on Friday, from 8:00 am to 12:00 am on Saturday, and from 8:00 am to 8:00 pm on Sunday. Phase I of the City of Tucson's 3.9-mile modern streetcar system was completed in the summer of 2014.

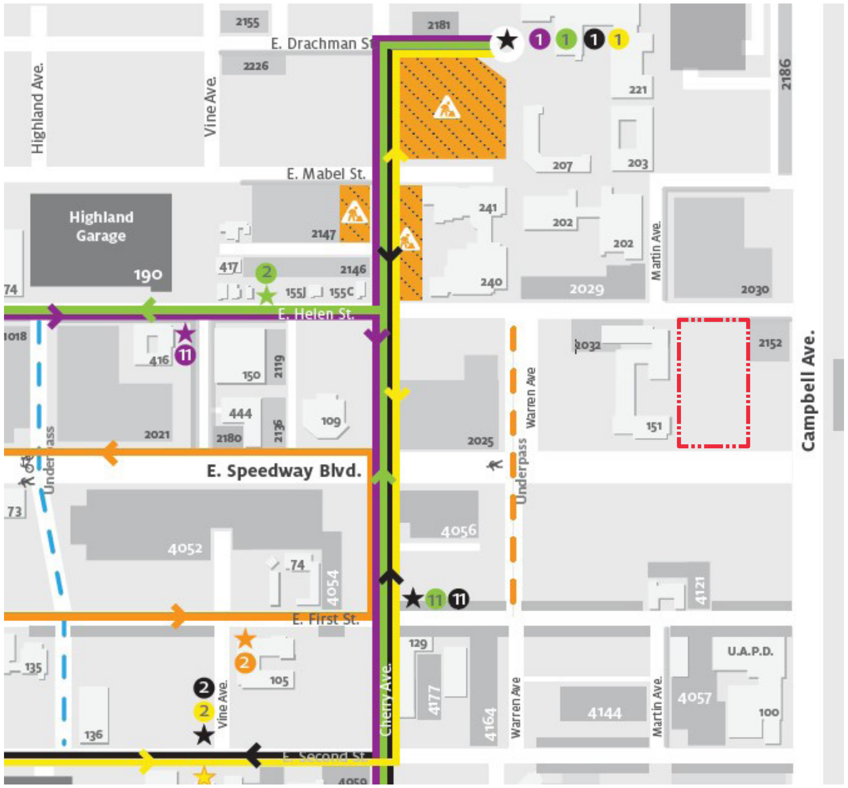
Designated Bike Routes

The PAD Site is surrounded by a robust network of designated bicycle routes and striped bike lanes (see Exhibit No. 45). Both Speedway Boulevard and Campbell Avenue are designated as Bike Routes with Striped Shoulders on the Pima County Regional Bike Map (PCRBM), while Helen Street is designated as a Residential Street.

An existing shared-use path along the Warren Avenue alignment serves as a primary north-south bicycle route for both cyclists and pedestrians. Both Warren Avenue and Highland Avenue feature underpasses that provide safe, grade-separated crossings beneath Speedway Boulevard and facilitate safe and direct access to the UA main Campus. The Warren Avenue underpass also provides passage for the streetcar; bikes must be walked through the underpass along with pedestrians. The Highland Avenue underpass accommodates both pedestrians and bicycle riders, making it a prime southward connective route to the main campus.

According to data obtained from the City of Tucson and UA, there are no current plans for the designation or construction of any new bicycle routes in the study area vicinity.

Exhibit No. 43 | University of Arizona Cat-Tran Shuttle Service



https://parking.arizona.edu/pdf/maps/cat-tran-shuttle-guide-web.pdf

PAD DISTRICT BOUNDARY

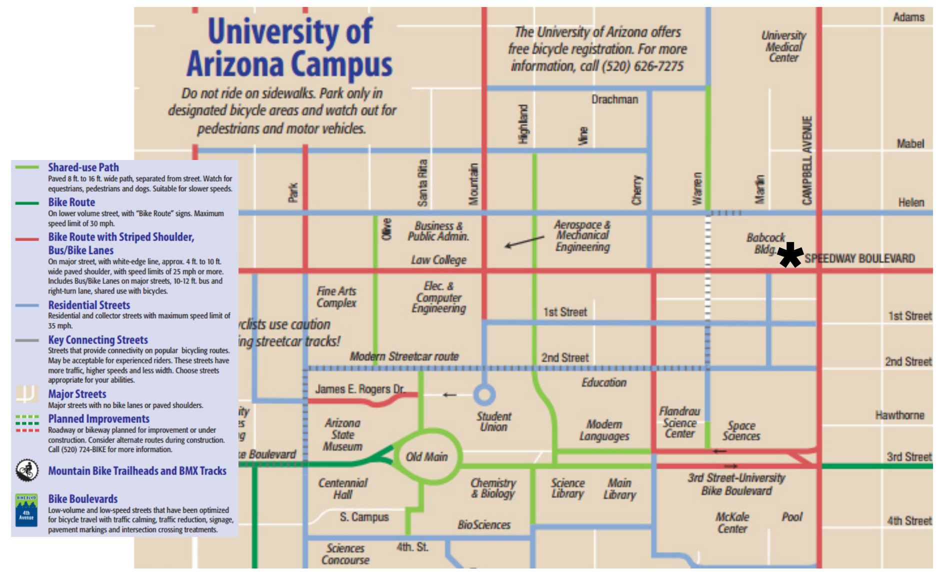
Exhibit No. 44 | Tucson Streetcar (Sunlink System) in Vicinity of PAD Site

http://www.sunlinkstreetcar.com

SUBJECT PAD SITE *

HELEN-WARREN STREETCAR STATION 19

Exhibit No. 45 | Pima County Regional Bike Map/UA Campus Bike Map



https://webcms.pima.gov/UserFiles/Servers/Server_6/File/Government/Transportation/Bike%20Maps/Pima%20County%20bike%20map%20cover%20side%202015.pdf

* SUBJECT PAD SITE

IV.D.2 Post-Development Impacts Analysis and TIA Recommended Modifications

As mentioned earlier, the Analysis Scenario used for this TIA represents an assumed, best-guess land-use breakdown that is reasonably likely to ultimately comprise the project. The exact tenant breakdown and intensity of each proposed use cannot be known at this time, as the final use breakdown will also be driven by market conditions at the time of actual development. Nonetheless, the Analysis Scenario employed herein represents a conservative, yet realistic set of land use assumptions that is a reliable basis for the accurate assessment of post-development impacts. If necessary at the time of actual development, an updated TIA will be prepared and provided to TDOT if the final land-use mix for the Project significantly diverges from that of the Analysis Scenario used herein.

a. Future Conditions Analysis

Traffic impact analysis procedures utilize a four-step process to forecast travel demands. *Trip generation* is the first step in the process; it estimates the number of trips to be "produced" or "generated" by a particular land use type within a specific traffic analysis zone. Traffic analysis zones are also "destinations" of trips, or trip "attractors." Examples of attractors are land uses such as commercial establishments and employment centers; the proposed PAD Project constitutes an attractor.

Trip generation is then followed by *trip distribution* (i.e. from which direction(s) are people traveling), *mode choice* (i.e. how they travel; by vehicle, walking/biking, or by bus/transit), and *route assignment* (which streets they utilize).

Upon completion of this four-step process, a capacity analysis of the roadway network (streets/intersections) is performed to evaluate their operational performance. Each of these steps is described in more detail below.

Project Trip Generation

In addition to the existing traffic volumes on the street network, the analysis of future conditions reflects trips that will be generated from future surrounding developments, including the new BUMC hospital, medical clinics, and associated offices, as well as on-going and future academic and research building construction on the Arizona Health Sciences Center (AHSC) campus.

The trip generation from these nearby developments was referenced in this study from the prior TIA completed for the BUMC project. As such, the background traffic element in this present analysis is represented by the total traffic previously estimated for Phase II of the BUMC development (year 2035), less the traffic that was then estimated (in the prior BUMC TIA) for the anticipated build-out of the subject PAD Site. The total trip generation used to represent the background traffic is therefore summarized in Table No. 9 below. The background trips distributed and assigned within the study area are illustrated in Exhibit No. 46.

Table No. 9 | Background Trip Generation
(Phase 2, 2035, Banner University Medical Center Traffic Study)

AM PEAK			PM PEAK		
IN	OUT	TOTAL	IN	OUT	TOTAL
1,761	436	2,196	412	1,660	2,099

DAILY TOTAL: 19,849

With the above in mind, trip generation was calculated from qualitative measures associated with the proposed PAD's mix of land uses, such as the estimated number of employees of a facility or business, development square footages, and number of residential dwelling or hospitality units. Trip generation estimates reflect the number of trips entering or exiting a site or development during a specified time period (e.g. daily, or during the morning and afternoon peak-periods). The Institute of Transportation Engineers (ITE) Trip Generation Manual contains trip-generation rates developed from an aggregation of more than 4,000 traffic studies and for dozens of land use categories. The ITE trip generation categories, rates, and in-out distributions used for the proposed PAD Project's mix of uses are presented in Table No. 10.

Exhibit No. 46 | Background Peak-Hour Traffic

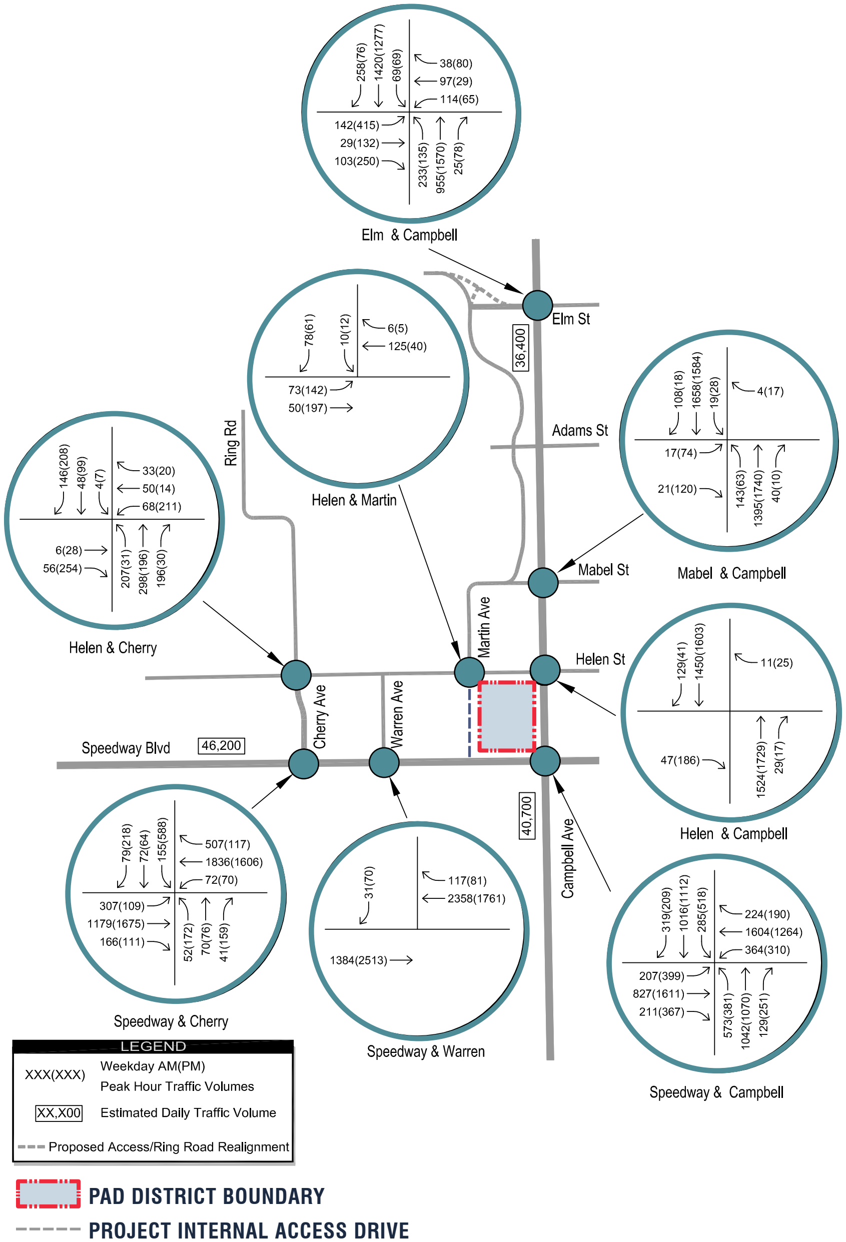


Table No. 10 | Trip Generation Land Uses, ITE Codes and Rates

HIGH-RISE RESIDENTIAL					
ITE 9TH EDITION CATEGORY:	232				
DAILY	T=4.18*(UNITS)	50%	IN	50%	OUT
AM PEAK HOUR	T=0.34*(UNITS)	19%	IN	81%	OUT
PM PEAK HOUR	T=0.78*(UNITS)	62%	IN	38%	OUT
HOTEL					
ITE 9TH EDITION CATEGORY:	310				
DAILY	T=8.17*(ROOMS)	50%	IN	50%	OUT
AM PEAK HOUR	T=0.53*(ROOMS)	59%	IN	41%	OUT
PM PEAK HOUR	T=0.60*(ROOMS)	51%	IN	49%	OUT
MEDICAL-DENTAL OFFICE BUILDING					
ITE 9TH EDITION CATEGORY:	720				
DAILY	T=36.13*(1000 SF)	50%	IN	50%	OUT
AM PEAK HOUR	T=2.39*(1000 SF)	79%	IN	21%	OUT
PM PEAK HOUR	T=3.57*(1000 SF)	28%	IN	72%	OUT
GENERAL OFFICE BUILDING					
ITE 9TH EDITION CATEGORY:	710				
DAILY	T=11.03*(1000 SF)	50%	IN	50%	OUT
AM PEAK HOUR	T=1.56*(1000 SF)	88%	IN	12%	OUT
PM PEAK HOUR	T=1.49*(1000 SF)	28%	IN	72%	OUT
SUPERMARKET					
ITE 9TH EDITION CATEGORY:	850				
DAILY	T=102.24*(1000 SF)	50%	IN	50%	OUT
AM PEAK HOUR	T=3.40*(1000 SF)	62%	IN	38%	OUT
PM PEAK HOUR	T=9.48*(1000 SF)	51%	IN	49%	OUT
HIGH-TURNOVER (SIT-DOWN) RESTAURANT					
ITE 9TH EDITION CATEGORY:	932				
DAILY	T=127.15*(1000 SF)	50%	IN	50%	OUT
AM PEAK HOUR	T=10.81*(1000 SF)	55%	IN	45%	OUT
PM PEAK HOUR	T=9.85*(1000 SF)	60%	IN	40%	OUT

Based on guidance provided by the ITE Trip Generation Manual, the weighted average rate was used to then forecast the trips generated by the Project. Table No. 11 provides a breakdown of the total baseline trip generation for the fully developed PAD Site; this breakdown is based upon the Analysis Scenario discussed earlier in this Section and which is a best-guess land-use breakdown that is reasonably likely to ultimately comprise the Project. While the final magnitude of each individual proposed use cannot be known at this time, the Analysis Scenario employed herein represents a conservative, realistic set of land use assumptions that is a reliable basis for the accurate assessment of post-development impacts.

Pass-by Trips and Internal Capture

It is important to note that, for many land uses, not all trips generated represent a new trip added to the roadway system. A percentage of all trips, referred to as “pass-by”, is from traffic already using the adjacent roadway and entering the Site as an intermediate stop on the way to or from another destination. From ITE data, a supermarket (grocery) land-use would have a pass-by rate of 36%, while a restaurant would have a pass-by rate of 43% in the PM peak period.

In addition, mixed-use developments have trip interactions between the various land-uses within the development itself. An individual makes a trip to a retail establishment, and then makes a trip to a restaurant, without making an additional trip on the adjacent street network.

To account for these types of internal trips within a multi-use development, internal capture rates were applied based on the National Cooperative Highway Research Program (NCHRP) publication, Enhancing Internal Trip Capture Estimation for Mixed-Use Developments. NCHRP Project 8-51 was used in this TIA. The NCHRP internal capture worksheet is provided in the full TIA report which is provided in Appendix D of this PAD document.

Table No. 11 | Project Trip Generation (Analysis Scenario)

LAND USES (ITE CATEGORY)	INTENSITY	UNITS	DAILY TOTAL	AM PEAK			PM PEAK		
				IN	OUT	TOTAL	IN	OUT	TOTAL
HIGH-RISE RESIDENTIAL (232)	28	DU	118	2	8	10	8	7	11
HOTEL (310)	92	ROOMS	752	29	20	49	28	27	55
MEDICAL-DENTAL OFFICE (720)	155	1000 SF	5,614	293	78	371	155	400	555
GENERAL OFFICE (710)	55	1000 SF	608	76	10	86	14	68	82
SUPERMARKET (850)	40	1000 SF	4,090	84	52	136	193	186	379
HIGH-TURNOVER (SIT-DOWN) RESTAURANT (932)	19	1000 SF	2,472	116	94	210	115	76	191
TOTAL			**13,654**	**600**	**262**	**862**	**513**	**764**	**1,273**

b. Alternative Mode Considerations

The proposed PAD possesses transit-oriented development (TOD) characteristics, being located near the Helen-Warren station of the streetcar, and within the immediate proximity of numerous transit/bus routes, designated bicycle routes, and established pedestrian sidewalks and street crossings.

As such, it is anticipated that a significant percentage of trips to and from the development will be made by walking, bicycling, riding the bus, and/or streetcar. Based on a review of American Community Survey data (their five-year estimate for Year 2011–2015), the Tucson area generally showed an 11% use of alternative transportation modes, and a 36% use of alternative modes for the area within an approximately one-mile radius around the proposed PAD Site (this higher percentage being influenced by students in the UA environment).

The TOD characteristics of the proposed PAD notwithstanding, the Project will also represent a more regional shopping and employment destination. The percentage of individuals who arrive by non-vehicular modes will always vary by land use. Hospitality/hotel patrons, for example, may rely on non-private-vehicle modes, while the percentage of employees and clinic patrons who use alternative modes will be less. It is reasonable to assume that the overall percentage of those who use alternative modes with the proposed PAD Project will be higher than the regional average of 11%, but not as high as the 36% that is reflective of more student usage. Multimodal percentages for the proposed PAD by land use were assumed as follows:

- Residential Use: 15% of trips will arrive by alternative modes. This recognizes that the residents will not primarily be affiliated with Banner Health or the UA/AHSC, but have employment outside the study area.
- Hospitality/Hotel Use: 35% of trips will arrive by alternative modes. Many hotel patrons will choose to stay at the hotel because of its location within walking distance to the UA and the BUMC hospital facilities. In addition, most higher-end hotels now offer a car-share program or on-site rentals that further reduce trip counts. The streetcar will also provide convenient access to the downtown core and other activity centers.
- Retail Land Use: 35% of trips will arrive by alternative modes, this being attendant to the street-level uses allocated for restaurants, retail shops, and grocery. The project area already has a high alternative mode use percentage, such that this portion of the development will attract a significant percentage of those trip types.
- Professional Office and Clinic Land Use: 10% of trips will arrive by alternative modes. It was assumed that these trips would generally originate outside of the project area of greater Tucson rather than be by UA students and faculty, and this alternative mode usage is consistent with the regional average.

A summary of these alternative mode use percentages is provided in Table No. 12. A summary of the trip generation, with the reductions associated with alternative mode usage, is provided in Table No. 13.

Table No. 12 | Alternative Mode Use Percentages of Trips

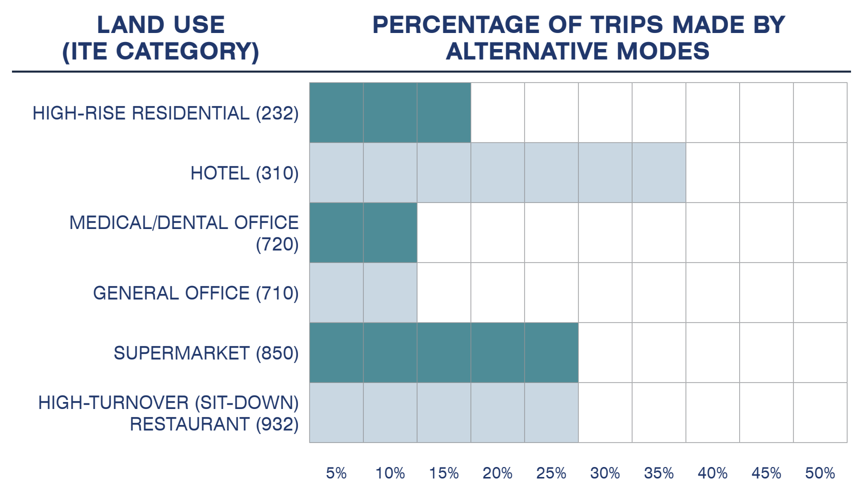


Table No. 13 | Reduced Trip Generation (Discounted for Multi-Modal Usage)

LAND USES (ITE CATEGORY)	INTENSITY	UNITS	DAILY TOTAL*	AM PEAK			PM PEAK		
				IN	OUT	TOTAL	IN	OUT	TOTAL
HIGH-RISE RESIDENTIAL (232)	28	DU	100	2	5	7	3	1	4
HOTEL (310)	92	ROOMS	489	18	3	21	12	11	23
MEDICAL-DENTAL OFFICE (720)	155	1000 SF	5,053	224	29	253	134	346	480
GENERAL OFFICE (710)	55	1000 SF	547	58	4	62	12	59	71
SUPERMARKET (850)	40	1000 SF	3,068	37	23	59	68	68	135
HIGH-TURNOVER (SIT-DOWN) RESTAURANT (932)	19	1000 SF	1,854	58	43	101	31	16	47
TOTAL			**11,110**	**397**	**106**	**503**	**259**	**501**	**760**

*DAILY TOTAL REFLECTS REDUCTIONS FOR MULTI-MODAL ONLY AND DOES NOT REFLECT REDUCTIONS DUE TO PASS-BY TRIPS OR INTERNAL CAPTURE

c. Trip Distribution and Route-Choice Assignment

Directional Trip Distribution

The next step in the analysis process is to estimate from which direction the trips are originating and to which they are traveling. The directional distribution for the proposed PAD Site is based on the most recent traffic volumes from the Pima Association of Government’s (PAG’s) traffic data management system (TDMS). Table No. 14 summarizes the trip distribution anticipated for the proposed PAD Site.

Route Choice/Traffic Assignment

Traffic assignment is the next step of the traffic forecast procedure and involves determining the amount of traffic that will use specific routes within the overall analysis network. The result of traffic assignment is the total number of projected trips, by direction and turning movements, at each of the study’s street intersections. Traffic assignment is determined by considering logical routings, available roadway capacities, left turns at critical intersections, and perceived travel times. The anticipated delay for vehicles making a left-turn at the eastbound approach at Mabel/Campbell

Table No. 14 | Project Trip Distribution

ROUTE	AVERAGE DAILY TRAFFIC (ADT)	PERCENTAGE OF ADT ON ROUTE
CAMPBELL AVENUE (FROM THE NORTH)	36,000	22%
SPEEDWAY BOULEVARD (FROM THE EAST)	40,100	25%
CAMPBELL AVENUE (FROM THE SOUTH)	37,500	23%
SPEEDWAY BOULEVARD (FROM THE WEST)	40,000	25%
PARK AVENUE (FROM THE SOUTH)	9,000	5%
TOTAL		**100%**

was considered in the assignment during the PM peak period (since this was the only intersection with an "F" LOS). It was assumed that 90% would therefore utilize Elm Street, from the Ring Road, or utilize Cherry Avenue for alternative northbound routes. Total peak-hour traffic assignment for the Project-generated traffic and all projected background traffic is shown in Exhibit No. 47.

d. Intersection Operational Analysis

Capacity analysis was performed for each study area intersection for background traffic, as well as for total traffic conditions (i.e. background traffic plus the PAD Project's traffic).

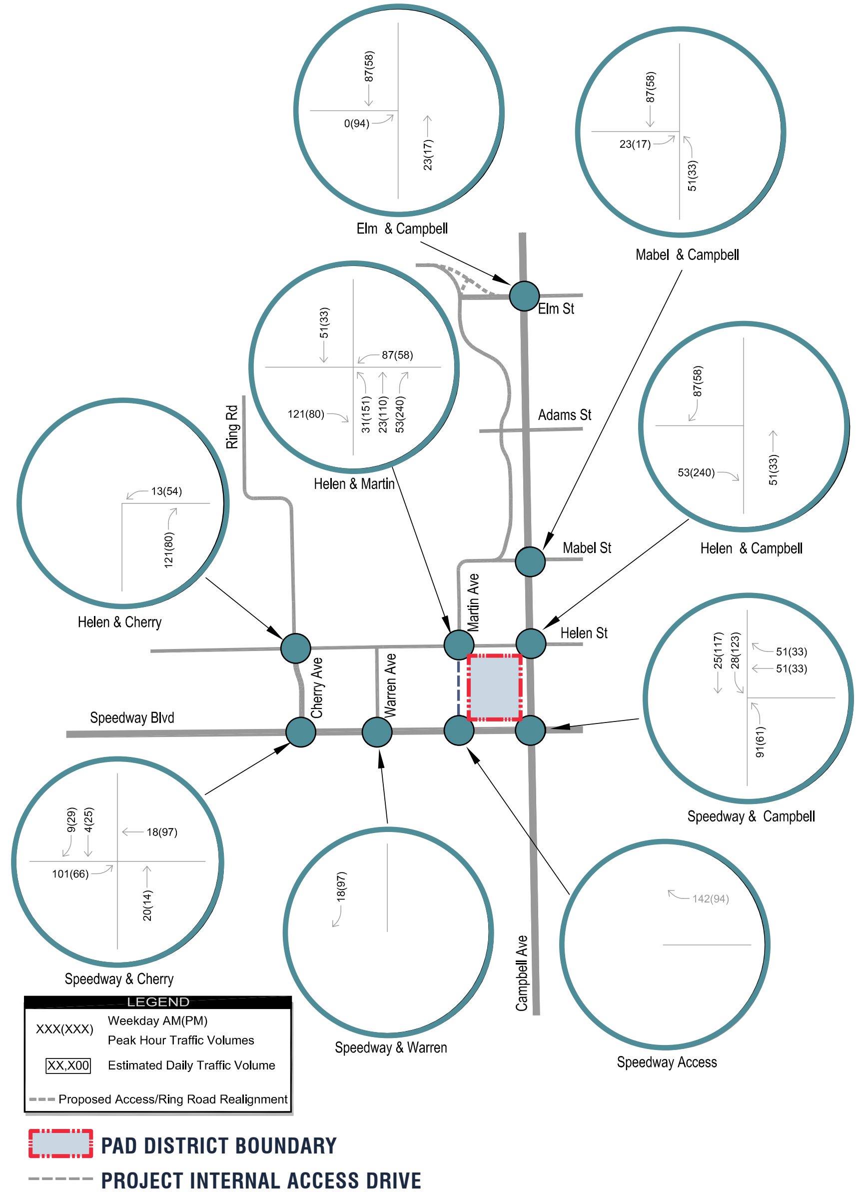
With the addition of the background traffic from the BUMC Phase II hospital development and new UA/AHSC campus facilities alone (i.e. without the additional traffic from the PAD Project), traffic operations at several study area intersections are negatively impacted.

> *Side note: The Elm Street at Campbell Avenue intersection will soon undergo capacity and design improvements by Banner Health. As such, it is assumed in this traffic-operations analysis that this intersection will be operating under the updated configuration, wherein eastbound dual left-turns and a southbound dedicated right-turn lane will be in place.*

The intersection of Cherry Avenue at Speedway Boulevard shows a significant decrease in operational performance during the PM peak period. Over five hundred (500) trips during the peak hours are forecasted to make a southbound left-turn. It is recommended to provide southbound dual left-turn lanes at this approach. During the AM period, eastbound traffic entering into the study area exceed the capacity of the single left-turn lane. An eastbound dual left-turn lane is needed to accommodate the increased vehicular traffic. The southbound dual left-turn movement should be permitted/protected, if sight-distance is adequate.

The Cherry Avenue at Helen Street intersection, currently an east/west two-way stop controlled intersection, is anticipated to operate at LOS "F" with the additional background traffic. To accommodate the AM right-turn traffic, a dedicated northbound right-turn lane is recommended; this also improves westbound operations. In addition, a westbound left-turn lane is recommended, with approximately two hundred (200) linear feet of storage to accommodate left-turn queues.

Exhibit No. 47 | Total (Project and Background) Peak-Hour Traffic Assignment



The Speedway Boulevard at Campbell Avenue intersection shows high delay due to the heavy traffic volumes during peak periods. It is recommended that an additional left-turn lane be constructed for the westbound approach on Speedway Boulevard. The storage length should be extended to two hundred sixty feet (260') for both left-turn lanes.

The Mabel Street at Campbell Avenue intersection has failing operational performance due to eastbound left-turn movements. High delays are common when a minor street intersects with a major arterial possessing the heavy traffic volume that characterizes Campbell Avenue. Additional improvements for the intersection are not recommended.

A summary of intersection performance and LOS ratings under background conditions is provided in Table No. 15.

Total Traffic Intersection Operations

Two tables are presented below providing summaries of intersection performance and LOS ratings under total traffic conditions (i.e. background traffic plus that from the proposed PAD Project). Table 15 reflects LOS performance without the necessary intersection improvements recommended above being in place. Table 15 assumes these recommended necessary intersection improvements are in place.

Table Nos. 16 and 17 illustrate that, with the above recommended intersection improvements being in place, traffic operations LOS levels will improve at the key intersections within the study area. These improvements will ensure an overall LOS of "D" or better at each pertinent signalized intersection (please note, however, that some of individual traffic movements within these intersections do not meet this LOS standard).

Table No. 15 | Background Peak-Hour Traffic LOS Summary

LOCAL INTERSECTION	INTERSECTION LOS	INTERSECTION DELAY (S)	TRAFFIC CONTROL
ELM STREET/ CAMPBELL AVENUE			
AM PEAK HOUR	C	23.7	SIGNALIZED
PM PEAK HOUR	C	30.2	
MABEL STREET/ CAMPBELL AVENUE*			
AM PEAK HOUR	F	181.3	UNSIGNALIZED
PM PEAK HOUR	F	529.4	
SPEEDWAY BOULEVARD/ CAMPBELL AVENUE			
AM PEAK HOUR	D	45.2	SIGNALIZED
PM PEAK HOUR	E	60.7	
CHERRY AVENUE/ SPEEDWAY BOULEVARD			
AM PEAK HOUR	D	35.6	SIGNALIZED
PM PEAK HOUR	E	67.1	
HELEN STREET/ CHERRY AVENUE*			
AM PEAK HOUR	F	92.2	UNSIGNALIZED
PM PEAK HOUR	F	134.6	
HELEN STREET/ MARTIN STREET*			
AM PEAK HOUR	A	9.7	UNSIGNALIZED
PM PEAK HOUR	A	9.8	
WARREN AVENUE/ SPEEDWAY BOULEVARD*			
AM PEAK HOUR	E	45.9	UNSIGNALIZED
PM PEAK HOUR	D	32.2	
HELEN STREET/ CAMPBELL AVENUE*			
AM PEAK HOUR	C	22.2	UNSIGNALIZED
PM PEAK HOUR	F	64.8	

*INTERSECTION LOS AND DELAY FOR UNSIGNALIZED INTERSECTIONS IS REPORTED AS "WORST-MOVEMENT LOS"

Table No. 16 | Total (Project and Background) Peak-Hour LOS Summary (Without Improvements)

LOCAL INTERSECTION	INTERSECTION LOS	INTERSECTION DELAY (S)	TRAFFIC CONTROL
ELM STREET/ CAMPBELL AVENUE			
AM PEAK HOUR	C	24.3	SIGNALIZED
PM PEAK HOUR	C	30.5	
MABEL STREET/ CAMPBELL AVENUE*			
AM PEAK HOUR	F	173.0	UNSIGNALIZED
PM PEAK HOUR	F	762.8	
SPEEDWAY BOULEVARD/ CAMPBELL AVENUE			
AM PEAK HOUR	D	53.7	SIGNALIZED
PM PEAK HOUR	E	68.6	
CHERRY AVENUE/ SPEEDWAY BOULEVARD			
AM PEAK HOUR	D	49.5	SIGNALIZED
PM PEAK HOUR	E	78.3	
HELEN STREET/ CHERRY AVENUE*			
AM PEAK HOUR	F	170.8	UNSIGNALIZED
PM PEAK HOUR	F	284.5	
HELEN STREET/ MARTIN STREET*			
AM PEAK HOUR	A	9.44	UNSIGNALIZED
PM PEAK HOUR	C	23.13	
WARREN AVENUE/ SPEEDWAY BOULEVARD*			
AM PEAK HOUR	F	56.3	UNSIGNALIZED
PM PEAK HOUR	D	34.7	
HELEN STREET/ CAMPBELL AVENUE*			
AM PEAK HOUR	D	31.8	UNSIGNALIZED
PM PEAK HOUR	F	104.4	

*INTERSECTION LOS AND DELAY FOR UNSIGNALIZED INTERSECTIONS IS REPORTED AS "WORST-MOVEMENT LOS"

Table No. 17 | Total (Project and Background) Peak-Hour LOS Summary (With Improvements)

LOCAL INTERSECTION	INTERSECTION LOS	INTERSECTION DELAY (S)	TRAFFIC CONTROL
ELM STREET/ CAMPBELL AVENUE			
AM PEAK HOUR	C	23.7	SIGNALIZED
PM PEAK HOUR	C	30.2	
MABEL STREET/ CAMPBELL AVENUE*			
AM PEAK HOUR	F	181.3	UNSIGNALIZED
PM PEAK HOUR	F	529.4	
SPEEDWAY BOULEVARD/ CAMPBELL AVENUE			
AM PEAK HOUR	D	46.7	SIGNALIZED
PM PEAK HOUR	D	49.5	
CHERRY AVENUE/ SPEEDWAY BOULEVARD			
AM PEAK HOUR	C	27.1	SIGNALIZED
PM PEAK HOUR	C	32.3	
HELEN STREET/ CHERRY AVENUE*			
AM PEAK HOUR	E	37.1	UNSIGNALIZED
PM PEAK HOUR	F	175.5	
HELEN STREET/ MARTIN STREET*			
AM PEAK HOUR	A	9.7	UNSIGNALIZED
PM PEAK HOUR	A	9.8	
WARREN AVENUE/ SPEEDWAY BOULEVARD*			
AM PEAK HOUR	F	56.3	UNSIGNALIZED
PM PEAK HOUR	D	34.7	
HELEN STREET/ CAMPBELL AVENUE*			
AM PEAK HOUR	D	31.8	UNSIGNALIZED
PM PEAK HOUR	F	104.4	

*INTERSECTION LOS AND DELAY FOR UNSIGNALIZED INTERSECTIONS IS REPORTED AS "WORST-MOVEMENT LOS"

e. Recommendations for Transportation Improvements

As shown in Exhibit No. 24 (the PAD Master Site Plan; p. 70-71), the Project proposes new access points off of Speedway Boulevard and Helen Street. Both access points are proposed to be approximately three hundred feet (300') west of Campbell Avenue. The Speedway Boulevard access point will be located in proximity to a Sun Tran bus pullout and will be used for delivery, emergency, and disabled access only, while the Helen Street access will be the Project's primary one for private vehicle ingress/egress. It is recommended that the Helen Street access entry be expanded to accommodate the high inbound/outbound traffic volumes. This includes providing a northbound dedicated left-turn lane exiting the Project and featuring the standard minimum storage length of one hundred twenty feet (120'). All-way stop control is recommended to be established at this entry/intersection with Helen Street. These improvements will, of course, be the responsibility of the PAD developer.

The following Table No. 18 provides recommendations for needed improvements at the study area's respective intersections. These improvements are the result of all projected future traffic increases, including those from background traffic (i.e. the ultimate development of the BUMC campus and the AHSC campus), together with that from the subject PAD Property.

Responsibility for the provision of these various intersection improvements is addressed under the "Comments" heading. With respect to the proposed PAD Project, the associated impact fees will be substantial. It is anticipated that these impact fee monies will fully address the owner/developers' financial responsibility for whatever needed improvements result directly from their project's impact.

Table No. 18 | Recommended Improvements

CAMPBELL AVENUE / ELM STREET

RECOMMENDATIONS
Campbell Avenue at Elm Street will be reconstructed, by others, as part of the Banner University Medical Center hospital/ redevelopment project. Improvements include:

- Improve Elm Street to a 5-lane roadway (2 inbound lanes, and 3 outbound lanes) between Campbell Avenue and Ring Road. One eastbound lane transitions to a dedicated left-turn lane at Elm Street/Campbell Avenue. West of the NE parking garage entrance, Elm Street continues as a 2-lane roadway with a raised median island and left turn lanes.
- Configure the Eastbound through lane to be a shared through/left movement to provide sufficient capacity for left-turning traffic.
- Extend existing northbound left turn lane on Campbell Avenue to 200'.
- Add a dedicated right-turn lane on southbound Campbell Avenue.

COMMENTS
Improvements by others; no additional improvements are recommended.

CAMPBELL AVENUE / MABEL STREET

RECOMMENDATIONS
No improvements recommended.

CAMPBELL AVENUE / HELEN STREET

RECOMMENDATIONS
No improvements recommended.

CAMPBELL AVENUE / SPEEDWAY BOULEVARD

RECOMMENDATIONS

- Add an additional 480' left-turn lane on eastbound Speedway Boulevard (for two total) to accommodate vehicles turning to northbound Campbell Avenue.
- Add an additional 260' left-turn lane on westbound Speedway Boulevard (for two total) to accommodate vehicles turning to southbound Campbell Avenue.

COMMENTS
Recommended as a City of Tucson project, as it is outside of the Speedway + Campbell Gateway Site. It is recommended that impact fees associated with the Project be applied toward these improvements.

SPEEDWAY BOULEVARD / WARREN AVENUE

RECOMMENDATIONS
No improvements recommended.

SPEEDWAY BOULEVARD / CHERRY AVENUE

RECOMMENDATIONS

- Extend left-turn lane on southbound Cherry Avenue to 200' (existing is 80').
- Add an additional 200' left-turn lane (for two total) on southbound Cherry Avenue to accommodate vehicles turning to eastbound Speedway Boulevard.
- Add an additional 350' left-turn lane on eastbound Speedway Boulevard.
- Add new receiving lane on Cherry Avenue.

COMMENTS
These improvements already warranted under Background Conditions.

HELEN STREET / MARTIN AVENUE

RECOMMENDATIONS

- Reconfigure Helen/Martin to four-way intersection.

COMMENTS
Recommended improvements by this PAD.

HELEN STREET / CHERRY AVENUE

RECOMMENDATIONS

- Add a 150' left-turn lane on westbound Helen street.
- Restripe Cherry Avenue to add a 120' dedicated right-turn lane on northbound Cherry Avenue.

COMMENTS
These improvements already warranted under Background Conditions.

IV.E Conceptual Drainage Solution and Associated Improvements

This Section presents a conceptual master drainage plan for the PAD Site. A full hydrology and hydraulic report will be prepared for review in conjunction with the Development Package. That full report will detail all proposed drainage infrastructure and the water harvesting measures.

IV.E.1 Master Drainage Plan

The Master Drainage Plan for the PAD Site focuses on three (3) primary objectives:

1. Discharge the on-site post-development stormwater runoff in a manner that is consistent with the objectives of the prior Banner-UMC PAD to the north, and which utilizes the existing and proposed drainage infrastructure designed within it to reduce the downstream 100-year stormwater flows that have historically impacted the Jefferson Park Neighborhood.
2. Collect, convey, and discharge on-site stormwater runoff from the PAD Site in a manner that is consistent with existing flow patterns.
3. In recognition of the aforementioned historical drainage issues impacting downstream neighborhoods, evaluate potential supplemental methods of stormwater containment, including both passive and active water harvesting features.

The Master Drainage Plan for the Banner-UMC PAD (City of Tucson Rezoning Case No. C9-15-06), located approximately one-half mile north of the Subject Property, provided a framework of drainage-related improvements and proposed mitigation measures to address historical drainage issues impacting the downstream Jefferson Park neighborhood. This mitigation framework, which included a network of new retention/detention basins, was implemented as part of the formal Development Package and Final Drainage Report for the Banner-UMC PAD that was approved by the City's Planning & Development Services Department (PDSD). These elements will be built in accordance with the project's construction schedule for the new BUMC Hospital, which is already well underway.

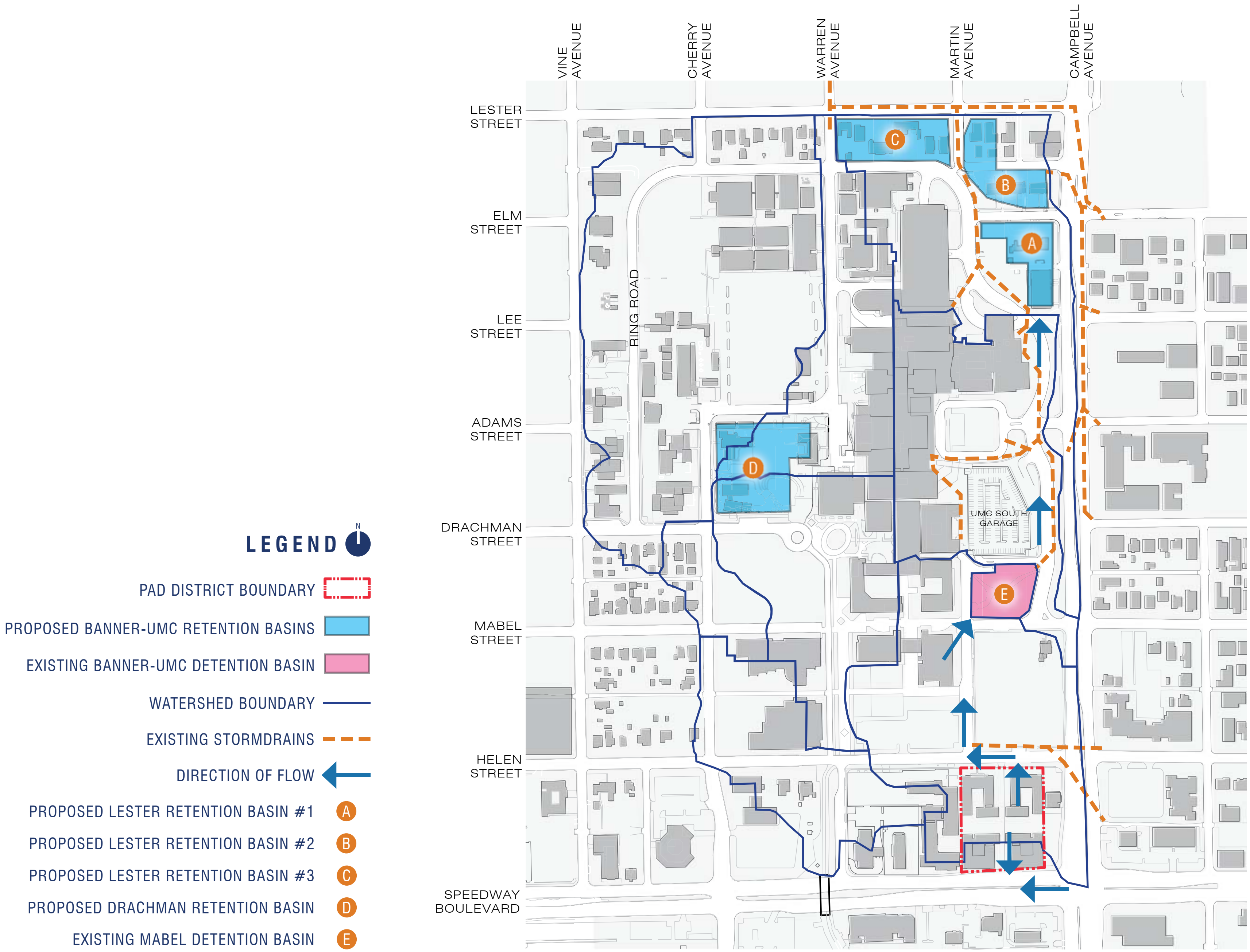
The aforementioned network of flood-control basins also incorporated a greenway element along the northernmost portion of the BUMC site to act as a buffer for the Jefferson Park Neighborhood. The proposed retention basins within the greenway will collect 100% of the on-site runoff from the eastern portion of the entire BUMC PAD property, as well as from upstream portions of the medical campus, in order to ameliorate the historical flooding that has afflicted Jefferson Park from surface flows exiting the medical campus. The upstream portion of the watershed contributing to this runoff includes most of the Subject PAD Property.

Existing stormwater discharges from the Speedway+Campbell Gateway PAD Site were calculated, in conjunction with those of the BUMC project, based on its fully developed condition. With respect to the Subject PAD, it is significant to note that its hydrologic parameters are the same in both the current and proposed condition, i.e. it is essentially 100% impervious surface. As such, there will be no increase in stormwater discharges from the PAD Project Site, in the post-development circumstance, over that of the present condition.

New on-site water containment measures will also serve to further meet the objectives of the PAD's Master Drainage Plan. Both passive and active water harvesting features will be incorporated into the project landscape plans during the preparation of the formal Development Package for the PAD Site.

Exhibit No. 48 provides an illustration of the off-site watersheds and drainage facilities that are an integral part of the Master Drainage Plan for this PAD.

Exhibit No. 48 | Off-Site Watershed and Drainage Infrastructure



IV.E.2 Post-Development Outfall Locations from the PAD Property

On-site stormwater runoff from the PAD Site will be collected, conveyed, and discharged at outfall locations in a manner that is consistent with existing surface flow patterns and which is in compliance with the master drainage plan prepared for the Banner-UMC PAD (see Exhibit No. 49, Master Drainage Plan).

The majority of existing stormwater runoff from the subject PAD Site is discharged northerly into Helen Street, where it proceeds westerly to Martin Street, then northerly to an existing detention basin at Mabel Street. Outflows from the Mabel Street basin are discharged northerly as both surface and storm-drain flows that are ultimately collected by two (2) new Lester Street retention basins located in the northern portion of the BUMC project. The runoff from the Subject PAD Site (both present and future) was wholly accounted for in the design and construction of these Lester Street basins, as well as in the ancillary storm drains proposed by the BUMC project. These mitigation measures were all proactively promulgated to reduce the 100-year storm flows exiting the BUMC PAD site into Jefferson Park.

A small portion of existing stormwater runoff from the Subject PAD Site flows southerly into Speedway Boulevard. This minor flow and the existing southerly flow pattern will be maintained in the post-development condition.

IV.E.3 Retention/Detention Requirements

The City of Tucson's detention/retention requirements are outlined in Chapter XIV of the "Standards Manual for Drainage Design and Floodplain Management in Tucson, Arizona." In accordance with these requirements, the PAD Site is not located within a designated Balanced or Critical Basin. Consequently, per the Manual, "detention/retention requirements may be waived for new development provided new or existing stormwater conveyance facilities can safely release and convey the increased on-site runoff without increasing flood hazards to adjacent properties."

Chapter XIV of the Standards Manual also includes the statement that, "new developments are required to practice stormwater harvesting to the maximum extent reasonably possible."

Additional detention/retention requirements are outlined in Section 1.4 of the Stormwater Detention/Retention Manual (Pima County Department of Transportation & Flood Control District, City of Tucson). For all new commercial or industrial developments larger than one (1) acre in size, a threshold retention system is required which, "retains, at a minimum, the volumetric difference between the developed and existing 5-year runoff or the difference in peak discharge, whichever is greater." The proposed PAD will conform with this requirement and provide all necessary calculations to verify same with the Final Drainage Report provided at the time of Development Package submittal to PDSD.

IV.E.4 Additional Methods of Runoff Containment

In response to concerns regarding the historical drainage problems in the neighborhoods downstream of the Project Site and the BUMC campus, requests have been made that this PAD attempt to go beyond standard measures and to contemplate the use of active and passive water harvesting features. In response, a policy was added as part of a the recent amendment to the University Area Plan to address these concerns and explore water harvesting measures at the time of rezoning. Water harvesting provisions are discussed in Section IV.G (Conservation Measures and Environmental Considerations) of this PAD Document.

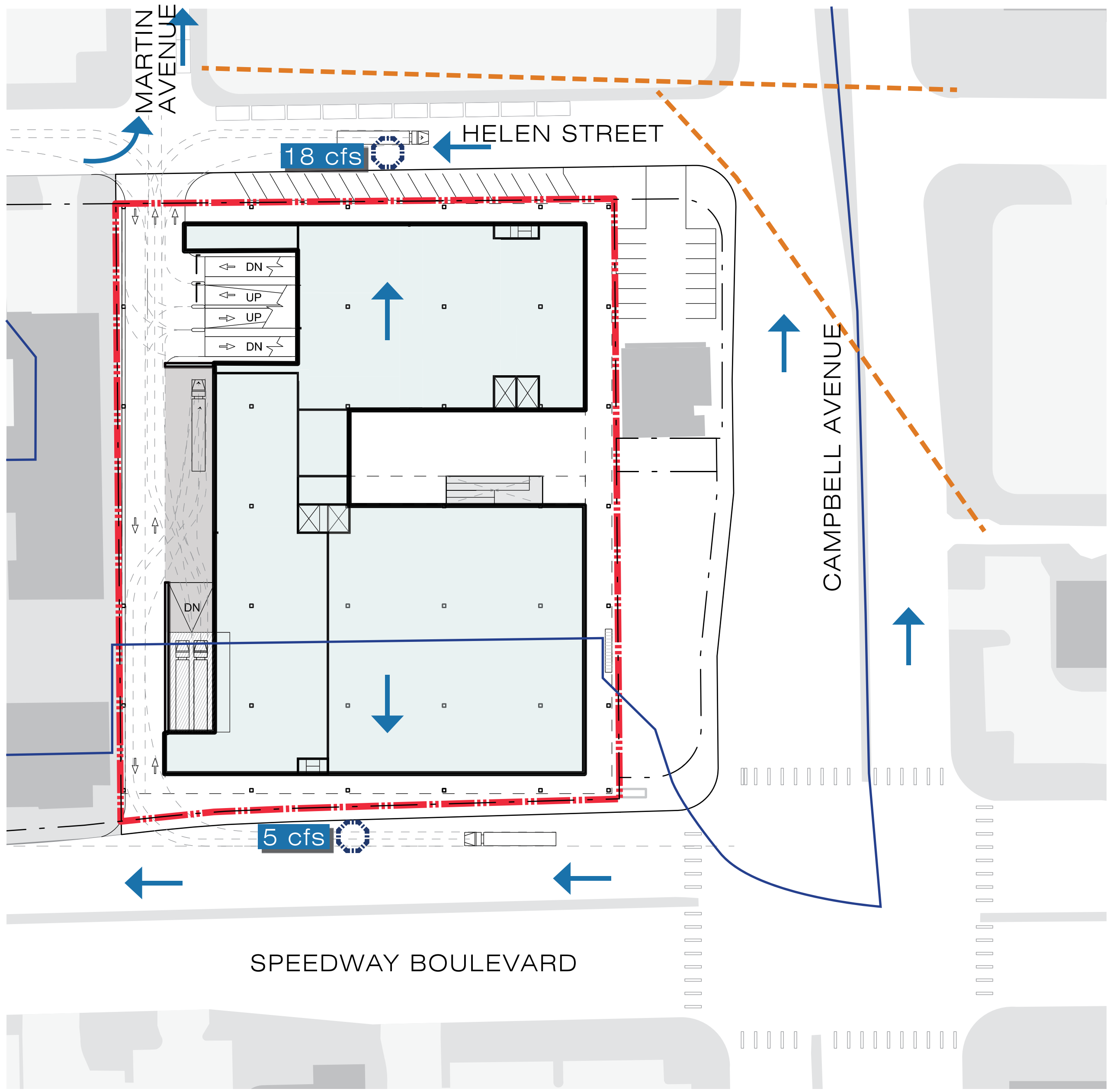
Final water harvesting measures, including both active and passive features, will be incorporated into the landscape plans within the formal future Development Package as submitted to PDSD.

IV.E.5 Statement of Downstream Impacts

Post-development stormwater runoff from the proposed PAD Site will cause no downstream impacts to any residential neighborhood, to the downstream Arizona Health Sciences Center (AHSC), nor to the proposed Banner-UMC medical campus.

New drainage facilities being constructed within the BUMC campus, together with the existing detention basin and storm drain network already in place, have been designed and sized based on the existing flows from the proposed PAD Site. Since the existing and proposed use of the PAD Property share the same hydrologic parameters (i.e. essentially 100% impervious surface), the post-development runoff values from the PAD Site will not result in any increase in discharges over existing levels. In fact, post-development volumes from the PAD Project Site may actually decrease a nominal amount as a result of planned water harvesting features.

Exhibit No. 49 | Master Drainage Plan



LEGEND

PAD DISTRICT BOUNDARY

PROPOSED BUILDING ENVELOPE

WATERSHED BOUNDARY

EXISTING STORMDRAINS

DIRECTION OF FLOW

100-YR CONCENTRATION POINT

IV.F Proposed Utility Infrastructure

Exhibit No. 50 depicts a comprehensive Master Utility Plan that identifies both existing known utilities serving the PAD Site, as well as proposed utility installations/extensions anticipated to be required to provide service to the PAD Site.

IV.F.1 Public and Private Sewer System

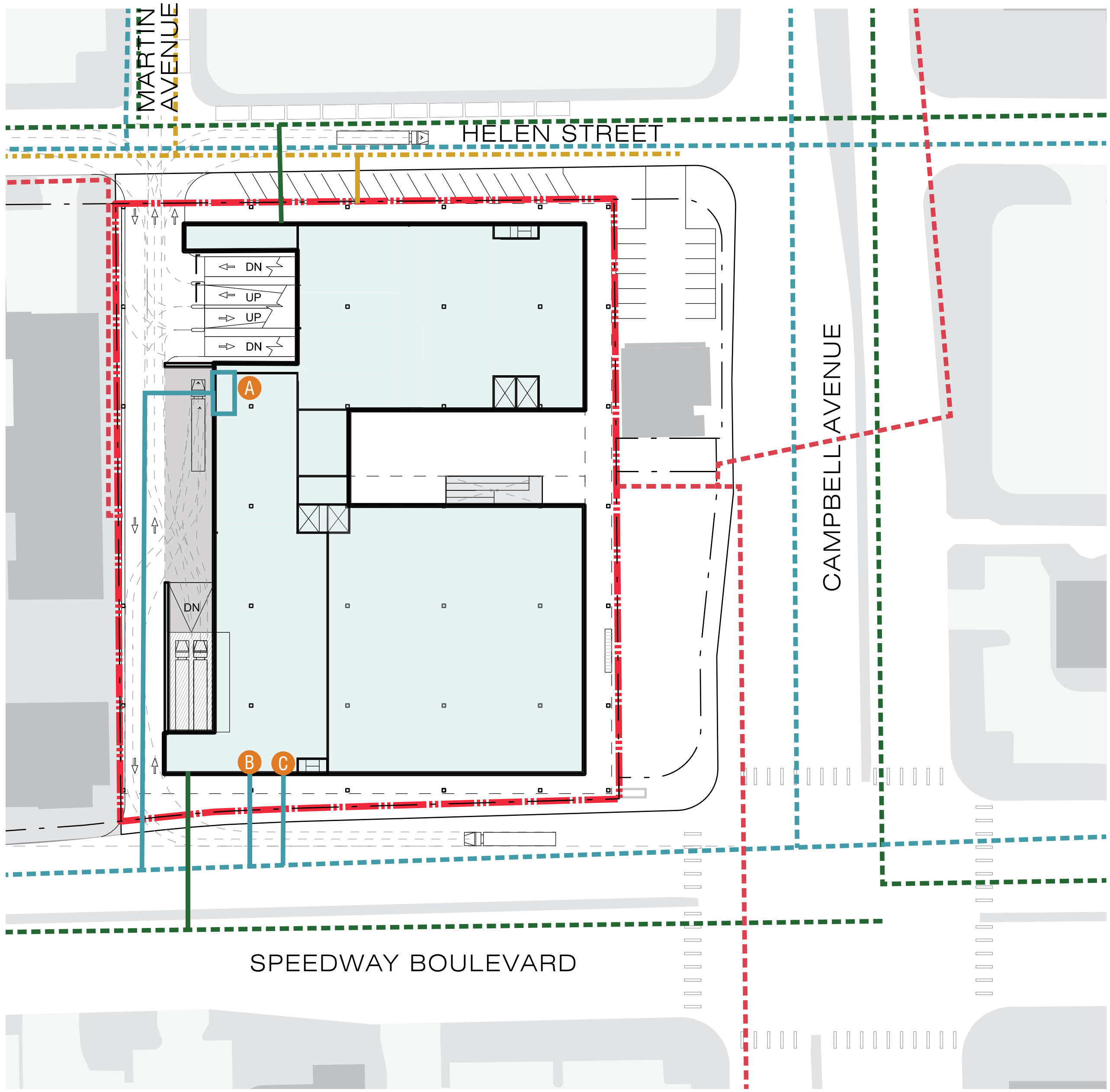
The Pima County Regional Wastewater Reclamation Department (PCRWRD) has indicated during initial coordination that:

- It is most likely that sewer service to the PAD Site will utilize one (1) or both of the two (2) public mains that currently provide sewer service to the existing Palm Shadows Apartments (PSA) located on the PAD Site. One of the sewer mains is located within Helen Street (PN G-098), while the other sewer is located in Speedway Blvd. (PN G-049).
- The two (2) above existing sewer mains are currently very close to their conveyance capacity and thus it is anticipated that downstream conveyance augmentation of either one or both of the mains will be required should the proposed PAD development produce wastewater flows that exceed those of the existing PSA complex and/or if the small amount of currently available excess capacity is no longer available at the time of development.

Prior to submittal of the future Development Package (DP) to the City of Tucson, the Owner/Developer will obtain a Type I Capacity Letter from PCRWRD verifying that capacity exists in the downstream public sewer system.

The following items shall constitute applicable PCRWRD rezoning conditions for this PAD:

1. The Owner/Developer shall not construe any action by Pima County as a commitment to provide sewer service to any new development within the rezoning area until Pima County executes an agreement with the Owner/Developer to that effect.
2. The Owner/Developer shall obtain written documentation from the Pima County Regional Wastewater Reclamation Department (PCRWRD) that treatment and conveyance capacity is available for any new development within the rezoning area, no more than ninety (90) days before submitting any tentative plat, development plan, preliminary sewer layout, sewer improvement plan, or request for building permit for review. Should treatment and/or conveyance capacity not be available at that time, the Owner/Developer shall enter into a written agreement addressing the option of funding, designing and constructing the necessary improvements to Pima County's public sewerage system at his or her sole expense or cooperatively with other affected parties. All such improvements shall be designed and constructed as directed by the PCRWRD.
3. The Owner/Developer shall time all new development within the rezoning area to coincide with the availability of treatment and conveyance capacity in the downstream public sewerage system.
4. The Owner/Developer shall connect all development within the rezoning area to Pima County's public sewer system at the location and in the manner specified by the PCRWRD in its capacity response letter and as specified by PCRWRD at the time of review of the tentative plat, development plan, preliminary sewer layout, sewer construction plan, or request for building permit.
5. The Owner/Developer shall fund, design and construct all off-site and on-site sewers necessary to serve the rezoning area, in the manner specified at the time of review of the tentative plat, development plan, preliminary sewer layout, sewer construction plan or request for building permit
6. The Owner/Developer shall complete the construction of all necessary public and/or private sewerage facilities as required by all applicable agreements with Pima County, and all applicable regulations, including the Clean Water Act and those promulgated by ADEQ, before treatment and conveyance capacity in the downstream public sewerage system will be permanently committed for any new development within the rezoning area.



LEGEND

PAD DISTRICT BOUNDARY

PROPOSED BUILDING ENVELOPE

EXISTING SEWER MAIN

NEW 6" OR 8" SEWER SERVICE LINE (BCS)

EXISTING 6" OR 12" WATER MAIN

NEW 4" WATER MAIN/FIRE SERVICE

EXISTING 2" GAS SERVICE LINE

NEW GAS SERVICE LINE

EXISTING ELECTRIC

NEW 4" WATER MASTER METER A

NEW PRIMARY 6" FIRE SERVICE B

NEW SECONDARY 6" FIRE SERVICE C

IV.F.2 Potable Water System

As discussed within Section II.E.1.b of this document, the PAD Site is currently provided with domestic potable water and fire flow water service by the City of Tucson Water Department (Tucson Water).

It is anticipated that Tucson Water will continue to provide water service to the PAD Site development, subject to its standard review and approval process which will include the submittal of a Water System Master Plan that will be modeled and modified accordingly for final approval by Tucson Water.

Based upon the above coordination with Tucson Water, as well as City of Tucson Fire Department, it is anticipated that domestic and fire flow service to the Site will utilize the following connections/improvements to the existing 12" public main (PN 202-1988) located beneath the pavement of Speedway Boulevard's westbound lanes. The following specifics apply:

SERVICE TYPE	CONNECTION/IMPROVEMENT
DOMESTIC SERVICE	4" MASTER METER WITH A 4" SERVICE LINE
IRRIGATION SERVICE	1" IRRIGATION METER
FIRE FLOW	DUAL 6" FIRE SERVICE LINE CONNECTIONS

IV.F.3 Dry Utilities

Currently, all dry utilities (electric, gas, telephone and cable television) are project-convenient and the associated service providers have all indicated that they are able, with standard conditions, to continue to provide services to the proposed PAD Site.

These conditions include largely routine matters, such as the establishment of on-site alignments, sizes, and easements and will be addressed during final site engineering, as is typical with any large-scale redevelopment endeavor.

IV.F.4 Phasing of Utility Construction

All on-site utility infrastructure required to provide service to the PAD Site will be constructed in a single phase.

IV.F.5 Maintenance Responsibilities for Utility Infrastructure

Maintenance of public utility infrastructure located within and/or adjacent to the PAD Site will be the responsibility of the servicing public utility provider or public agency.

All private sewers/BCS's, water lines, fire lines, electric services, and irrigation systems shall be the responsibility of the PAD owner.

IV.G Conservation Measures and Environmental Considerations

In conceptualizing this PAD Site and its architecture, numerous sustainability principles and practices are envisioned, including an environmentally conscious design framework, energy and water conservation strategies, and various efficiencies in construction methods and building materials. These are discussed in more detail below.

IV.G.1 Conservation Standards

a. Energy Efficiency Provisions and Standards

The Project design incorporates a series of both active and passive strategies to best further community goals and objectives for energy efficiency and sustainability. These are enumerated below.

<u>Passive Strategies</u>

The most profound and substantive results with respect to sustainability are achieved when the basic design of a project is driven by fundamental principles which account for and optimize environmental conditions, that recognize the importance of energy efficiencies from the onset, and which wisely balance these factors within architectural aesthetics. This PAD manifests such principles in the following design features:

- Primary building volumes are positioned in east-west fashion to optimize solar orientation; this approach faces the smaller building elevations to the east and west, with the larger, predominant faces oriented to the north and south so as to best manage solar exposure. This approach best protects the east and west elevations from harsh summer conditions, while allowing the north and south elevations to harvest winter sun and optimize internal natural light.

- The building volumes are crafted in long, thin envelopes rather than massive blocks so as to maximize the availability of natural light into interior building areas, thereby reducing energy consumption and enhancing human comfort.
- Comfortable, microclimatic outdoor spaces are incorporated into the Project by way of a large ground-level central open space and plaza, roof terraces, select internal courtyards integrated into the building base, and perimeter streetscapes employing human-scale details to create shaded refuge and gathering areas.

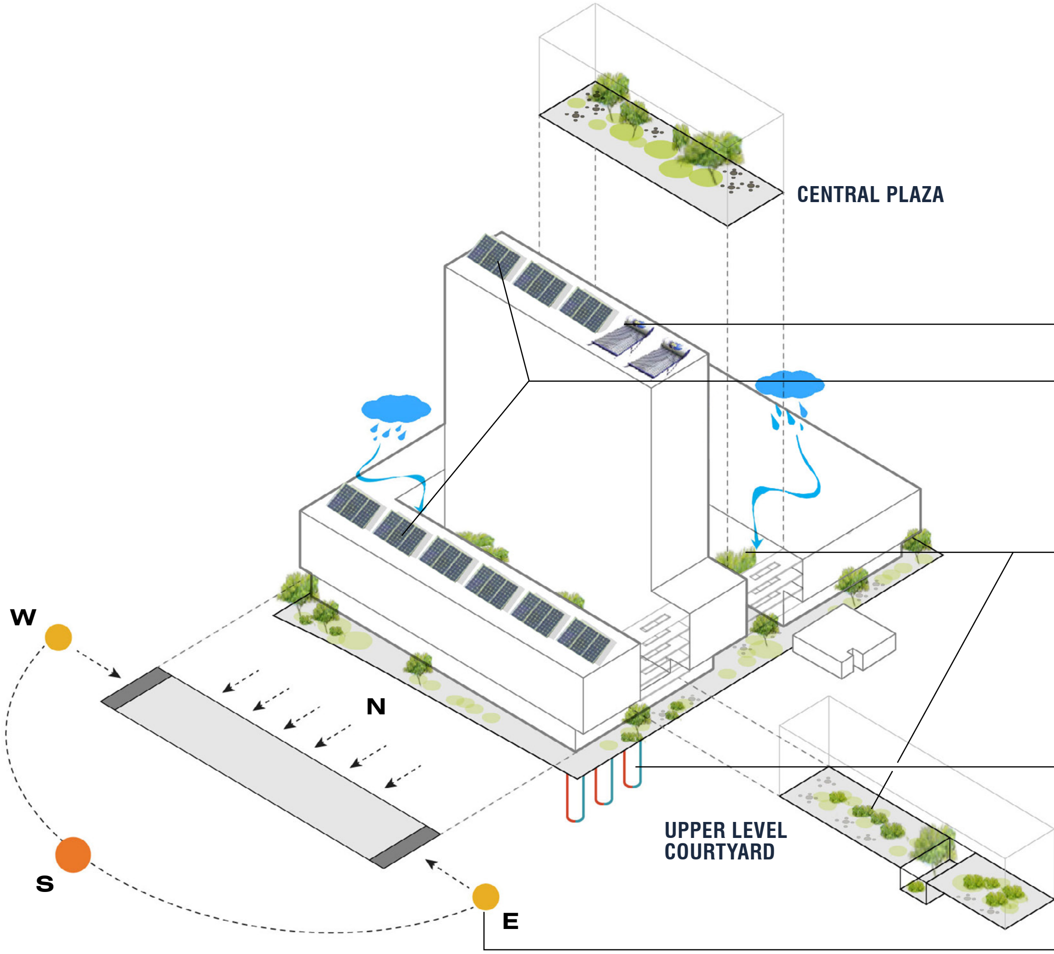
Active Strategies

The above passive elements provide for a natural sustainability that is inherent in the basic building and site design. Supplementing these inherent elements are the intended active energy-efficiency and sustainability features enumerated below. The following items will be studied in conjunction with select specialty consultants in engineering and energy conservation to determine their respective effectiveness and to best coordinate their holistic performance in conjunction with each other and with the Project's identified passive strategies:

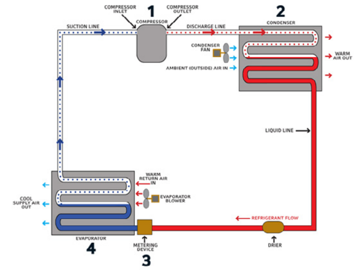
- The building architecture employs a double façade that features an outer "skin" of louvers, constructed of composite resin, metal, or terracotta material, which shields the inner building's glass and steel surface. For all intents and purposes, this louvered outer façade shades the entire inner building that lies behind it and creates a vertical "breezeway" for passive convection cooling.
- The double façade minimizes the impacts of harsh summer sunlight and maximizes the harvesting of solar energy during the winter months. To achieve this objective, the louvers are oriented horizontally stationary on the south-facing elevations, vertically on the east and west elevations (with the option of being mechanically movable), and vertically stationary (with wider spacing) on the north-facing elevations.
- The proposed buildings will utilize efficient HVAC systems featuring condensate water collection.
- Low energy and energy-star rated appliances and MEP equipment.
- During final design, the following additional items will be evaluated on a cost-benefit basis to determine their feasibility for use on the Project:
    - Low or no-flow plumbing fixtures
    - Solar photovoltaic panels on the roof-top of the 20-story high-rise and other roof-top areas where appropriate
    - A roof top solar water heating system
    - Sub-surface geothermal energy systems

Exhibit No. 51 summarizes the Project's active sustainability strategies, while Exhibit No. 52 illustrates how the Project's double-façade design facilitates passive cooling and optimizes/manages solar exposure.

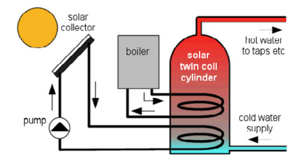
Examples of double facade buildings



EFFICIENT HVAC WITH CONDENSATE WATER COLLECTION



SOLAR WATER HEATER*

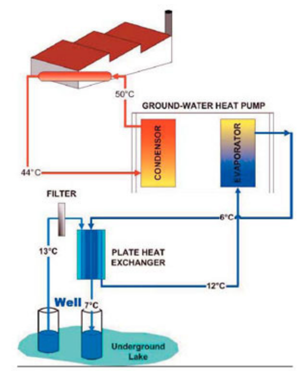


PHOTOVOLTAIC PANELS*

- HARVEST SOLAR ENERGY
- PROVIDE SHADE STRUCTURE

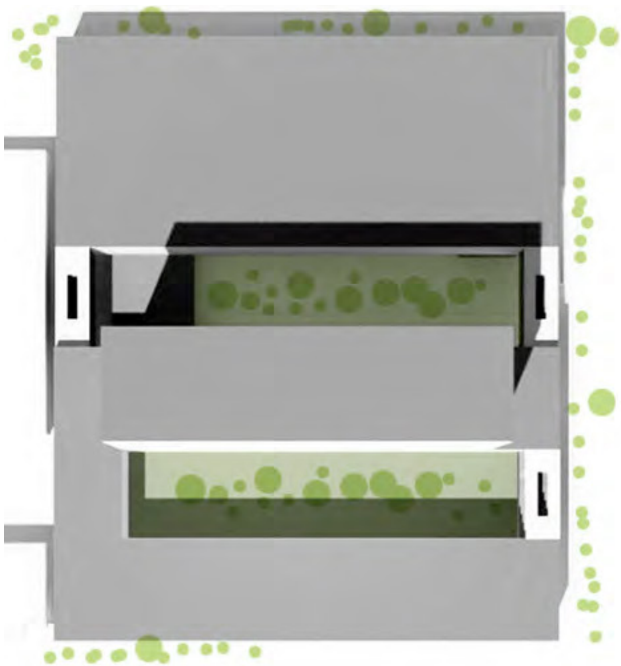
RAINWATER HARVESTING IN CENTRAL PLAZA & UPPER-LEVEL COURTYARDS

GEOTHERMAL ENERGY*

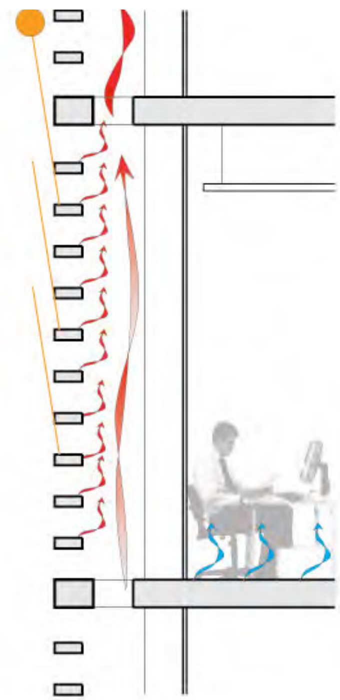


OPTIMIZED PASSIVE SOLAR ORIENTATION

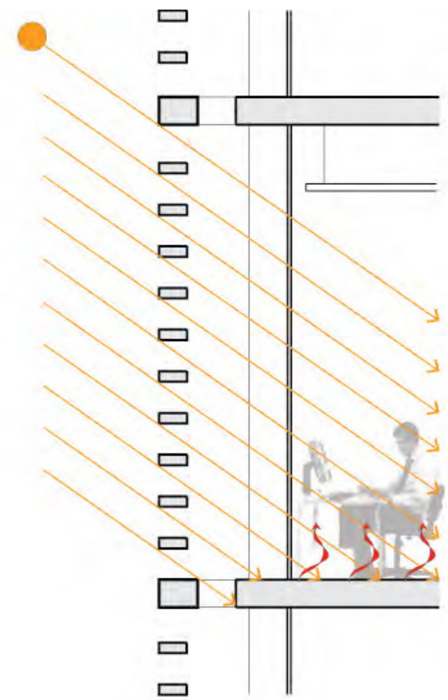
* Cost-benefit characteristics of these items to be evaluated at time of final architectural design



USING THE BUILDING MASSES TO SHADE THE PUBLIC SPACES.



SUMMER



WINTER

PLAZAS
SHADE
PROPOSED BUILDINGS

PASSIVE COOLING STRATEGY

1. COOLING THROUGH CONVECTION EFFECT
2. REFRESHING MICROCLIMATE COURTYARDS AND STREETSCAPES
3. NATURAL AIRFLOW THROUGH INTERIOR ATRIUMS

General Strategies

In addition to the above active and passive strategies, the following general design and construction guidelines will apply to the Project:

- New design shall seek to exceed ASHRAE 90.1 2007 requirements by a target of ten percent (10%). In the event that incentives may be offered by local utility companies for exceeding the above threshold, and to the extent such incentives have a positive cost-benefit characteristic, the Project design team shall submit the application for the incentives.
- Utilize LED outdoor lighting of less than or equal to 3600 kelvin.
- Building materials shall be purchased from local manufacturers and suppliers whenever possible and to the extent that they meet or exceed the owner's and architect's standards for quality, durability and cost-competitiveness.
- Materials which can be cost-effectively re-used shall be harvested where feasible.
- Waste materials will be sorted and recycled, to the extent practical, to reduce the total amount of landfill waste generated by the Project.
- Materials specifications calling for the following will be stressed wherever possible:
    1. Products containing high post-consumer content,
    2. Wood products that are from rapidly renewable sources, and
    3. Materials that are easily reusable, recyclable or biodegradable.

b. Outdoor Potable Water Conservation Standards

The following water conservation elements will be incorporated into the PAD's outdoor areas:

- Plant materials and landscape accents will be limited to climate-adaptive species.
- A low water-use irrigation system will be utilized for all landscape areas. The system will incorporate automatic controllers, flow-sensing valves, rain-sensor shut-off capability, and will be metered separately to record historical water usage throughout the site (see landscape-related standards in Section IV.G.3 below for further detail).
- Rainwater harvesting techniques will be used in ground-level landscape areas and raised terraces, as well as in containerized storage systems where feasible (also see Section IV.G.3 below).

IV.G.2 Heat Island Considerations and Mitigation Measures

The PAD Project, for all practical considerations, provides a material improvement in heat island characteristics when compared to the existing site conditions. The current Palm Shadows Apartments project is essentially an unshaded asphalt parking lot and community pool surrounded by a cluster of apartment buildings. There is negligible landscaping and no legitimate microclimate areas anywhere on the property.

The proposed Project, on the other hand, introduces vegetation and shade within microclimatic courtyards, plazas, terraces, and pedestrian streetscapes and has virtually no surface parking, since nearly all will be provided in above-ground and/or sub-surface structures. The double-façade design of the buildings further reduces reflectivity and solar heating of the Site and its surroundings.

For all of these reasons, no special heat island mitigation measures are stipulated for the PAD Site.

IV.G.3 Irrigation, Smart Controllers, Water Harvesting, etc.

a. Irrigation and Smart Controllers

A low water use irrigation system will be utilized for all landscape areas, including streetscape plantings and the Project's central plaza. The system will incorporate an automatic controller, flow sensing valves, rain shut-off capability, and will be metered separately to monitor water usage in the different landscape zones (streetscape, plaza) within the Project. The irrigation system will include an enviro-transpiration module to enhance the system's ability to connect with local weather stations and thereby automatically adjust for seasonal weather changes. The use of a smart irrigation system will provide a performance system to maximize the management of water and water conservation. Details of the system will be provided in the formal Development Package (DP) submitted to PDSD.

b. Rainwater Harvesting

The PAD District will integrate passive water harvesting techniques where feasible throughout the PAD District. The City of Tucson Technical Standards Manual Section 4-01.0.0 establishes the standards for meeting the requirements of the Rainwater Harvesting Ordinance, with the stipulation that theses standards apply to all commercial development plans submitted after June 1, 2010. “Commercial Development” is defined in Section 12-01.0.0 as “any new non-residential development that is intended to be used primarily for commercial activities, and is subject to the requirements of the International Building Code.” While technically a mixed-use development, the Speedway + Campbell Gateway PAD possesses a significant commercial/retail component, all of which occurs at street-level.

The above notwithstanding, it is appropriate to nonetheless recognize that the PAD is occurring on an infill property that is constrained by its surroundings and by the demands of its high-intensity, high-density urban focus. The amount of actual on-the-ground landscape areas will be at a high premium and will be strategically integrated within the urban plazas and promenades along the Project’s street frontages.

With this in mind, the PAD District will maximize water harvesting in areas with the capability to effectively and intelligently integrate such features in reasonable fashion. It is understood that the water harvesting elements may or may not meet the full percentage of supplemental irrigation per the UDC and per the City of Tucson Technical Standards Manual Section 4-01.0.0. Passive water harvesting elements (e.g. depressed planters) will be implemented where such conditions facilitate same in new landscape areas. The Project will further evaluate the following active water harvesting measures at the time of development to determine their cost-benefit characteristics and their feasibility for incorporation into Project:

- Curb-less catchments to facilitate sheet flow into landscape areas
- Design site elements including curb cuts, flush curbs and pervious/semi-pervious pavers
- Micro-basins in landscape areas
- Routing mechanisms of roof / canopy / shade structure drainage into landscape areas
- Pipe or tank containments integrated within the sub-surface parking structure

The specific water-harvesting methods employed shall be appropriately detailed and annotated as such on the final civil plans and landscape drawings submitted to PDSD as part of the project’s Development Package.

IV.G.4 Self-Certification of Conservation and Sustainability Measures

Concurrent with the submittal of the future Development Package (DP) to PDSD, or with the submittal of architectural plans to PDSD for building permits, the owner/developer’s appropriate registered design professional shall submit a letter detailing the particular measures employed in final design to address and promote the above Conservation Standards described in Sections IV.G.1 or IV.G.3, as appropriate.

The architect’s self-certification letter accompanying the future architectural plans submitted to PDSD for building permits shall describe the particular measures being employed to further the Active, Passive, and General intended sustainability strategies found in Section IV.G.1.a above.

The specific methods employed to accomplish the objectives of prior Section IV.G.1.b (Outdoor Potable Water Conservation) and Section IV.G.3.b (Rainwater Harvesting) shall be appropriately detailed and annotated as such on the final civil plans and landscape drawings submitted to PDSD as part of the project’s Development Package. PDSD’s Engineering Section shall utilize the approved civil/landscape drawings to conduct a site inspection, at the time of construction, to confirm installation of the specific rainwater harvesting provisions detailed on the aforementioned plans.

IV.H Architectural Standards and Design Guidelines

The Project's driving architectural concept proposes a significant contemporary lifestyle addition to Tucson's urban environment. This Section details its particulars.

IV.H.1 Architectural Design Concept and Building Massing

The surrounding context of the PAD Site is one of the busiest arterial intersections in the entire Tucson metropolitan region and, at the same time, is one of its most underdeveloped and underutilized collection of properties. This Project is a first and major step in transforming this underutilized area and in helping to create the type of vibrant activity center that will energize the nearby Tucson Streetcar and stimulate further investment and redevelopment.

The University of Arizona, through its 2009 Comprehensive Campus Plan (CCP) update, has similarly envisioned the growth and intensification of its nearby holdings, proposing significant new building massing and height throughout the PAD's surroundings (refer to prior Exhibit No. 26). This CCP massing complements the intensive development and construction activity that is already underway within the Arizona Health Sciences Center and at Banner-University Medical Center.

This nascent activity provides the appropriate platform for a project that features the sort of building massing and height that is inherent in this PAD. While making a strong high-rise statement, the proposed architecture ensures proper proportioning and transitioning with its present surroundings through the careful stepping of shorter building bases around the project's entire perimeter. This attention to proportioning notwithstanding, the vision of this Project is clearly a forward-looking one. The extent to which it "fits" within its context will only be enhanced over time as the anticipated redevelopment and further intensification of its surroundings becomes reality.

Within this emerging context, the Speedway + Campbell Gateway PAD will foster a close relationship between living, working, entertaining, dining, and shopping for those who occupy the Project, those who work there, and those who visit it. The stage for this environment is one of vibrant interaction and aesthetic spatial experiences brought forth in a warm and inviting setting. A primary focus on human activity and the use of space, rather than on the buildings themselves, will create a unique sense of place that is grounded in a strong understanding of the local climate and Southwest lifestyle.

The architectural framework of the Project employs an integrated series of slender building envelopes as opposed to more massive or monolithic ones. These slender volumes are purposefully positioned in east-west fashion so as to not only optimize their solar orientation and energy efficiency, but to also maximize the entry of indirect natural light into the interior building areas, creating more comfortable and vibrant indoor environments for their occupants. Lastly, this spatial arrangement creates intervening, open-air gaps between the building envelopes that yield both ground-level plaza and upper-level courtyard opportunities. The building envelopes themselves provide direct shade and microclimate benefit to these open-air areas.

Exhibit No. 53 provides an architectural rendering of the Project looking westward from the east side of Campbell Avenue. This view clearly illustrates the aforementioned slender building envelopes, their east-west orientation, and the open-air spaces that intervene. Exhibit No. 54 portrays the central open-air plaza sited adjacent to the Project's high-rise component. While the final design of this key component will evolve over time, this rendering nonetheless rightly conveys the type of character, energy, and feel this plaza will embody.

Along the Site's perimeters, the Project architecture utilizes shorter building heights that better relate to adjacent Speedway Boulevard and Campbell Avenue. These shorter heights provide a proper transition to the Project's high-rise component, which is appropriately setback further from the adjoining street frontages. At the Site's street-level interfaces, all buildings will employ strategic variations in their façade to create visual variety, human-scale spaces, shaded understory corridors, vibrant storefronts, and inviting areas for walking and gathering.

Exhibit No. 53 | Architectural Renderings of the Completed Project

View from the Southeast Corner of the Speedway + Campbell Intersection

View from the Helen-Warren Streetcar Station

NOTE: For contextual purposes, these renderings also incorporate the anticipated future building massing per the University of Arizona Comprehensive Campus Plan, 2009 Update.

Exhibit No. 54 | Central Courtyard/Plaza

View of the Central Courtyard and Plaza from the Project's Campbell Avenue Frontage

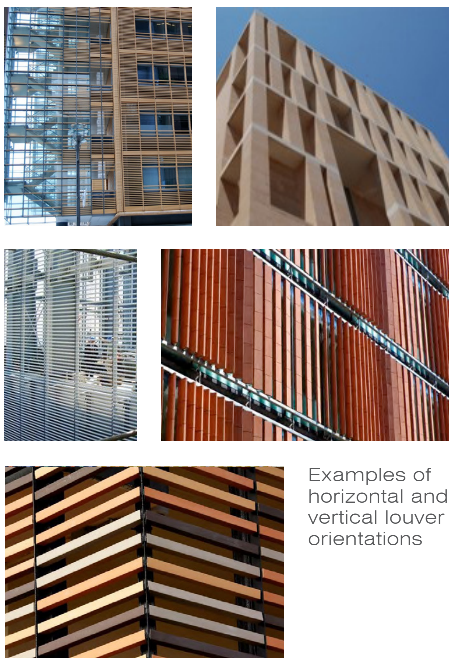
IV.H.2 Building Materials, Colors and Special Features

With respect to materials, the Project architecture employs a double façade that features an outer structure of louvers constructed of ceramic terracotta, powder coated metal, or composite resin. This outer façade shields the inner building's surface, minimizes the impacts of harsh summer sunlight, and maximizes the harvesting of solar energy during the winter months.

Beyond these clear energy-efficiency aspects, however, the louvers represent a unique aesthetic element that eliminates any semblance of monolithic building faces and instead introduces continuous visual variety throughout the Project. Exhibit No. 55 illustrates various styles of louvers, as well as the orientation that will be used on the north, south, and east/west building elevations. This respective variation in horizontal and vertical louvering best optimizes solar impacts and opportunities and is deeply rooted in local climatic realities.

The use of shading louvers as a primary aesthetic and functional element pays homage to the historic use of extensive architectural climate-control features that dates back to Tucson's earliest days. Recessed windows, shaded walkways and porticos, and building overhangs similarly sheltered people from the Southwest's harsh summer conditions while welcoming the winter sun's warmth. While the PAD Project's proposed architecture is unquestionably contemporary, it is nonetheless grounded in a deep respect for this history.

In keeping with this same approach, the project's color and materials palette (see Exhibit 56) utilizes an architectural vocabulary which features traditional colors and materials used in innovative and contemporary ways.



Examples of horizontal and vertical louver orientations

Exhibit No. 55 | Façade Elevations and Orientation of Louvers

Exhibit No. 56 | Conceptual Colors and Materials Palette

LEGEND

WOOD ACCENTS 1
ANODIZED BRONZE WINDOW SYSTEMS 2
TERRACOTTA LOUVERS & TEXTURES 3
WHITE ARCHITECTURAL CONCRETE 4
NATIVE AND REGIONALLY ADAPTIVE PLANTS 5
PUBLIC ART 6
REFLECTION POOLS & FOUNTAINS 7
TEXAS LIMESTONE FLOORING 8
EXTERIOR LOUNGE FURNITURE 9
EXPOSED AGGREGATE CONCRETE SURFACES 10

Other key building materials and features that characterize the Project architecture include the following:

- The exposed, refined concrete of major structural elements will often be left plainly visible to provide an authentic expression of the building's construction,
- Refined inserts and elements of wood and stone will be provided in those areas where people are in closest contact with exterior building areas,
- Outdoor stationary and movable furniture elements will match the wood and stone accents of the buildings,
- Metal façade elements will integrate with window profiles to emphasize a simple and clean complement of materials,
- Full-height, low-energy insulated glass elements will allow for deep visibility into the buildings at ground level and minimize the need for artificial illumination,
- Floors will commonly utilize stone and concrete to solidify a sense of groundedness, refinement, and indigenous materials,
- The consideration of exterior façade shade louvers comprised of materials such as terracotta, while clearly contemporary, also harkens back to the same base materials of clay and brick that have characterized the traditional University of Arizona material palette.

IV.H.3 Architectural Design Self-Certification Procedures

Given the architectural renderings, elevations, and detail presented in this PAD document, no future, separate or subsequent architectural review process is required for the Project. This provision is subject only to the requirement that the final architectural design of the Project which is presented at the time of building permits is in substantial conformance with the aesthetics, architectural concept, building elevations, and materials presented herein.

Concurrent with the submittal of the building plans for review by the Planning and Development Services Department (PDSD), the architect of record shall submit a letter, signed and sealed with his or her Arizona registration, certifying that the plans are in general conformance with the PAD prescriptions articulated in Sections IV.H.1 and IV.H.2 above.

Prior to submittal of the architect's certification letter and building plans to PDSD, the owner/developer and their architect shall hold a meeting with the project's Neighborhood Liaison Group (NLG) to present and discuss the final architectural design. The purpose of this meeting is not to provide a forum for detailed critique, but rather to ensure that the NLG is informed as to the project's final architectural design and, most importantly, to provide confirmation to the NLG that the owner/ developer has duly followed through on the architectural representations that have been made to the NLG and illustrated within this PAD document.

IV.I Interpretation and Modification of PAD District Regulations

Section IV (Land Use Proposal) of this PAD, in particular the Land Use Regulations presented within Section IV.B, have been structured to provide for clear interpretation and application by the City of Tucson in regulating a specialized land use and zoning framework for the PAD District. In the event that supplemental PAD changes or interpretations become necessary in the future, they shall proceed in accordance with the parameters below.

IV.I.1 General Administration and Interpretation Authority

The PAD will not result in the modification or change of any existing City of Tucson adopted building code or other ordinances, except those portions of the City Unified Development Code (UDC) and Administrative Manual as specifically modified in this PAD document, together with the modification of the applicable City of Tucson Zoning Map.

The PAD shall be generally administered under the authority of the Director of the Planning and Development Services Department (PDSD). Whenever a conflict arises between the Speedway + Campbell Gateway Planned Area Development (PAD) and the Unified Development Code, the PAD shall control. When the PAD does not specifically address a particular topic, the UDC and Administrative Manual shall control.

a. Anticipated Phasing

Due to the inherent space limitations of the PAD Property, together with the near impossibility that attends phasing improvements in a vertical fashion, the Project is envisioned as a single-phase construction process.

b. Street Improvements/Modifications within the Public Right-of-Way

The PAD Site is highly constrained by public streets to the north, south and east and, given the magnitude and intensity of the uses proposed, certain improvements to the adjacent public streets will attend the Project. These will be comprised of particular material improvements that pertain to the larger transportation system, including potential modifications to turn lanes at the Speedway/Campbell intersection. More detail on transportation impacts and project-related street-improvements is provided in Section IV.D (Transportation Infrastructure) of this PAD document.

The Project also includes pedestrian streetscape improvements along its two (2) immediately adjacent public-street frontages (Speedway Boulevard and Helen Street). These will occur within identified Design Zones that partially extend into the actual public street rights-of-way. The particulars of these Design Zones are discussed in Section IV.B.3.I (Landscape Requirements).

c. Owner Maintenance Responsibilities

All facilities and site improvements on the PAD Property will be the sole maintenance responsibility of the owners. The maintenance of any public utility improvements on the Site, whether above-ground or sub-surface, will remain the responsibility of the servicing utility company.

d. Financial Assurances

Following the adoption of a zoning ordinance approving this PAD, the owners shall submit a form of financial assurances for review and acceptance by the City of Tucson. This form of assurances may be a performance bond or similar financial instrument, or may be a formal Development Agreement, and shall address the on-site and/or off-site infrastructure and any new street improvements or modifications as necessary to ensure the proper functioning of the Project as depicted on the detailed Master PAD Site Plan presented above in Exhibit No. 24.

e. City of Tucson Waiver of Claims

The owners shall execute and record a separate agreement, per adopted City of Tucson format, to waive any claims against the City for zoning amendments in conformance with A.R.S. Sec. 12-1134(I).

IV.I.2 Amendments to the PAD District

The Director of the Planning and Development Services Department may administratively approve minor changes to the specialized land use regulations and development standards set forth in this PAD, provided such changes are not in conflict with the overall intent, goals and objectives of the PAD as presented herein.

a. Criteria for Minor Amendments and Associated Process

The following shall be considered minor changes that fall within the administrative purview of the Director of Planning and Development Services:

- Addition of new information to the PAD, Master Site Plan, maps, or text that does not change the effect of any regulation, development standard, or guideline.
- Changes to the public or private infrastructure as presented herein as necessary to properly serve the intended Master Site Plan and which do not significantly increase the development capacity of the presented Site Plan nor alter the guiding goals and objectives of same.
- The addition of permitted uses that may not be specifically enumerated in Sections IV.B.2.b and IV.B.2.c of this document, but which are determined to be sufficiently similar in type and nature to those explicitly listed as permitted.
- Adjustments to the Development Standards in Section IV.B.3 (Development Standards) of this document that are not harmful to the interests of the larger community or affected neighborhoods, or which are not explicitly stated in the PAD, but which are consistent with the guiding goals and objectives of the Project and which do not create any public health or safety issues.
- Specifically, adjustments to section IV.B.3.d (Individualized Vehicle Parking Requirements) as necessary to properly reflect the required parking and appropriate mixed-use reductions based upon the Project's ultimate/final land-use composition.
- Adjustments to any aspect of Section IV of this PAD that is required in order to comply with changes in local, state or federal safety and/or health codes.
- The following PDSD administrative procedures may be processed, as necessary, through the minor amendment process of this PAD: 1) Technical Standard Modification Requests (TSMR's); 2) Design Development Options (DDO's) for landscaping and screening requirements.

b. Criteria for Major Amendments and Associated Process

Major amendments to this PAD shall be those changes or modifications that materially alter the guiding goals, objectives, or Master Site Plan presented in the PAD. The PDSD Director will determine if a proposed amendment would result in a major change per the enumerated criteria established in UDC Section 3.5.5.J.2.c. Major amendments shall be processed in accordance with UDC Section 3.5.3, Zoning Examiner Legislative Procedure.

The University Area Plan (UAP) contains certain provisions that allow for the incorporation of adjacent Arizona Board of Regents (ABOR) properties into this PAD without the need for an amendment to the UAP. Any such incorporation of ABOR properties will be processed as a major amendment to the Speedway + Campbell Gateway PAD.

Section Five | Bibliography

City of Tucson Transit-Oriented Development Handbook. Prepared by HDR/SR Beard & Associates; undated.

Major Streets & Routes Plan, City of Tucson Department of Transportation. Originally adopted by the Mayor & Council November 15, 1982. Last Amended July 10, 2007.

Pima County Regional Trail System Masterplan. Prepared by the City of Tucson Department of Parks & Recreation and the Pima County Department of Natural Resources Parks & Recreation, in collaboration with McGann & Associates. August, 2010.

Plan Tucson; City of Tucson General & Sustainability Plan 2013. Adopted by the Mayor & Council, June, 2013. Voter ratified November 5, 2013 by way of Proposition 402.

Stormwater Detention/Retention Manual, Pima County Department of Transportation & Flood Control District and the City of Tucson.

Traffic Impact Analysis (Draft Report), Speedway Boulevard and Campbell Avenue Planned Area Development. Kimley-Horn, June 8, 2017.

Tucson Modern Streetcar Land Use and Development Implementation Plan. Prepared by The Planning Center, in conjunction with Poster Frost Mirto, Inc. and the Pima Association of Governments; undated.

Tucson Streetcar Corridor Investment Guide. City of Tucson publication; undated. Web reference: www.tucsonaz.gov/streetcar-investment

Unified Development Code, City of Tucson. Chapter 23B of the Tucson Code. Adopted October 9, 2012. Subsequently amended and current through September 23, 2014.

University Area Plan. Prepared by the City of Tucson Planning Department, May 8, 1989; amended November, 2014.

University of Arizona Comprehensive Campus Plan, 2009 Update. Final Draft for the Board of Regents as submitted October 20, 2009; adopted by the Board of Regents December, 2009.

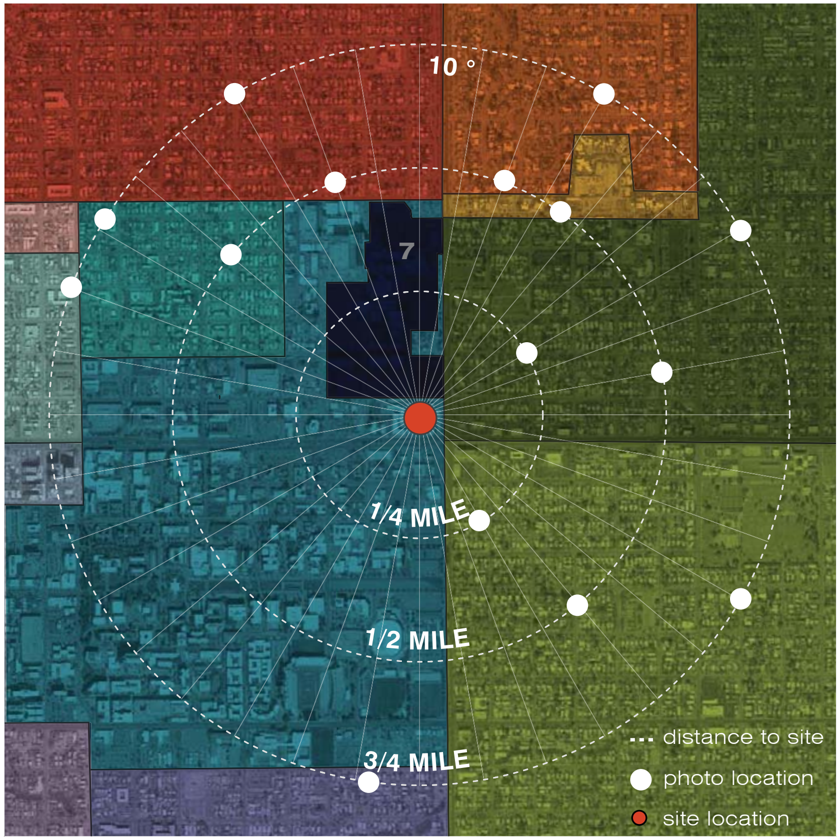
Urban Land Institute and International Council of Shopping Centers; Smith, Mary, Shared Parking, 2nd Edition, Washington, D.C., 2005.

Section Six | Appendices

Appendix A | Post-Development Photo-Simulations and Viewsheds from Surrounding Neighborhoods

Viewshed Impacts & Project Visibility Study

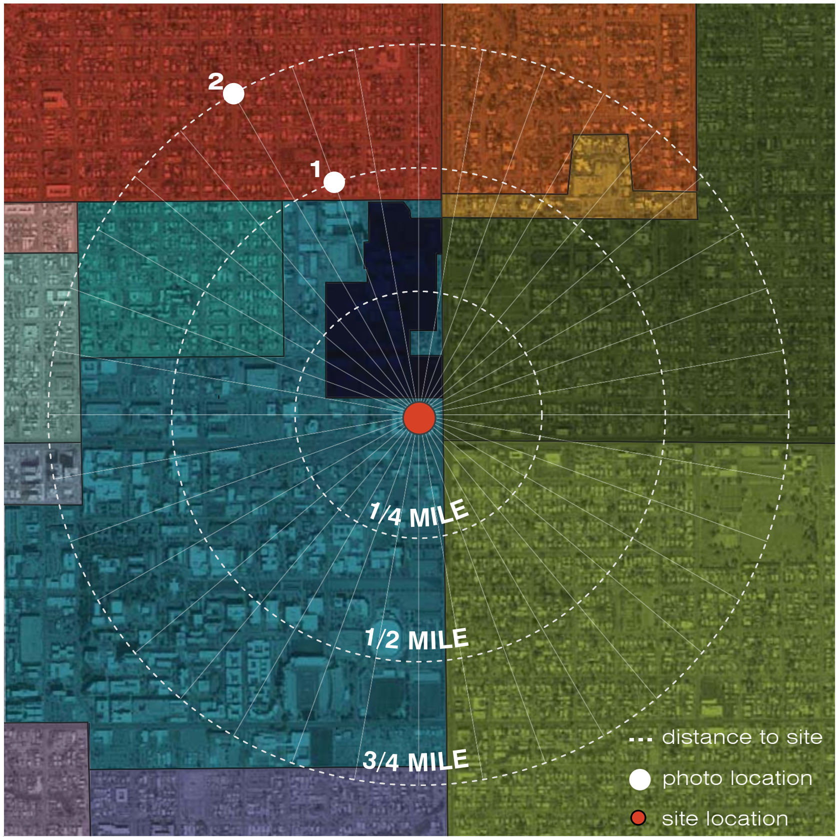
Photos Per Neighborhood



Neighborhoods	1/4 mile	1/2 mile	3/4 mile
Jefferson Park		X	X
Catalina Vista		X	X
Blenman Elm	X	X	X
Catalina Vista / Blenman Elm		X	
Feldman's			X
North University		X	X
Banner UMC			
West University			
University of Arizona			
Pie Allen			
Rincon Heights			X
Sam Hughes	X	X	X

Viewshed Impacts & Project Visibility Study

Jefferson Park



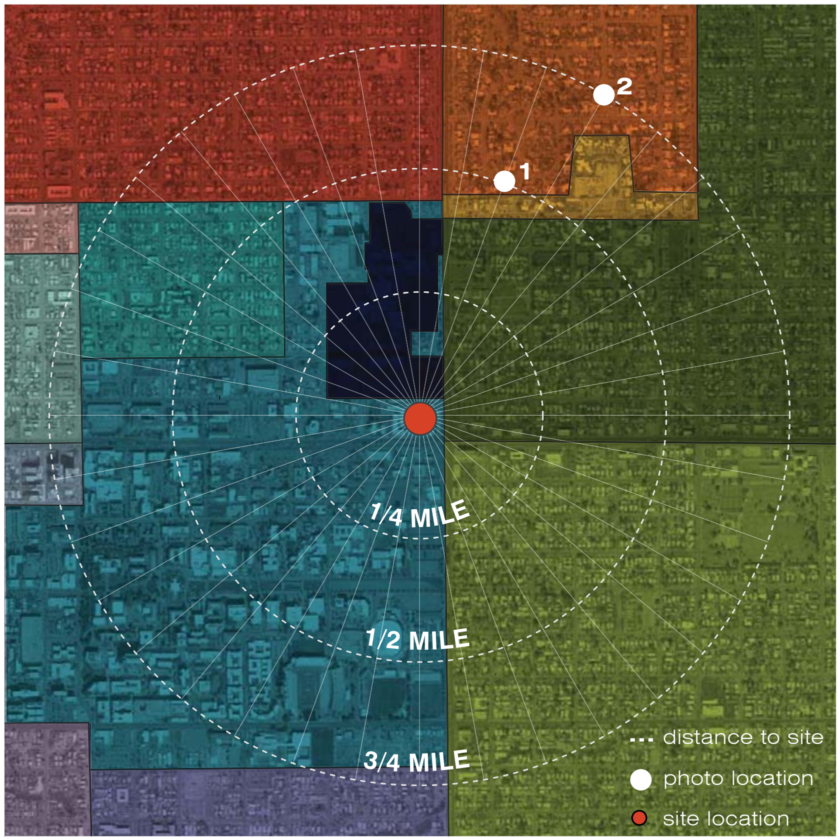
1. Jefferson Park - East Lester St & N Cherry Ave 1/2 mile

2. Jefferson Park - Highland Ave & Waverly St 3/4 mile

Jefferson park | Catalina Vista | Blenman Elm | Catalina Vista / Blenman Elm
Feldman's | N. University | U of A | UMC
W. University | Pie Allen | Rincon Heights | Sam Hughes

speedway & campbell | rick joy architects and shenkarow realty advisors

Viewshed Impacts & Project Visibility Study
Catalina Vista



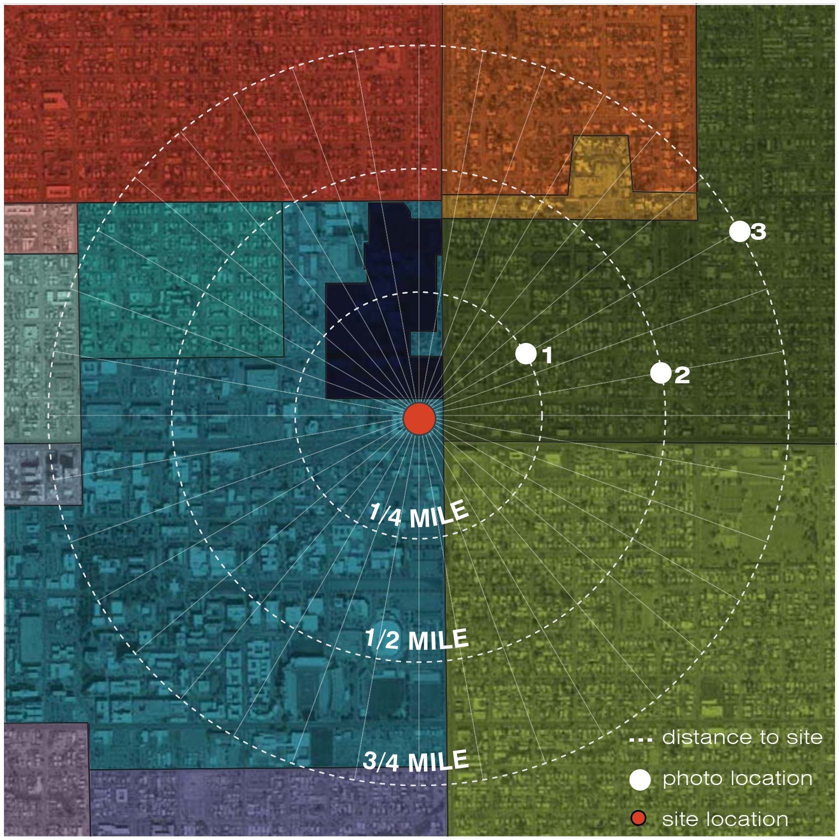
Jefferson park | Catalina Vista | Blenman Elm | Catalina Vista / Blenman Elm
Feldman's | N. University | U of A | UMC
W. University | Pie Allen | Rincon Heights | Sam Hughes


1. Catalina Vista - N Kramer Ave & N Sierra Vista Dr 1/2 mile


2. Catalina Vista - N Waverly St & N Wilson Ave 3/4 mile

speedway & campbell | rick joy architects and shenkarow realty advisors

Viewshed Impacts & Project Visibility Study
Blenman Elm



Jefferson park | Catalina Vista | Blenman Elm | Catalina Vista / Blenman Elm
Feldman's | N. University | U of A | UMC
W. University | Pie Allen | Rincon Heights | Sam Hughes

1. Blenman Elm - E Mabel St & N Olsen Ave 1/4 mile

2. Blenman Elm - E Mabel & N Norton Ave 1/2 mile

3. Blenman Elm - N Forgeus Ave & E Lee St 3/4 mile

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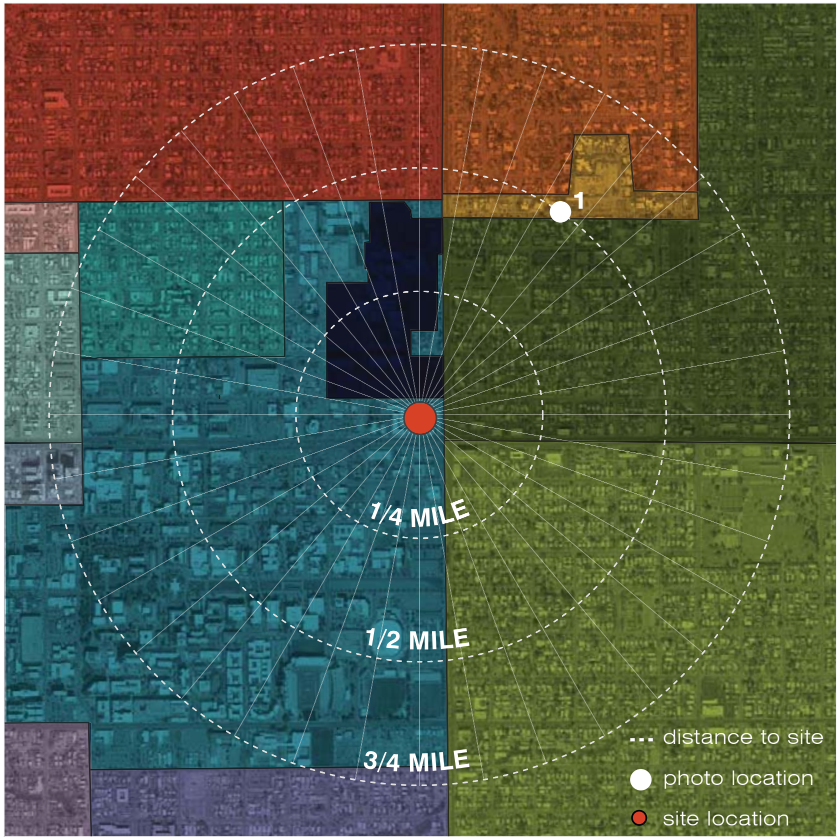
Viewshed Impacts & Project Visibility Study

Catalina Vista / Blenman Elm

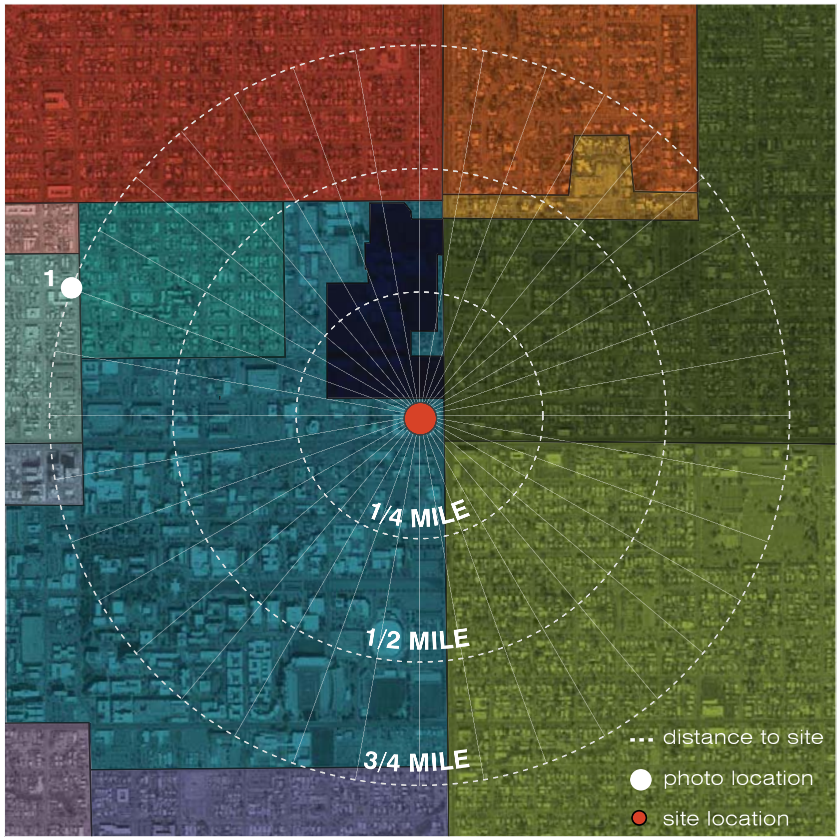


Jefferson park | Catalina Vista | Blenman Elm | Catalina Vista / Blenman Elm
Feldman's | N. University | U of A | UMC
W. University | Pie Allen | Rincon Heights | Sam Hughes

1. Catalina Vista / Blenman Elm - Elm St Between N Olsen ave & N Wilson Ave 1/2 mile

speedway & campbell | rick joy architects and shenkarow realty advisors

Viewshed Impacts & Project Visibility Study
Feldman's



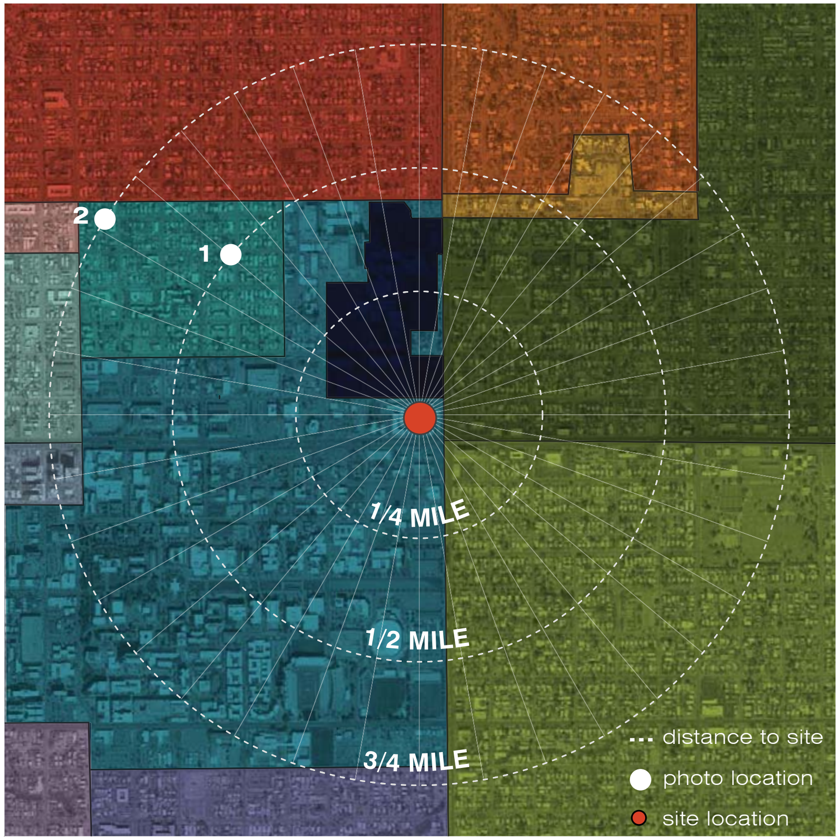
1. Feldman's - E Adams St & N Park Ave 3/4 mile

Jefferson park	Catalina Vista	Blenman Elm	Catalina Vista / Blenman Elm
Feldman's	N. University	U of A	UMC
W. University	Pie Allen	Rincon Heights	Sam Hughes

speedway & campbell | rick joy architects and shenkarow realty advisors

Viewshed Impacts & Project Visibility Study

North University



Jefferson park | Catalina Vista | Blenman Elm | Catalina Vista / Blenman Elm
Feldman's | N. University | U of A | UMC
W. University | Pie Allen | Rincon Heights | Sam Hughes

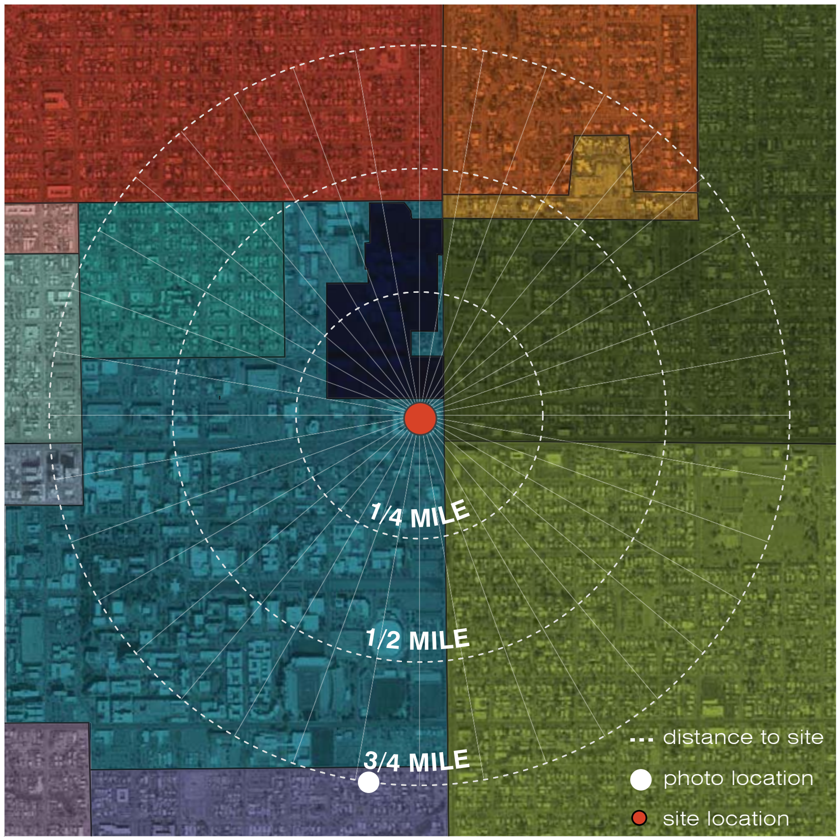
1. North University - N Highland Ave & E Lee St 1/2 mile

2. North University - E Elm St & N Fremont Ave 3/4 mile

speedway & campbell | rick joy architects and shenkarow realty advisors

Viewshed Impacts & Project Visibility Study

Rincon Heights

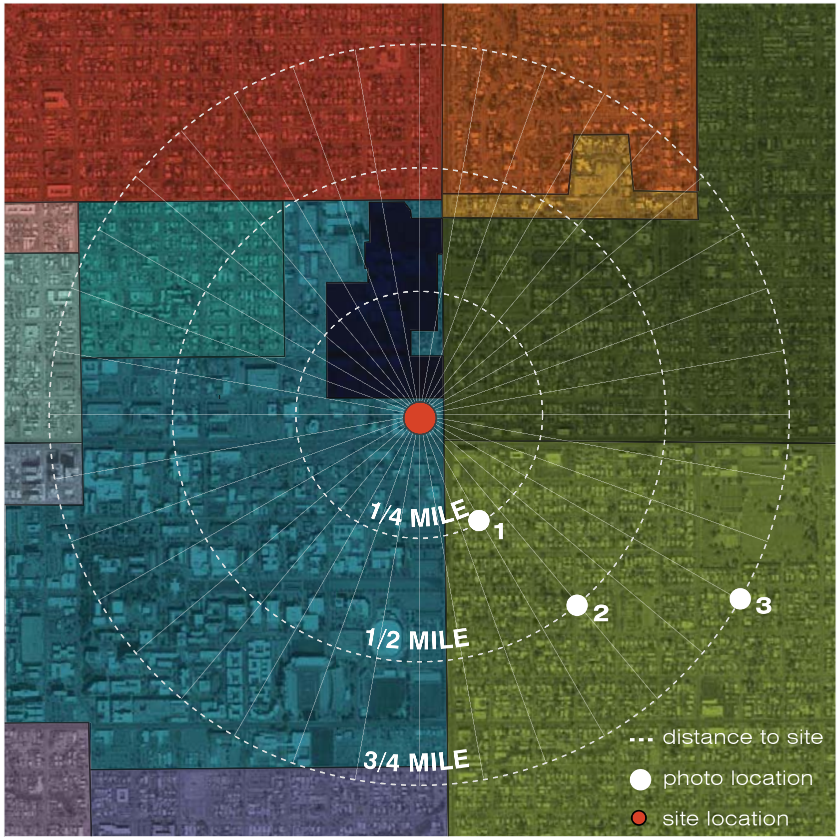


1. Rincon Heights - N Martin Ave & E 7th St 3/4 mile

- Jefferson park
- Catalina Vista
- Blenman Elm
- Catalina Vista / Blenman Elm
- Feldman's
- N. University
- U of A
- UMC
- W. University
- Pie Allen
- Rincon Heights
- Sam Hughes

speedway & campbell | rick joy architects and shenkarow realty advisors

Viewshed Impacts & Project Visibility Study
Sam Hughes



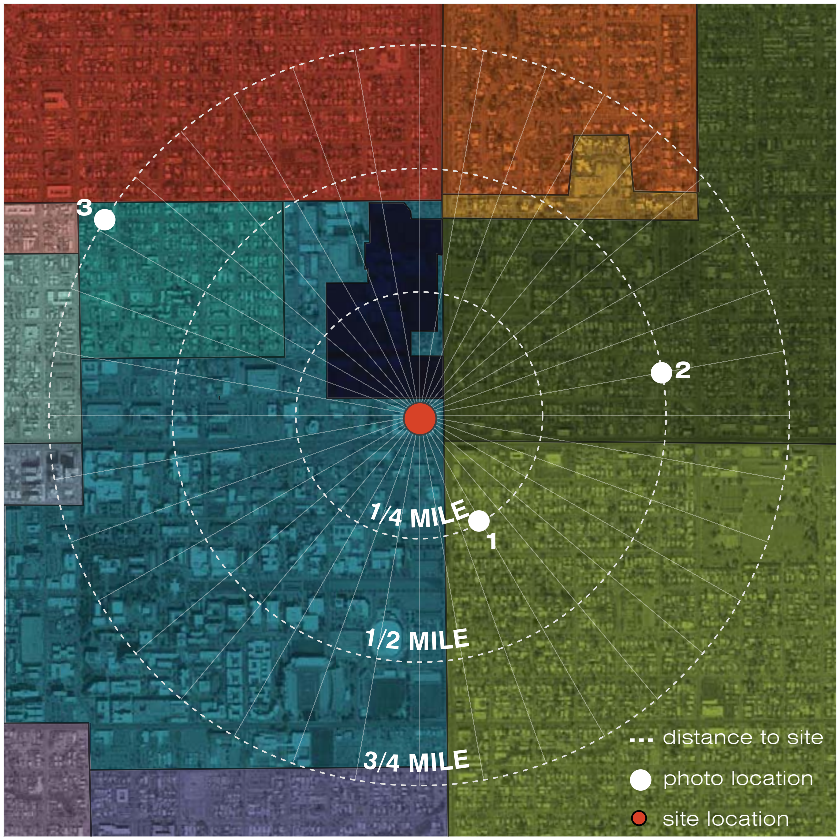
1. Sam Hughes - E 2nd St & N Norris Ave 1/4 mile

2. Sam Hughes - E 3rd St & N Plumer Ave 1/2 mile

3. Sam Hughes - E 3rd St & N Forgeus Ave 3/4 mile

Jefferson park
Catalina Vista
Blenman Elm
Catalina Vista / Blenman Elm
Feldman's
N. University
U of A
UMC
W. University
Pie Allen
Rincon Heights
Sam Hughes

Viewshed Impacts & Project Visibility Study
Summary



Jefferson park	Catalina Vista	Blenman Elm	Catalina Vista / Blenman Elm
Feldman's	N. University	U of A	UMC
W. University	Pie Allen	Rincon Heights	Sam Hughes

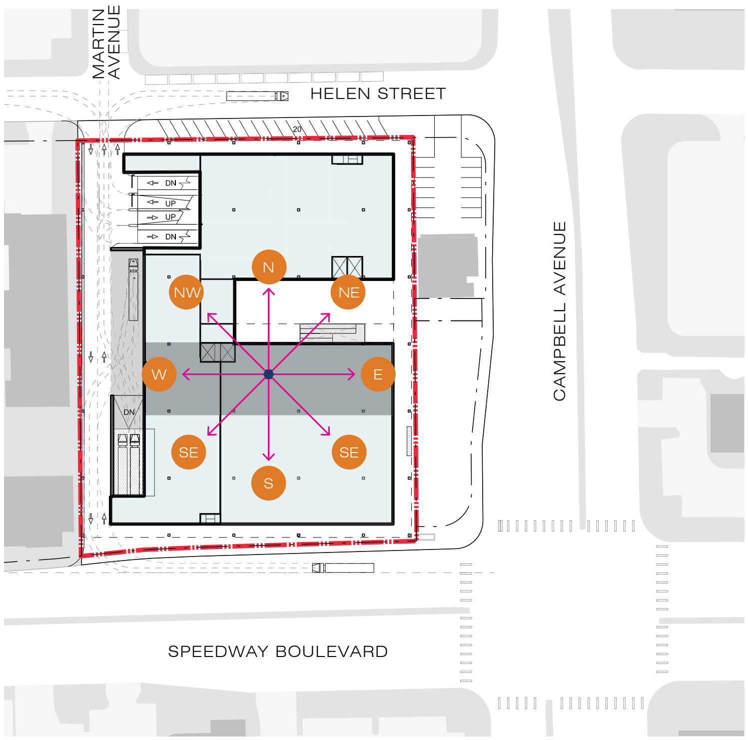

1. Sam Hughes - E 2nd St & N Norris Ave 1/4 mile


2. Blenman Elm - E Mabel & N Norton Ave 1/2 mile


3. North University - E Elm St & N Fremont Ave 3/4 mile

speedway & campbell | rick joy architects and shenkarow realty advisors

Appendix B | Drone Photos from various Proposed Building Heights into Outlying Neighborhoods



LEGEND

PAD DISTRICT BOUNDARY

PROPOSED BUILDING ENVELOPE

HIGH-RISE ELEMENT

DRONE PHOTO ORIGIN AND DIRECTION

	LOOKING NORTH	LOOKING NORTHEAST
PHOTOS TAKEN FROM 85' HEIGHT		
PHOTOS TAKEN FROM 165' HEIGHT		
PHOTOS TAKEN FROM 250' HEIGHT		

APPENDIX ITEM: 1
DRONE PHOTOS FROM PROPOSED HIGH-RISE LOCATION TO OUTLYING AREAS

LOOKING EAST | LOOKING SOUTHEAST | LOOKING SOUTH

PHOTOS TAKEN FROM 85' HEIGHT

PHOTOS TAKEN FROM 165' HEIGHT

PHOTOS TAKEN FROM 250' HEIGHT

APPENDIX ITEM: 2
DRONE PHOTOS FROM PROPOSED HIGH-RISE LOCATION TO OUTLYING AREAS

LOOKING SOUTHWEST

LOOKING WEST

LOOKING NORTHWEST

PHOTOS TAKEN FROM 85' HEIGHT

PHOTOS TAKEN FROM 165' HEIGHT

PHOTOS TAKEN FROM 250' HEIGHT

APPENDIX ITEM: 3
DRONE PHOTOS FROM PROPOSED HIGH-RISE LOCATION TO OUTLYING AREAS

Appendix C | Post-Development Acoustic Study

Speedway and Campbell Gateway Project

Helicopter Overflight Acoustical Analysis

Prepared for

Rick Joy Architects
400 South Rubio Avenue
Tucson, Arizona 85701

Project Manager
Philipp Neher

Lance Willis, PhD

R. 0, August 29, 2017

Table of Contents

1. Summary

This report investigates the change in community aircraft noise exposure with regard to helicopter flights to and from the existing helipads on top of the Diamond Children's Medical Center at the Banner University Medical Center with the addition of a proposed 20 story building at Speedway Boulevard and Campbell Avenue. Acoustical analysis of the reflection and reverberation effects of the proposed building has shown no significant change in sound pressure levels for surrounding residential areas.

2. Site Summary

2.1 Existing Residential Site

The Palm Shadow Apartments are currently located on the proposed building site at Campbell Avenue and Speedway Boulevard as indicated by the red rectangle in Figure 2.1. These buildings will be removed prior to construction.

Figure 2.1. Existing Residential Site Aerial

Zoning for the surrounding properties is residential with a corridor of commercial properties along Speedway Boulevard. The Banner University Medical Center is on the north side of the PAD site. Single family residences are located east of Campbell Avenue. Properties to the south and west belong to the University of Arizona.

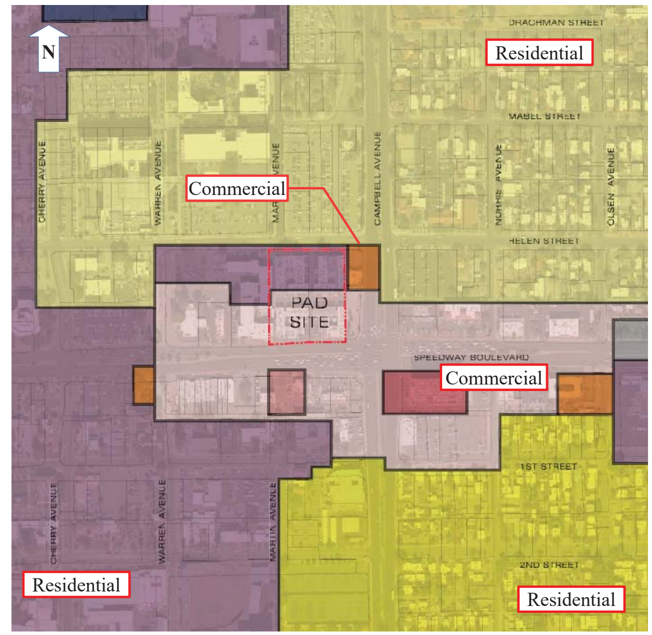


Figure 2.2. Zoning Adjacent to Proposed Site

2.2 Helicopter Flight Paths

The new hospital expansion under construction to the west of the Diamond Children's Medical Center has required an adjustment to the flight paths of helicopters going to the hospital. The two helipads are expected to remain in their current location on top of the DCMC and the type of aircraft using the helipads is expected to remain the same.

Currently and for the indefinite future, the flight paths for arrival and departure will be those shown in Figure 2.3. Flyovers of the neighborhoods to the north, east, and west will continue to be outside the designated fly friendly flight paths, except for extenuating circumstances due to wind conditions, patient conditions, or traffic on the helipad. Beginning at the University of Arizona stadium to the south, aircraft on the eastern flight path will fly over the proposed building on an approximately eight degree approach slope. This will place the aircraft at roughly 400 feet above the ground at Speedway Boulevard. Departures to the east from the southern flight path are also expected to continue on an eight degree upward slope over Speedway Boulevard.

2.3 Noise Sensitive Areas

The primary noise sensitive locations that are likely to be affected by the addition of a highrise structure are the residential areas to the northeast and southeast of the proposed site. Four points have been selected for the reflection and reverberation impact analysis labeled G1 through G4 in Figure 2.4. Locations to the north and west on the far side of the Banner University Medical Center are not expected to be impacted by reflected sound.

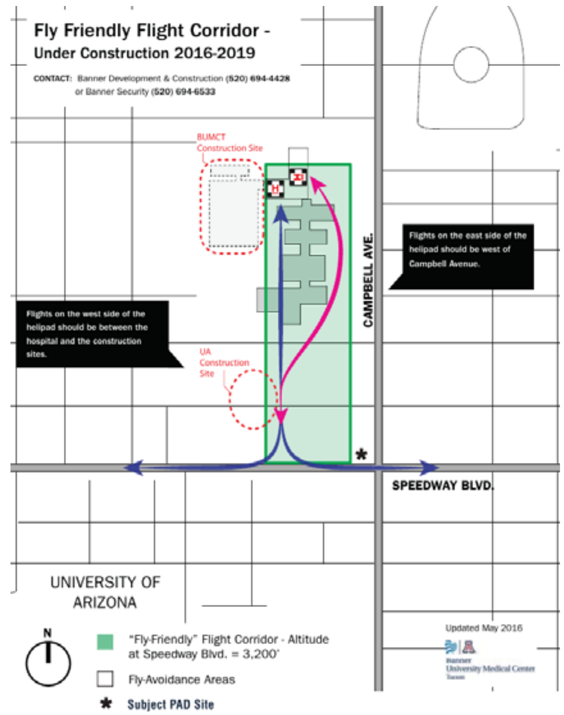


Figure 2.3. Current Flight Paths for Aircraft Landing at Medical Center

Figure 2.4. Noise Assessment Locations

3. Community Noise Impact

3.1 Helicopter Acoustical Characteristics

The typical aircraft flown in and out of the medical center are the Airbus AS350 and Bell 407. Limited acoustical data is available for these aircraft so the Bell 206L has used for the acoustical analysis. This aircraft is in the same class as the AS350 and 407 and has been the subject of extensive acoustical testing by the Federal Aviation Administration [1].

Figure 3.1. Airbus AS350

Figure 3.2. Bell 206L4

The U.S. Department of Transportation tested a Bell 206L at Dulles Airport, Oct 14, 1976. It had the following characteristics:

Engine: Allison 250-C20B Turboshaft
Empty weight: 1894 lb
Max. gross weight: 3900 lb
Passenger capacity: 7
Single rotor

Main Rotor
- Blades: 2
- Diameter: 37 ft
- Rotor rpm: 394
- Blade passage frequency: 13 Hz
- Tip speed: 763 ft/s

Tail Rotor
- Blades: 2
- Diameter: 5.17 ft
- Rotor rpm: 2550
- Blade passage frequency: 85 Hz
- Tip speed: 690 ft/s

The data used here is from the hover test. Aircraft approaching and departing the helipads are typically flying at low speed in nearly level flight. The hover test was performed with the aircraft hovering five feet above the tarmac at Dulles Airport. Random incidence microphones were set up for grazing incidence at a height of four feet and a distance of 150 m. Unweighted octave band data is shown in Table 3.1. The overall A-weighted sound pressure level was 78.1 dBA.

Frequency (Hz)	31.5	63	125	250	500	1000	2000	4000	8000
SPL re 20 uPa	80.2	78	76.5	80.8	77.2	71.5	67.9	56.1	49.8

Table 3.1. Octave Band Sound Pressure Level of Bell 206L at 150 m

3.2 Change in Sound Pressure Levels Due to Building Reflections

The addition of a 20 story building at the corner of Speedway Boulevard and Campbell Avenue will result in reflections of aircraft sound directed to the east of Campbell Avenue for certain sections of the flight paths. Due to the altitude of the aircraft these reflections will generally be directed at the ground in the immediate vicinity of the building as illustrated in Figure 3.3.

Figure 3.3 also demonstrates why noise assessment locations farther from the building have not been included in the analysis. With the aircraft above the building roof level, reflected sound will be traveling downward, impinging on the ground close to the building. When the helicopters are below the roof level of the building they will be far away, close to the hospital helipads. In this case, the large difference in path lengths between the direct path and the reflected path for locations to the north of the hospital will make the resultant change in sound pressure level insignificant.

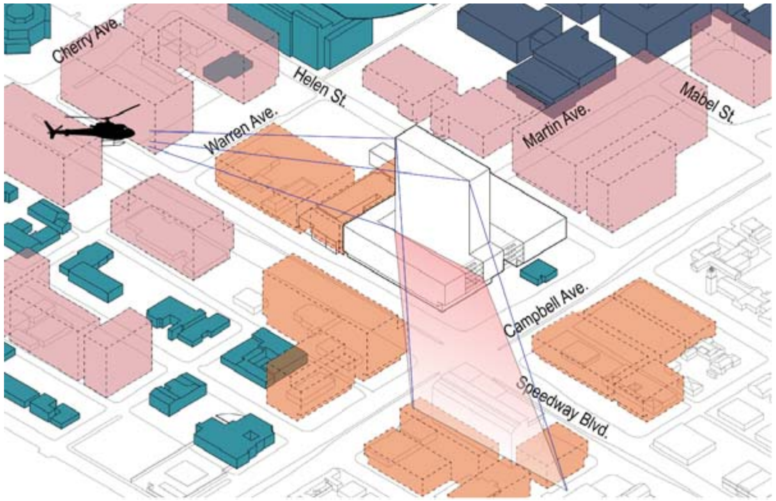


Figure 3.3. Typical Reflection Coverage Pattern for Aircraft Flying Over Proposed Building

Each noise assessment location has been analyzed for the eastern and southern flight paths (see Figure 2.4). The change in sound exposure level (SEL) for the entire flyover and the change in the maximum sound pressure level (SPL) during each flyover are listed for each noise assessment location in Table 3.2.

	Eastern Approach		Southern Approach	
NAL	Change in SEL (dBA)	Change in Max SPL (dBA)	Change in SEL (dBA)	Change in Max SPL (dBA)
G1	0.0	0.0	0.2	0.7
G2	0.0	0.0	0.2	0.8
G3	0.0	0.0	0.0	0.0
G4	0.6	1.1	0.0	0.0

Table 3.2. Change in Sound Impact Due to Building Reflections at Noise Assessment Locations

At point G3 no reflections from either flight path are expected. At the remaining noise assessment locations only one flight path cast a reflection at each location. The increases in sound pressure level are very small with the highest at point G4, a 0.6 dBA increase in SEL and 1.1 dBA increase in the maximum SPL. These numbers are very conservative in that no atmospheric absorption has been taken into account with regard to the direct/reflected path length difference and the building has been represented as a perfect reflector. Atmospheric absorption is not likely to contribute much attenuation in this case due to the distances involved and the comparatively small amount of high frequency energy radiated by helicopters.

3.3 Reverberation and the Canyon Effect

With regard to reverberation, the accumulation of acoustical energy between the proposed building and nearby structures is not expected to be different than for the existing structure on the site. Reverberation requires a set of enclosing surfaces that trap sound. Although the proposed building is significantly taller than the existing structure on the site, it is not paired with neighboring structures of sufficient height to trap additional sound in the space between. The primary acoustical effect of the proposed higher structure will be reflective rather than reverberant and, as shown above, that effect is small.

4. Conclusions

Acoustical analysis of the reflection and reverberation effects of the proposed 20 story building at Speedway Boulevard and Campbell Avenue has shown no significant change in sound pressure levels in surrounding residential areas. The greatest change in maximum sound pressure level was found to 1.1 dBA and the maximum change in sound exposure level for the entire eastern and southern flight paths was found to be 0.6 dBA.

A just noticeable difference in sound pressure level (JNDL) is, in most outdoor situations, about 3 dBA. The calculations performed here show that the sound exposure level changes due to reflections are not expected to be appreciable.

Because the aircraft will be flying above the building, reflections will be directed downward impinging on the ground immediately around the building. The reflected path length to locations more distant from the proposed building will be much greater than the direct path length, making the reflected sound pressure small in comparison to the direct sound.

The structures surrounding the proposed building were not found to have surfaces capable of entrapping sound in a way that would cause excessive reverberation or a canyon effect with regard to nearby residential areas.

5. References

[1] True, H. C.; Rickley, E. J.; and Letty, R. M., “Helicopter Noise Measurements Data Report”, Vol. I, April 1977. Available from the Federal Aviation Administration, report no. FAA-RD-77-57.

[2] Helicopter Association International, “Fly Neighborly Guide,” rotor.org, Alexandria, VA. 2009.

Appendix

A1. Glossary of Acoustical Terms and Abbreviations

A1.1 Abbreviations

AI: articulation index

ASEL: A-weighted sound exposure level

ASTC: apparent sound transmission class

dB: decibel

DNL: day - night level

FSTC: field sound transmission class

Hz: Hertz

IIC: impact insulation class

kHz: kilohertz

L_{eq}, LA_{eq}, LC_{eq}: equivalent sound pressure level

NC: noise criteria

NIC: noise isolation class

NIPTS: noise induced permanent threshold shift

NR: noise reduction

Pa: Pascal

POE: probable occupant evaluation (see room criteria)

PTS: permanent threshold shift

PWL: sound power level

QAI: quality assessment index (see room criteria)

RC: room criteria

RT_{60}: reverberation time

SEL: sound exposure level

SII: speech interference index

SIL: speech interference level

SLM: sound level meter

SPI: speech privacy index

SPL: sound pressure level

STI: speech transmission index

TTS: temporary threshold shift

A1.2 Terms

A-weighting: see frequency weighting

absorption coefficient: see sound absorption coefficient

acoustical coupler: a cavity of predetermined shape and volume used for the calibration of earphones or microphones in conjunction with a calibrated microphone adapted to measure the sound pressure developed within the cavity

anechoic room: a room whose boundaries absorb practically all of the sound incident thereon, thereby providing essentially freefield conditions

articulation index (AI): a number (ranging from 0 to 1) which is a measure of the intelligibility of speech- the higher the number the greater the intelligibility. This metric has been replaced by the Speech Intelligibility Index (SII) defined in ANSI S3.5.

average sound level: see equivalent continuous sound level

background noise: the total noise from all sound sources other than a particular sound that is of interest

band: a subsection of the frequency spectrum

C-weighting: see frequency weighting

coupler: see acoustical coupler

day-night level (DNL): the 24 hour equivalent (average) A-weighted sound pressure level. A 10 dBA penalty is incurred between the hours of 10:00 PM and 7:00 AM. The DNL system has been adopted by the U.S. Department of Housing and Urban Development, the Department of Defense, and the Federal Aviation Administration.

decibel (dB): a unit of level which denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the common logarithm (base 10) of this ratio.

diffuse field: a sound field which has statistically uniform energy density and in which the directions of propagation of the sound waves are randomly distributed. In a practical sense, the sound pressure levels at all points in the room are nearly the same except near the room

boundaries and a sound wave reaching a given point in the room is equally likely to arrive from all directions.

direct sound: sound which reaches a given location in a direct line from the source without any reflections.

equivalent continuous sound level (L_{eq}): the level of steady sound which, in a stated time period and at a stated location, has the same sound energy as the time varying sound. If frequency weighting is applied, the equivalent continuous sound level may be designated LA_{eq} to indicate A-weighting or LC_{eq} to indicate C-weighting, etc. See also frequency weighting.

field sound transmission class (FSTC): a single number rating similar to sound transmission class (STC), except that the transmission loss values used to derive this class are measured in the field. FSTC ratings are typically lower than STC ratings which are measured under laboratory conditions.

flanking path: A wall or floor/ceiling construction that permits sound to be transmitted along its surface; or any opening, which permits the direct transmission of sound through the air.

freefield: a sound field in which the boundaries have negligible effect over the frequency range of interest.

frequency: the number of times that a waveform repeats itself in a given period of time, usually one second, i.e. the number of cycles per second). Unit: Hz.

frequency weighting: a prescribed frequency dependent attenuation or amplification applied to measured sound data usually intended to better approximate the sensation of loudness in a human listener. For example, A, B, and C weighting approximate the frequency dependent shape of the equal loudness contours for soft, moderate, and loud sounds.

Hertz (Hz): unit of frequency, cycles per second.

impact insulation class (IIC): a single number metric used to compare the effectiveness of floor-ceiling assemblies in providing reduction of impact-generated sounds such as footsteps. This rating is derived from values of normalized impact sound pressure levels in accordance with ASTM E492.

insertion loss: the reduction in sound level at the location of the receiver when a noise reduction measure such as a barrier, attenuator, muffler, etc. is inserted into the transmission path between the source and receiver. Unit: dB.

level: the logarithm of the ratio of a given quantity to the reference quantity of the same kind. Levels represent physical quantities such as sound pressure on a logarithmic scale and are therefore expressed in decibels. Unit: dB.

loudness: that attribute of auditory sensation in terms of which sounds may be ordered on a scale extending from soft to loud. Unit: sone.

masking: the process by which the threshold of hearing for one sound is raised by the presence of another sound.

noise criteria (NC): a single number criteria for the HVAC or mechanical noise level in a room derived from measured octave band data. The octave bands are weighted to de-emphasize low frequencies because the human ear is least sensitive to these frequencies. This metric is not valid for outdoor measurements.

noise induced permanent threshold shift (NIPTS): the permanent hearing loss resulting from noise exposure.

noise isolation class (NIC): a single number rating derived from measured values of noise reduction between two enclosed spaces that are connected by one or more paths. This rating is not adjusted or normalized to a standard reverberation time.

noise reduction (NR): the difference in sound pressure level between any two points along the path of sound propagation, e.g. the difference in level between the interior and exterior of a building where the sound level inside is due only to exterior noise.

octave: the frequency interval between two tones whose frequency ratio is 2.

omnidirectional microphone: a microphone whose response is independent of the direction of the incident sound wave.

Pascal (Pa): a unit of pressure. 1 Pascal = 1 Newton per square meter ($1\ N / m^2$).

permanent threshold shift (PTS): a permanent increase in the threshold of hearing at a given frequency.

point source: a source that radiates sound as if from a single point.

receiver: a person (or persons) or equipment which is affected by sound.

refraction: (1) the phenomenon by which the direction of propagation of a sound wave is changed as a result of a spatial variation is the speed of sound. (2) The angular change in direction of a sound wave as it passes obliquely from one medium to another having different sound speed.

reverberation time (RT_{60}): of an enclosure, for a sound of a given frequency or frequency band, the time that is required for the sound pressure level in the enclosure to decrease by 60 dB after the source has stopped. Unit: second.

room criteria (RC, RC Mark II): an octave band metric for evaluating HVAC noise inside a room. RC is a two dimensional metric consisting of a curve number that is the arithmetic average of the 500, 1000, and 2000 Hz octave band sound pressure levels and a qualitative descriptor identifying the character of the sound spectrum. The descriptor can be (N) for neutral, (LF) for low frequency dominance (rumble), (MF) for midfrequency dominance (roar), and (HF) for high frequency dominance (hiss). In addition, acoustically induced vibration can be designated by (LFV_B) for moderate, but perceptible vibration and (LFV_A) for clearly perceptible vibration. As an example, the maximum RC prerequisite for LEED is designated as RC 37(N) indicating curve number 37 with a neutral spectrum.

Further, two intermediary metrics are used in calculating the room criteria. The quality

assessment index (QAI) is a measure of the deviation from the given RC curve. The probable occupant evaluation (POE) is based on the magnitude of the QAI and can be 'Acceptable,' 'Marginal,' or Objectionable.'

Sabin: a unit of measure of sound absorption; a measure of sound absorption of a surface. It is the equivalent of 1 square foot of a perfectly absorbing surface; a metric Sabin is the equivalent of 1 square meter of a perfectly absorbing surface.

sone: the unit of loudness. One sone is the loudness of a pure tone presented frontally at a frequency of 1000 Hz and a sound pressure level of 40 dB referenced to 20 micropascals.

sound absorption coefficient (α): ideally, the fraction of diffusely incident sound power that is absorbed (or otherwise not reflected) by a material or surface.

sound exposure level (SEL): over a stated time period or event, 10 times the logarithm base 10 of the ratio of the time integral of the sound pressure squared to the product of the reference sound pressure, 20 μPa, squared and the reference time, one second. This quantity is used to characterize single events of short duration where the averaged level (L_{eq}) is inadequate.

sound level meter (SLM): an instrument that is used to measure sound level, with a standard frequency weighting and standard exponentially weighted time averaging.

sound power level (PWL): the total acoustical power emitted from a sound source expressed in decibels relative to 10^{-12} Watts.

sound pressure level (SPL): the acoustical pressure amplitude expressed in decibels relative to 20 micropascals.

sound transmission class (STC): a single number rating used to compare sound insulation properties of walls, floors, ceilings, windows, or doors. See also field sound transmission class.

speech intelligibility index (SII): metric defined under ANSI S3.5 to quantifiy the intelligibility of speech under adverse listening conditions such as noise masking, spectral filtering, and reverberation. The SII is defined for a scale of 0 to 1 where values greater than 0.75 indicate good communication and values below 0.45 indicate generally poor communication conditions.

speech intelligibility test: a procedure that measures the portion of test items (such as syllables, monosyllabic words, or sentences) that are heard correctly.

speech interference level (SIL): an index for assessing the interference effects of noise on the intelligibility of speech, derived from measurements of the background noise level of contiguous octave bands; i.e. the arithmetic average of the octave band sound levels for the bands centered at 500, 1000, 2000, and 4000 Hz (four band method) or the corresponding average for the octave bands centered at 500, 1000, and 2000 Hz (three band method). If other octave bands are used they must be specified. Unit: dB.

speech privacy index (SPI): The SPI is essentially the opposite of the speech intelligibility index and is defined as 1 - SII and usually represented as a percentage. An SPI above 80% is considered normal privacy while an SPI above 95% would meet the requirements of confidential privacy.

speech transmission index (STI): an index for rating the intelligibility of speech that takes both noise and reverberation into account.

temporary threshold shift (TTS): a temporary increase in the threshold of hearing at a given frequency.

threshold of hearing: for a given listener, the minimum sound pressure level of a specified sound that is capable of evoking an auditory sensation. The sound reaching the ears from other sources is assumed negligible.

transducer: a device designed to receive an input signal of a given kind and to furnish an output signal of a different kind in such a manner that the desired characteristics of the input signal appear in the output signal. For example, a microphone takes an acoustic pressure as an input and produces an electrical voltage as an output that is direct proportion to the instantaneous acoustic pressure amplitude. Other common examples in noise measurement would be a loudspeaker, accelerometer, or laser Doppler vibrometer (LDV).

transmission loss: the reduction in sound level from one side of a partition to the other.

wavelength: the distance a sound wave travels in the time it takes to complete one cycle.

weighting: see frequency weighting

Appendix D | Draft Traffic Impact Assessment

SPEEDWAY BOULEVARD AND CAMPBELL AVENUE PLANNED AREA DEVELOPMENT

Traffic Impact Analysis

June 8, 2017

Kimley»Horn

Speedway Boulevard and Campbell Avenue, Planned Area Development, Traffic Impact Analysis

June 8, 2017

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1. INTRODUCTION

Background Information

A proposed 19-story mixed-use building is proposed to be constructed on the northwest corner of Speedway Boulevard and Campbell Avenue, near the University of Arizona, in Tucson, Arizona.

The proposed development will consist of 368,814 square feet, on approximately 2.5 acres in the northwest corner of Campbell Avenue and Speedway Boulevard where the Palm Shadows Apartments are currently located. The building will include a variety of uses including residential, hotel, a major grocery store, office and clinic spaces and retail shops. Parking facilities will also be included in the development.

A vicinity map of the proposed development is provided in **Figure 1**.

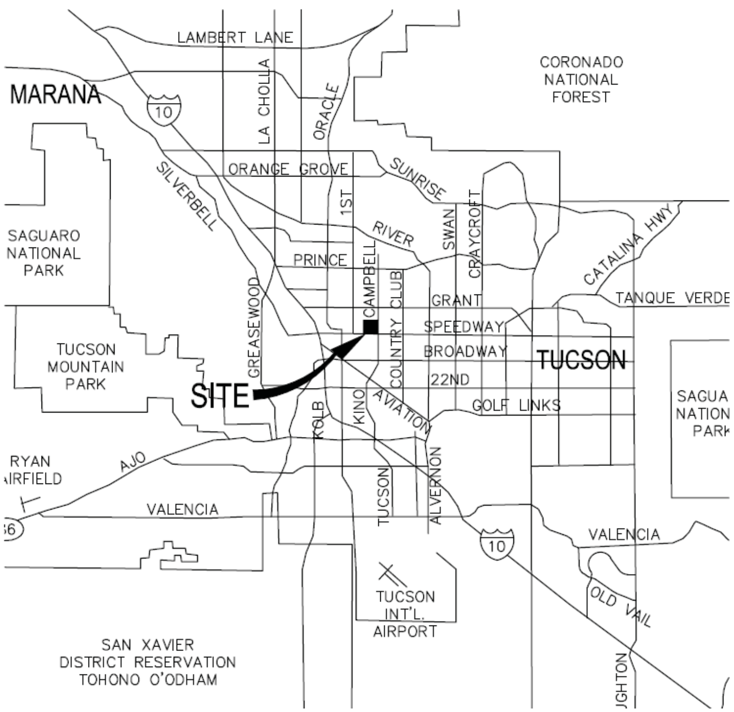
Study Purpose

The scope of the analysis includes the following:

- Develop trip generation estimates for the proposed development for an "Analysis Scenario". The "Analysis Scenario" is represents an assumed and likely set of land-uses and intensities that will ultimately occupy the project. It should be emphasized that the exact tenant's, and intensity of each proposed land use is not known at this time; the "Analysis Scenario" represents conservative, yet realistic land use assumptions.
- Distribute and assign generated traffic to adjacent roadway network.
- Analyze the traffic impacts of the proposed development on surrounding transportation infrastructure. The following signalized intersections are analyzed:
  - Speedway Boulevard and Cherry Avenue
  - Speedway Boulevard and Campbell Avenue
  - Campbell Avenue and Elm Street
- Document transportation improvements and recommendations for each study area intersection and roadway segments.
- Calculate parking requirements considering the various uses and their peak demands.

The proposed Speedway Boulevard & Campbell Avenue site plan is provided in **Appendix A.**

Figure 1. Vicinity Map



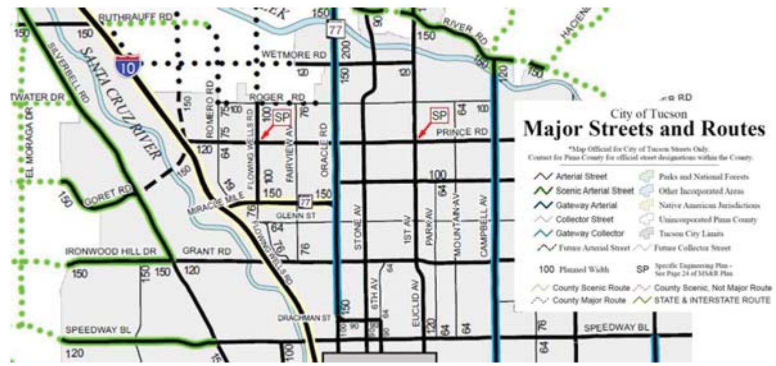
2. EXISTING CONDITIONS

City of Tucson Major Streets and Routes

The City of Tucson Major Streets and Routes Plan (MS&RP) identifies the general location and width of existing and proposed freeways, arterial and collector streets. The MS&RP also identifies future rights-of-way, setback requirements, typical intersections and cross sections, and gateway and scenic routes. The MS&RP (**Figure 2**) defines future right of way of Campbell Avenue and Speedway Boulevard to be 120 feet. Campbell Avenue is identified as a Gateway Arterial.

Gateway Arterials are routes to major employment centers, shopping areas, recreational areas, and transportation centers which are used regularly by large numbers of residents and visitors. The purpose of this designation is to improve the appearance of the built environment through the use of standards for the design and landscaping of the roadway and adjacent developments.

Figure 2. City of Tucson Major Streets and Routes Plan



Existing Roadway Network

Streets that are within the immediate vicinity of the project and provide access and circulation are described below.

Campbell Avenue

Campbell Avenue is the major north-south arterial roadway that runs directly east of the proposed development. Campbell Avenue is a six-lane arterial with raised medians and has a 35 MPH posted speed limit. The road is constructed to the maximum cross-section supported by the City of Tucson Major Streets and Routes Plan.

<u>Speedway Boulevard</u>

Speedway Boulevard is a major east-west arterial roadway directly south of the proposed development. Speedway Boulevard is a six-lane arterial roadway with raised medians and has a 35 MPH posted speed limit. The road is constructed to the maximum cross-section supported by the City of Tucson Major Streets and Routes Plan.

<u>Local Public Streets</u>

Helen Street serves as a minor east-west collector street that provides access to several University of Arizona buildings and parking facilities on the north side of Speedway Boulevard. Helen Street will serve as one of the primary access points directly north of the proposed development.

Cherry Avenue serves as a minor north-south collector street providing access to the main University of Arizona campus (to the south of Speedway), and to the Banner University Medical Center (north of Speedway). It lies approximately 1/4 mile west of the Site. The intersection of Cherry Avenue and Speedway Boulevard is signalized.

<u>Ring Road</u>

The 0.8 mile Ring Road within the AHSC (to the immediate north) is a low speed, two-lane corridor with a speed limit of approximately 20 MPH.

It essentially forms a loop through AHSC and the Banner-UMC (BUMC) property to the adjacent north. The Road extends from Cherry Avenue, at Drachman Street, then north to Elm Street, and ultimately south to Mabel Street. As part of BUMC's construction of a new hospital (currently in progress), the Ring Road will be realigned with Elm Street to create a new, primary access point and signalized intersection for the hospital and for users within AHSC, as illustrated in **Figure 3**.

Multimodal Connectivity

The proposed mixed-use development will be served by Sun Tran and Cat Tran bus services, the Modern Streetcar, and bicycle and pedestrian facilities.

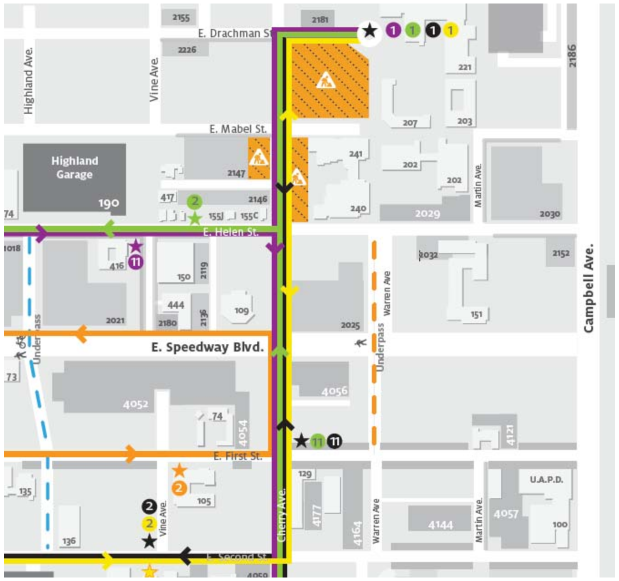
<u>Sun Tran Bus Routes</u>

Sun Tran provides transit service bordering the proposed development with bus stops on Campbell Avenue and Speedway Boulevard. Bus routes on Speedway Boulevard include Routes 4, 5, 102X, 103X, 105X, and 109X. Bus routes on Campbell Avenue include Route 9, 15, 20, and 103X.

http://www.sunlinkstreetcar.com

<u>Cat Tran Shuttle Service</u>

The University of Arizona Cat Tran system circulates within the UA campus and near the proposed project site. The Green, Yellow, and Purple routes run along Cherry Avenue, west of the project site.



https://parking.arizona.edu/pdf/

Sun Link Streetcar Facilities

The 3.9-mile modern streetcar system, known as Sun Link, was completed in the summer of 2014. The streetcar line begins at Warren Avenue and Helen Street on the northwest corner of the proposed development and provides direct access to the University of Arizona campus and to downtown Tucson, terminating on the west side of I-10. Sun Link's service provides 10 to 15 frequency during the weekday and weekend peak periods and 20 to 30 minute frequency during off-peak periods. The streetcar operates from 7:00 am to 10:00 pm on Monday to Thursday, from 7:00 am to 12:00 am on Friday, from 8:00 am to 12:00 am on Saturday, and from 8:00 am to 8:00 pm on Sunday.

http://www.sunlinkstreetcar.com

Existing & Planned Bike Routes

The proposed development is surrounded by a robust network of designated bicycle routes and bicycle lanes. Both Speedway Boulevard and Campbell Avenue are designated as Bike Routes with Striped Shoulder on the Pima County Regional Bike Map. Helen Street is designated as a Residential Street on the Pima County Regional Bike Map.

An existing shared-use path along the Warren Avenue alignment serves as a north-south bicycle route for both cyclists and pedestrians. The Warren Avenue and Highland Avenue underpasses (directly west of the proposed project) provides a grade-separated crossing beneath Speedway Boulevard to facilitate direct access to the UA main Campus. The Warren Avenue underpass provides a link for the streetcar and is a pedestrian-only connection (bikes must be walked). Highland Avenue underpass accommodates both pedestrians and bicyclists, making it the best southward connective route to the main campus.

www.tucsonaz.gov

According to data obtained from the City of Tucson and UA, there are no current plans for the designation or construction of any new bicycle routes in the study area vicinity.

Existing Configurations and Traffic Conditions

Existing traffic control configuration at primary intersections within the study area are illustrated in **Figure 3**. Signalized intersections that will serve the proposed development are at

Campbell Avenue/Elm Street, Campbell Avenue/Speedway Boulevard and Speedway Boulevard /Cherry Avenue.

Traffic volume data was collected in 2012 as part of the AHSC Traffic and Circulation Study and the Banner University Medical Center Traffic Impact Analysis. A comparison (**Table 1)** of the 2012 traffic volumes with 2015 and 2016 traffic volumes (from Pima Association of Governments Transportation Data Management System) shows that 2015/2016 peak-hour traffic volumes for both the AM and PM period at the study intersections are lower than that collected in 2012. Furthermore, several University of Arizona building are under construction within the project vicinity, including the Banner University Medical Center, which may alter traffic patterns within the study area. As such, the 2012 peak-hour traffic volumes are used in this analysis. The 2012 peak-hour traffic volumes, which represent current volumes in this analysis, are summarized in **Figure 4.**

Table 1. Comparison of 2012 and 2015/2016 Traffic Volumes

Campbell Avenue / Speedway Boulevard

2012 (April) and 2016 (October traffic volumes (intersection entering vehicles)		
AM		
2012:	6,024 VPH	
2016:	5,521 VPH	8.3% decrease
PM		
2012:	6,946 VPH	
2016:	6,428 VPH	8.1% decrease

Cherry Avenue / Speedway Boulevard

2012 (April) and 2015 (September) traffic volumes (intersection entering vehicles)		
AM		
2012:	4,061 VPH	
2015:	3,539 VPH	14.7% decrease
PM		
2012:	4,276 VPH	
2015:	4,306 VPH	~1% decrease

Campbell Avenue / Elm Street

2012 (April) and 2015 (September) traffic volumes (intersection entering vehicles)		
PM		
2012:	3,481 VPH	12.3% decrease
2015:	3,052 VPH	

A capacity analysis of existing study area streets and intersections was conducted. Capacity analysis is performed consistent with methodologies outlined in the Highway Capacity Manual (Transportation Research Board, 2010). The Highway Capacity Manual (HCM) employs methodologies to calculate intersection Level of Service (LOS). LOS is a qualitative assessment of the quantitative effect of factors such as intersection geometry, lane configuration, and traffic volumes. Operating conditions are categorized as “A” through “F,” with “A” representing the most favorable conditions and “F” representing the least favorable.

The City of Tucson requires the traffic impact of new development on streets and intersections to be mitigated to a Level of Service D or better.

Table 2 shows the delay (wait time thresholds) for each LOS grade.

Table 2. Level of Service Delay Thresholds

LOS	Signalized Intersection	Unsignalized Intersection
A	≤10 sec	≤10 sec
B	10-20 sec	10-15 sec
C	20-35 sec	15-25 sec
D	35-55 sec	25-35 sec
E	55-80 sec	35-50 sec
F	≥80 sec	≥50 sec

Intersection LOS is computed as a weighted average of vehicle delay. An intersection may have an acceptable overall LOS but may also have individual movements with unacceptable LOS. As a result, all movements are analyzed individually, and recommendations are made to reduce delay and increase capacity on critical movements.

A summary of the resulting capacity analysis for peak-hour existing conditions are found in **Table 3.**

The stop-controlled intersection of Mabel Street/Campbell Avenue operate at LOS "F". This is due to the delay incurred by vehicles attempting to make a left turn from eastbound Mabel Street to Northbound Campbell Avenue. LOS "F" on a minor street that is stop-controlled at its intersection with a major arterial is a common condition in busy urban environments.

Figure 3. Existing Traffic Configuration

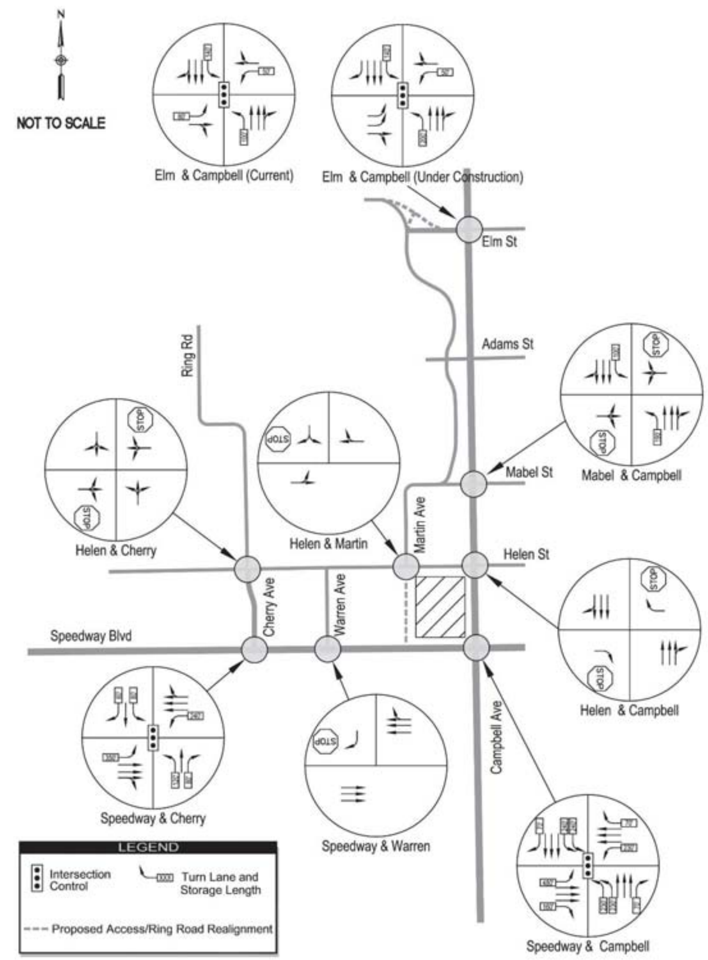


Figure 4. Existing Peak-Hour Traffic Volumes

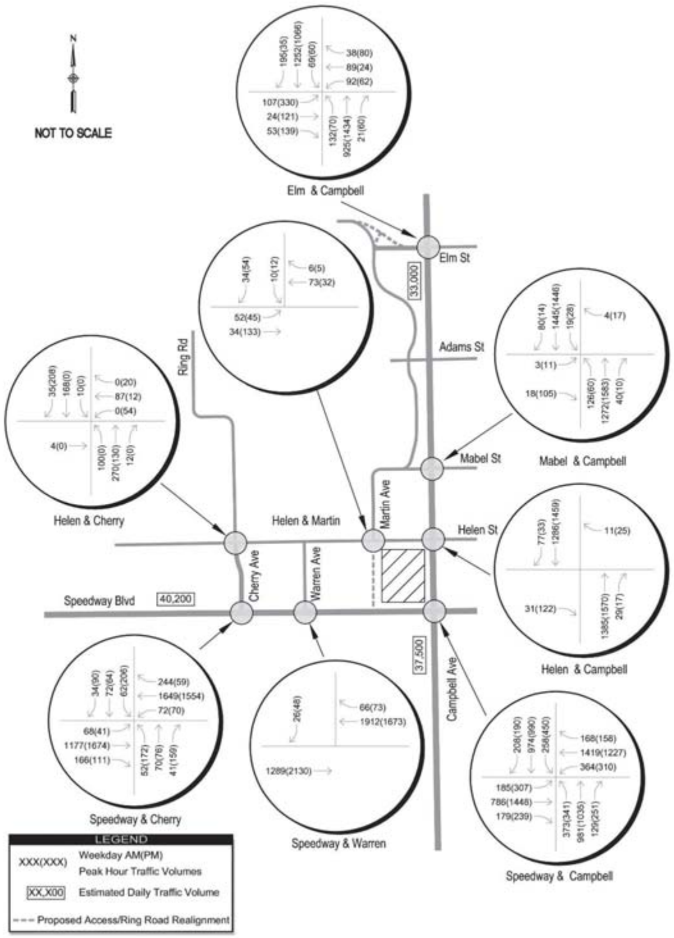


Table 3. Existing Peak-Hour LOS Summary

Local Intersection	EB			WB			NB			SB			Intersection LOS	Intersection Delay (s)	Traffic Control
	L	T	R	L	T	R	L	T	R	L	T	R			
Elm Street / Campbell Avenue															
AM Peak Hour	C	A	C	C	A	C	C	C	C	B	B	B	B	18.4	Signalized
PM Peak Hour	D	A	C	C	A	C	C	C	C	D	C	C	C	28.5	
Mabel Street / Campbell Avenue*															
AM Peak Hour		F			C			-			-		F	86.0	Unsignalized
PM Peak Hour		F			C			-			-		F	147.2	
Speedway Boulevard / Campbell Avenue															
AM Peak Hour	E	D	D	E	D	C	D	D	C	D	D	D	D	45.8	Signalized
PM Peak Hour	D	D	C	E	D	C	D	E	D	F	D	D	D	52.7	
Cherry Avenue / Speedway Boulevard															
AM Peak Hour	D	A	A	C	D	D	D	D	D	D	D	D	C	20.2	Signalized
PM Peak Hour	D	C	C	D	C	C	C	C	C	D	C	C	C	26.9	
Helen Street / Cherry Avenue*															
AM Peak Hour		C			C			-			-		C	22.4	Unsignalized
PM Peak Hour		A			B			-			-		B	10.8	
Helen Street / Martin Street*															
AM Peak Hour		-			-			-			A		A	9.2	Unsignalized
PM Peak Hour		-			-			-			A		A	9.1	
Warren Avenue / Speedway Boulevard*															
AM Peak Hour		-			-			-			D		D	27.9	Unsignalized
PM Peak Hour		-			-			-			D		D	25.9	
Helen Street / Campbell Avenue*															
AM Peak Hour		C			C			-			-		C	18.1	Unsignalized
PM Peak Hour		D			C			-			-		D	29.4	

* Intersection LOS and Delay for unsignalized intersections is reported as "Worst-Movement LOS"

3. FUTURE CONDITIONS ANALYSIS

Traffic impact analysis procedures utilize a four-step process to forecast travel demands. Trip generation is the first step in the process that estimates the number of trips to be "produced" or "generated" by a particular land use type within a specific traffic analysis zone. Traffic analysis zones are also "destinations" of trips, or trip "attractors." Examples of attractors are land uses such as commercial establishments and employment centers.

Trip generation is followed by trip distribution (from which direction are people traveling), mode choice (how do they travel – by vehicle, walking/biking, or by bus), and route assignment (which streets do they utilize).

Upon completion of the four-step process, a capacity analysis of the roadway network (streets/intersections) is performed to evaluate their operational performance. Each of these steps is described in more detail below.

Background Traffic

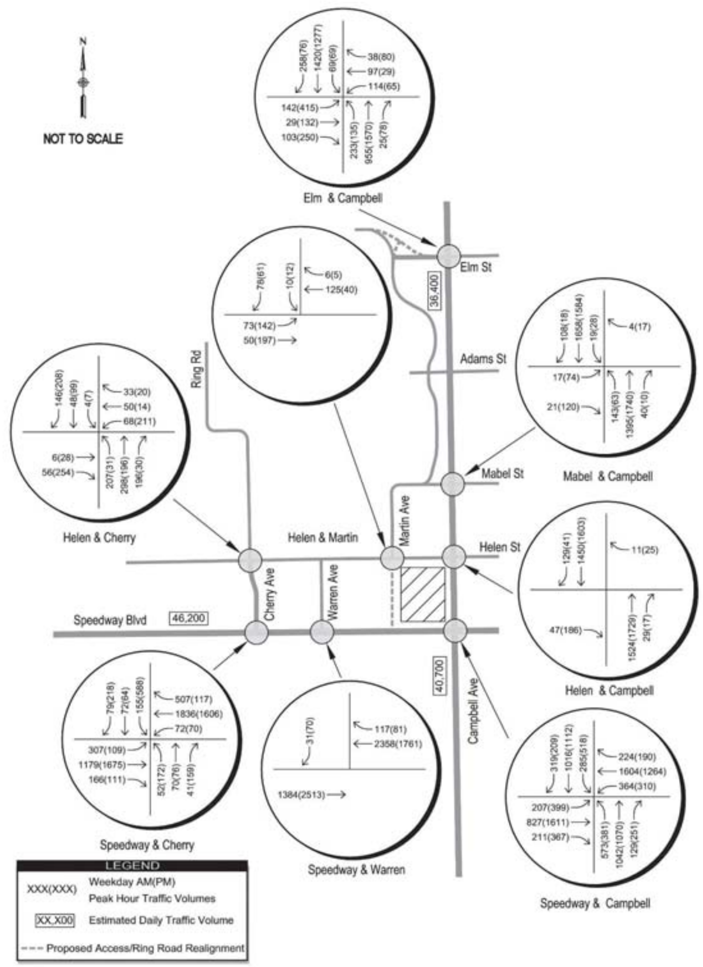
In addition to the existing traffic volumes on the street network, the analysis of future conditions reflects trips that will be generated from future surrounding developments including the Banner University Medical Center, medical clinics, and offices, and on-going and future academic and research building construction by the University of Arizona.

The trip generation from these surrounding developments were referenced from the Banner University Medical Center traffic analysis. *As such, background traffic in this analysis is represented by the total traffic estimated for the Phase II Banner University Medical Center development (year 2035), less the traffic estimated to be generated by the Speedway/Campbell development.* The total trip generation used to represent the background traffic is summarized in **Table 4**. The background trips distributed and assigned within the study area are shown in **Figure 5**.

Table 4. Background Trip Generation (Phase 2, 2035, Banner University Medical Center Traffic Study)

	Daily Total	AM Peak			PM Peak		
		In	Out	Total	In	Out	Total
Total	19,849	1,761	436	2,196	412	1,660	2,099

Figure 5. Background Peak-Hour Traffic



Trip Generation

Trip-generation is calculated from qualitative measures associated with the development land uses such as number of employees of a facility, development square footage, number of residential units, or number of dwelling units. Trip generation estimates reflect the number of trips entering or exiting a site or development during a specified time period (e.g., daily, or during the morning peak-period). The Institute of Transportation Engineers (ITE) Trip Generation Manual contains trip-generation rates developed from an aggregation of over 4,000 traffic studies, for dozens of land uses. Trip generation rates for Speedway/Campbell development proposed uses are outlined in **Table 5.**

Table 5. Trip Generation Land Uses, ITE Codes and Rates

High-Rise Residential					
ITE 9th Edition:	**232**				
Daily	T = 4.18*(Dwelling Units)	50%	In	50%	Out
AM Peak Hour	T = 0.34*(Dwelling Units)	19%	In	81%	Out
PM Peak Hour	T = 0.78*(Dwelling Units)	62%	In	38%	Out
Hotel					
ITE 9th Edition:	**310**				
Daily	T = 8.17*(Rooms)	50%	In	50%	Out
AM Peak Hour	T = 0.53*(Rooms)	59%	In	41%	Out
PM Peak Hour	T = 0.60*(Rooms)	51%	In	49%	Out
Medical-Dental Office Building					
ITE 9th Edition:	**720**				
Daily	T = 36.13*(1000 SF)	50%	In	50%	Out
AM Peak Hour	T = 2.39*(1000 SF)	79%	In	21%	Out
PM Peak Hour	T = 3.57*(1000 SF)	28%	In	72%	Out
General Office Building					
ITE 9th Edition:	**710**				
Daily	T = 11.03*(1000 SF)	50%	In	50%	Out
AM Peak Hour	T = 1.56*(1000 SF)	88%	In	12%	Out
PM Peak Hour	T = 1.49*(1000 SF)	28%	In	72%	Out
Supermarket					
ITE 9th Edition:	**850**				
Daily	T = 102.24*(1000 SF)	50%	In	50%	Out
AM Peak Hour	T = 3.40*(1000 SF)	62%	In	38%	Out
PM Peak Hour	T = 9.48*(1000 SF)	51%	In	49%	Out
High-Turnover (Sit-Down) Restaurant					
ITE 9th Edition:	**932**				
Daily	T = 127.15*(1000 SF)	50%	In	50%	Out
AM Peak Hour	T = 10.81*(1000 SF)	55%	In	45%	Out

PM Peak Hour	T = 9.85*(1000 SF)	60%	In	40%	Out

Based on guidance provided by the *Trip Generation Handbook,* the weighted average rate was used to forecast the trips generated for the proposed land uses. **Table 6** provides a summary of the total baseline trip generation.

Table 6. Project Trip Generation (Analysis Scenario)

Land Uses	Intensity	Units	Daily Total	AM Peak			PM Peak		
				In	Out	Total	In	Out	Total
High-Rise Residential (232)	28	DU	118	2	8	10	8	7	11
Hotel (310)	92	Rooms	752	29	20	49	28	27	55
Medical-Dental Office (720)	155	1000 SF	5,614	293	78	371	155	400	555
General Office (710)	55	1000 SF	608	76	10	86	14	68	82
Supermarket (850)	40	1000 SF	4,090	84	52	136	193	186	379
High-Turnover (Sit-Down) Restaurant (932)	19	1000 SF	2,472	116	94	210	115	76	191
Total			**13,654**	**600**	**262**	**862**	**513**	**764**	**1,273**

Pass-by Trips and Internal Capture

For many land-uses, not all trips generated by a development represents a new trip added to the roadway. A percentage of trips, referred to "pass-by" trips, are made by traffic already using the adjacent roadway and enter the site as an intermediate stop on the way from another destination. From ITE data, a supermarket land-use would have a pass-by percentage of 36 percent and a restaurant would have a pass-by percentage of 43 percent for the PM peak period only.

In addition, mixed-use developments generally have trip interactions between the various land-uses within the development. An individual makes a trip to a retail establishment, and then makes a trip to the restaurant, without making an addition trip on the adjacent street network.

To account for those internal trips within a multi-use development, internal capture rates were applied based on National Cooperative Highway Research Program (NCHRP) publication, Enhancing Internal Trip Capture Estimation for Mixed-Use Developments: NCHRP Project 8-51, was used. The NCHRP internal capture worksheet is provided in Appendix B.

Alternative Transportation Considerations

The proposed development consists of transit oriented development (TOD) characteristics, located at the end of the Streetcar, and is within the immediate vicinity of the University of Arizona and Banner University Medical Center.

It is anticipated that a high percentage of trips to and from the development will be made by walking, bicycling, riding the bus, or streetcar. Based on the review of American Community

Survey data (5-year estimate for 2011 – 2015), the Tucson area showed a 11 percent use of alternative transportation modes and 36 percent use of alternative transportation modes for the area approximately 1-mile around the proposed development (mainly influenced by students around the UA).

The proposed development will be served by the Streetcar, as well as the significant bicycling and walking infrastructure associated with the University of Arizona. However, the development will also serve as a regional shopping and employment destination. The percentage of individuals who arrive by non-vehicular modes will vary by land use: hotel patrons will rely significantly on non-vehicular modes, while the percentage of employees and clinic patrons who use alternative modes will be less. It is reasonable to assume that the overall percentage of those who use alternative modes will be higher than the regional average of 11%, but not quite has high as for buildings directly on the University of Arizona Campus (36%). Multimodal percentages by land use were assumed as follows:

- **Residential Land Use:** 15% of trips arrive by alternative modes. This recognizes that the residents will not primarily be affiliated with Banner Health or the UA but have employment outside the study area.
- **Hotel Land Use:** 35% of trips arrive by alternative modes. Many hotel patrons will choose to stay at the hotel its location within walking distance to the UA and Banner Health facilities. The street car will also provide convenient access to downtown.
- **Retail Land Use:** 35% of trips arrive by alternative modes, for street-level development allocated for restaurant and grocery. The project area already has a high alternative mode use percentage such that the retail portion of the development will attract a significant portion of those trip types.
- **Office and Clinic Land Use:** 10% of trips arrive by alternative modes. It was assumed that the trips would generally originate outside of the project area of greater Tucson rather than UA students and faculty, and alternative mode usage is consistent with the regional average.

A summary of the alternative mode use percentages is provided in **Table 7**.

Table 7. Alternative Mode Use Percentages of Trips

Land Use (ITE Code)	Percentage of Trips made by Alternative Mode
High-Rise Residential (232)	15%
Hotel (310)	35%
Medical-Dental Office (720)	10%
General Office (710)	10%
Supermarket (850)	25%
High-Turnover (Sit-Down) Restaurant (932)	25%

A summary of the trip generation with the reductions associated with internal capture, pass-by trips, and alternative mode usage is provided in **Table 8**.

Table 8. Reduced Trip Generation (Discounted for Pass-by, Internal Capture and Multi-Modal)

Land Uses	Intensity	Units	Daily Total*	AM Peak			PM Peak		
				In	Out	Total	In	Out	Total
High-Rise Residential (232)	28	DU	100	2	5	7	3	1	4
Hotel (310)	92	Rooms	489	18	3	21	12	11	23
Medical-Dental Office (720)	155	1000 SF	5,053	224	29	253	134	346	480
General Office (710)	55	1000 SF	547	58	4	62	12	59	71
Supermarket (850)	40	1000 SF	3,068	37	23	59	68	68	135
High-Turnover (Sit-Down) Restaurant (932)	19	1000 SF	1,854	58	43	101	31	16	47
Total			**11,110**	**397**	**106**	**503**	**259**	**501**	**760**

**Daily total does not include reductions due to pass-by trips and internal capture*

Directional Trip Distribution

The next step in the analysis process is to estimate from which direction that the trips are originating and traveling to. The directional distribution for the proposed development is based on the most recent traffic volumes from PAG's TDMS. The distribution assumes that 22 and 23 percent of trips that will access the study area will travel from the north and south on Campbell Avenue, respectively. From east and west, 25 percent of trips will access the study area from both directions on Speedway Boulevard. **Table 9** summarizes the trip distribution assumed for the proposed development.

Table 9. Project Trip Distribution

Route	Average Daily Traffic (ADT)	Percentage of ADT on Route
Campbell Avenue (from the north)	36,000	22%
Speedway (from the east)	40,100	25%
Campbell Ave (from the south)	37,500	23%
Speedway Blvd (from the west)	40,000	25%
Cherry Avenue (from the south)	9,000	5%
Total	-	100%

Route Choice/Traffic Assignment

Traffic assignment is the next step of the traffic forecast procedure and it involves determining the amount of traffic that will use specific routes within the analysis network. The result of traffic assignment is total projected trips, by direction and turning movements, at each of the study intersections. Traffic assignment is determined by considering logical routings, available roadway capacities, left turns at critical intersections, and perceived travel times. The anticipated delay for vehicles making a left-turn at the eastbound approach at Mable/Campbell was considered in the assignment during the PM peak period. It was assumed that 90 percent would utilize Elm Street from the Ring Road or utilize Cherry Avenue to head north of the development alternative northbound routes. Site generated traffic assignment is shown in **Figure 6**.

Figure 6. Site Generated Peak-Hour Traffic Assignment

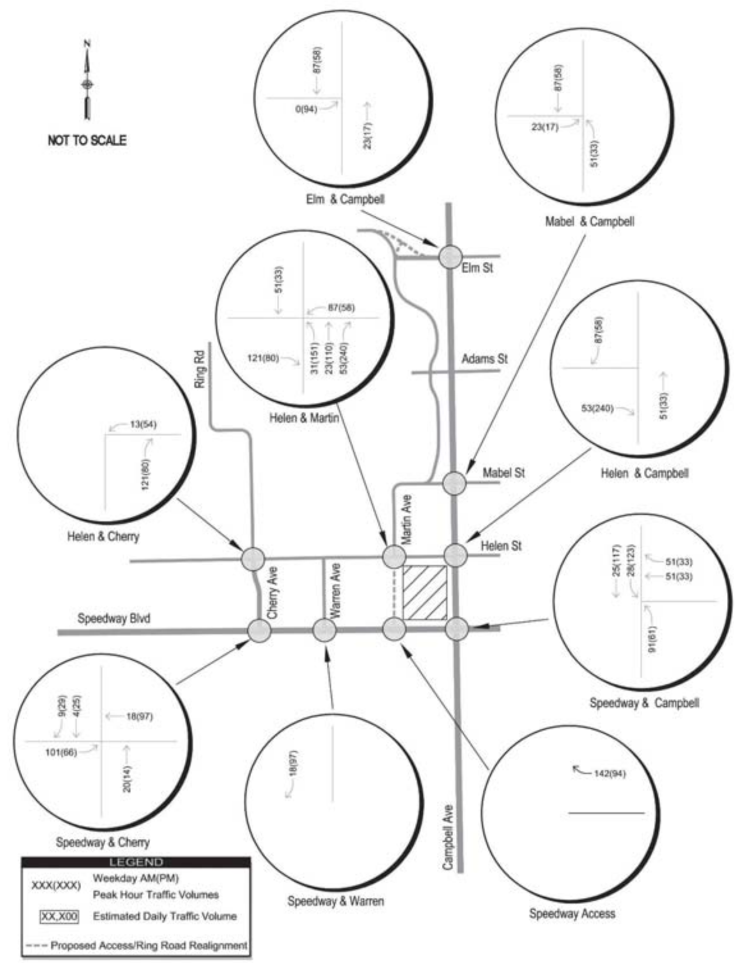
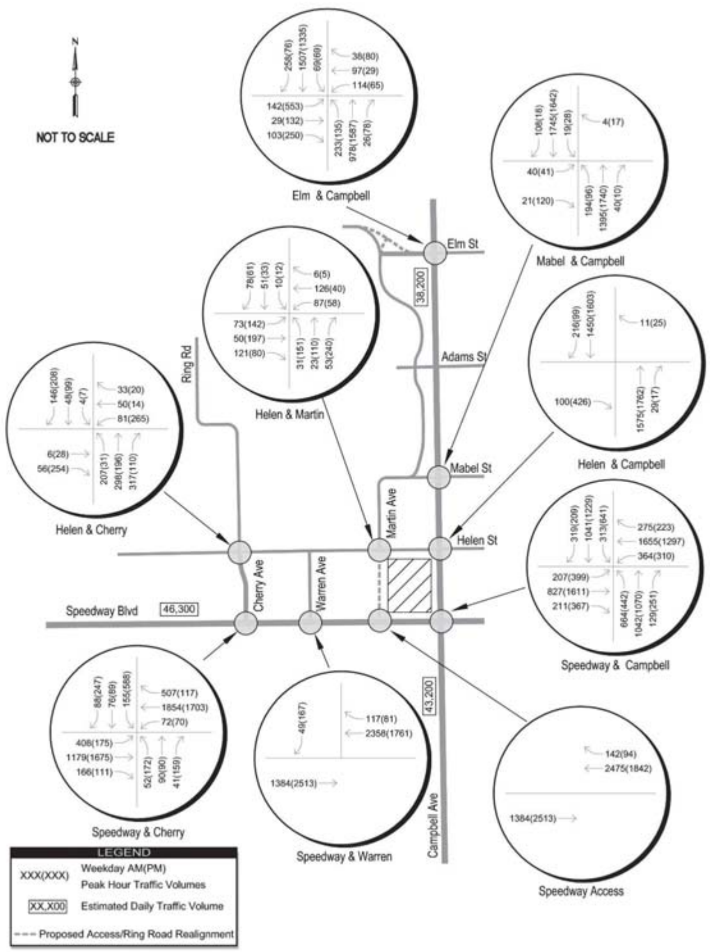


Figure 7. Total (Project + Background) Peak-Hour Traffic Assignment



Study Area Intersection Operations Analysis

The City of Tucson requires the traffic impact of new development on roadways and intersections to be mitigated to a Level of Service D or better (equivalent to being delayed at the intersection for less than 35-55 seconds per vehicle). Capacity analysis was performed for each study area intersection for Background traffic and Total (Project + Background) traffic conditions.

Table 11 summarizes the capacity analysis results for Project and Background Traffic. Table 12 summarizes the capacity analysis results for Project and Background Traffic with the recommended improvements. **Table 13** summarizes the recommended improvements.

<u>*Background Traffic Operations*</u>

With the addition of the background traffic from the Banner University Medical Center Phase II development and other UA facilities, traffic operations at several study area intersections are impacted by the increase in traffic volumes.

Note the Elm & Campbell intersection, which will soon undergo improvements by Banner, is assumed to operate with the updated configuration with eastbound dual left-turns and a southbound dedicated right-turn lane.

The intersection of Cherry Avenue / Speedway Boulevard showed a significant decrease in operational performance. During the PM peak period. Over 500 trips during the peak hour were forecasted to make a southbound left-turn. It is recommended to provide southbound dual left-turn lanes at the approach. During the AM period, eastbound traffic entering into the study area exceed the capacity of the single left-turn lane. An eastbound dual left-turn lane is needed to accommodate the increased vehicular traffic. The southbound dual left-turn movement should be permitted/protected, if sight-distance is adequate.

The Cherry Avenue / Helen Avenue intersection, currently an east/west two-way stop controlled intersection, is anticipated to operate at a LOS F with the additional background traffic. To accommodate the AM right-turn traffic a dedicated northbound right-turn lane is recommended. This also improves westbound operations. In addition, a westbound left-turn lane is recommended with 150' of storage to accommodate left-turn queues.

The Speedway Boulevard / Campbell Avenue shows high delay due to the heavy traffic volumes during peak periods. It is recommended that an additional left-turn lane be constructed for the westbound approach on Speedway Boulevard. To accommodate the anticipated queues, the storage should be extended to 260' for both left-turn lanes

It should be noted that the Mabel Street / Campbell Avenue intersection has failing operational performance due to eastbound left-turn movements. High delays are common when a minor street intersects with a major street with heavy traffic volumes such as Campbell Avenue. Additional improvements for the intersection are not recommended.

<u>*Total Traffic Operations*</u>

The recommended improvements will improve traffic operations performance at the key intersections. The improvements lead to LOS D or better at each study area signalized intersection. However, note that some of the individual movements perform at LOS D or worse.

As shown in the site plan, the development proposes new access points on Speedway Boulevard and on Helen Street. Both are proposed to be approximately 300' west of Campbell Avenue. The Speedway Boulevard access point will be located adjacent to a Sun Tran bus pullout.

It is recommended that the Helen Street access point be expanded to accommodate the high inbound/outbound traffic volumes. This includes providing a northbound dedicated left-turn lane with the standard minimum storage requirements (120'). All-Way Stop control is recommended to be maintained at the intersection.

Table 10. Background Peak-Hour Traffic LOS Summary

Local Intersection	EB			WB			NB			SB			Intersection LOS	Intersection Delay (s)	Traffic Control
	L	T	R	L	T	R	L	T	R	L	T	R			
Elm Street / Campbell Avenue															
AM Peak Hour	D	A	D	D	A	D	C	C	C	B	B	A	C	23.7	Signalized
PM Peak Hour	C	A	D	D	A	D	D	C	C	D	C	C	C	30.2	
Mabel Street / Campbell Avenue*															
AM Peak Hour		F			C			-			-		F	181.3	Unsignalized
PM Peak Hour		F			C			-			-		F	529.4	
Speedway Boulevard / Campbell Avenue															
AM Peak Hour	E	C	A	E	D	B	E	D	A	D	D	C	D	45.2	Signalized
PM Peak Hour	F	E	D	F	D	D	E	E	D	F	D	D	E	60.7	
Cherry Avenue / Speedway Boulevard															
AM Peak Hour	F	B	B	B	C	C	D	D	D	E	D	D	D	35.6	Signalized
PM Peak Hour	E	F	F	E	F	F	C	B	B	F	B	B	E	67.1	
Helen Street / Cherry Avenue*															
AM Peak Hour		B			F			-			-		F	92.2	Unsignalized
PM Peak Hour		B			F			-			-		F	134.6	
Helen Street / Martin Street*															
AM Peak Hour		-			-			-			A		A	9.7	Unsignalized
PM Peak Hour		-			-			-			A		A	9.8	
Warren Avenue / Speedway Boulevard*															
AM Peak Hour		-			-			-			E		E	45.9	Unsignalized
PM Peak Hour		-			-			-			D		D	32.2	
Helen Street / Campbell Avenue*															
AM Peak Hour		C			C			-			-		C	22.2	Unsignalized
PM Peak Hour		F			C			-			-		F	64.8	

* Intersection LOS and Delay for unsignalized intersections is reported as "Worst-Movement LOS"

Table 11. Total (Project + Background) Peak-Hour Traffic LOS Summary

Local Intersection	EB			WB			NB			SB			Intersection LOS	Intersection Delay (s)	Traffic Control
	L	T	R	L	T	R	L	T	R	L	T	R			
Elm Street / Campbell Avenue															
AM Peak Hour	D	A	D	D	A	D	C	C	C	B	C	A	C	24.3	Signalized
PM Peak Hour	D	A	D	D	A	D	D	C	C	D	C	C	C	30.5	
Mabel Street / Campbell Avenue*															
AM Peak Hour		F			A			-			-		F	173.0	Unsignalized
PM Peak Hour		F			C			-			-		F	762.8	
Speedway Boulevard / Campbell Avenue															
AM Peak Hour	F	D	D	D	E	C	F	D	C	D	D	E	D	53.7	Signalized
PM Peak Hour	F	F	D	F	E	D	F	E	D	F	D	D	E	68.6	
Cherry Avenue / Speedway Boulevard															
AM Peak Hour	F	B	B	C	F	F	D	D	D	F	D	D	D	49.5	Signalized
PM Peak Hour	F	F	F	E	F	F	C	B	B	F	B	B	E	78.3	
Helen Street / Cherry Avenue*															
AM Peak Hour		B			F			-			-		F	170.8	Unsignalized
PM Peak Hour		B			F			-			-		F	284.5	
Helen Street / Martin Street*															
AM Peak Hour		A			A			A			A		A	9.44	Unsignalized
PM Peak Hour		D			B			C			B		C	23.13	
Warren Avenue / Speedway Boulevard*															
AM Peak Hour		-			-			-			F		F	56.3	Unsignalized
PM Peak Hour		-			-			-			D		D	34.7	
Helen Street / Campbell Avenue*															
AM Peak Hour		D			C			-			-		D	31.8	Unsignalized
PM Peak Hour		F			C			-			-		F	104.4	

* Intersection LOS and Delay for unsignalized intersections is reported as "Worst-Movement LOS"

Table 12. Total (Project + Background) Peak-Hour LOS Summary (with Improvements)

Local Intersection	EB			WB			NB			SB			Intersection LOS	Intersection Delay (s)	Traffic Control
	L	T	R	L	T	R	L	T	R	L	T	R			
Elm Street / Campbell Avenue															
AM Peak Hour	D	A	D	D	A	D	C	C	C	B	B	A	C	23.7	Signalized
PM Peak Hour	D	A	D	D	A	D	D	C	C	D	C	C	C	30.2	
Mabel Street / Campbell Avenue*															
AM Peak Hour		F			C			-			-		F	181.3	Unsignalized
PM Peak Hour		F			C			-			-		F	529.4	
Speedway Boulevard / Campbell Avenue															
AM Peak Hour	E	D	D	D	D	C	E	D	C	D	D	E	D	46.7	Signalized
PM Peak Hour	E	D	D	F	D	B	E	D	C	E	D	D	D	49.5	
Cherry Avenue / Speedway Boulevard															
AM Peak Hour	D	A	B	B	C	D	D	D	D	D	D	D	C	27.1	Signalized
PM Peak Hour	D	C	C	D	C	C	D	C	D	D	C	C	C	32.3	
Helen Street / Cherry Avenue*															
AM Peak Hour		B			E			-			-		E	37.1	Unsignalized
PM Peak Hour		B			F			-			-		F	175.5	
Helen Street / Martin Street*															
AM Peak Hour		-			-			-			A		A	9.7	Unsignalized
PM Peak Hour		-			-			-			A		A	9.8	
Warren Avenue / Speedway Boulevard*															
AM Peak Hour		-			-			-			F		F	56.3	Unsignalized
PM Peak Hour		-			-			-			D		D	34.7	
Helen Street / Campbell Avenue*															
AM Peak Hour		D			C			-			-		D	31.8	Unsignalized
PM Peak Hour		F			C			-			-		F	104.4	

* Intersection LOS and Delay for unsignalized intersections is reported as "Worst-Movement LOS"

Table 13. Recommendations Summary

ID	Intersection	Recommendations	Comments
1	Campbell Ave / Elm St	Campbell / Elem is will be reconstructed (by others) as part of the Banner University Medical Center redevelopment project. Improvements include: • Improve Elm Street to a 5-lane roadway (2 inbound lane, and 3 outbound lanes) between Campbell Avenue and Ring Road. One EB lane transitions to a dedicated left-turn lane at Elm Street/Campbell Avenue. West of the NE Parking Garage entrance, Elm Street continues as a 2-lane roadway with a raised median island and left turn lanes. • Configure the EB through lane to be a shared through/left movement to provide sufficient capacity for left-turning traffic. • Extend existing northbound left turn lane on Campbell Avenue to 200'. • Add a dedicated right-turn lane on southbound Campbell Avenue.	Improvements by others; no additional improvements are recommended.
2	Campbell Ave / Mabel St	• No improvements recommended.	-
3	Campbell Ave / Helen St	• No improvements recommended.	-
4	Campbell Ave / Speedway Blvd	• Add an additional 480' left-turn lane on eastbound Speedway Blvd (for two total) to accommodate vehicles turning to northbound Campbell Ave. • Add an additional 260' left-turn lane on westbound Speedway Blvd (for two total to accommodate vehicles turning to southbound Campbell Ave.	• Recommended as a City of Tucson project, as it is outside of the Speedway/Campbell site. It is recommended that impact fees associated with the project be applied toward these improvements.
5	Speedway Blvd / Warren Ave	• No improvements recommended.	-
6	Speedway Blvd / Cherry Ave	• Extend left-turn lane on southbound Cherry Avenue to 200' (existing is 80').	• Recommended

ID	Intersection	Recommendations	Comments
		• Add an additional 200' left-turn lane (for two total) on southbound Cherry Ave to accommodate vehicles turning to eastbound Speedway Blvd. • Add an additional 350' left-turn lane on eastbound Speedway Blvd. • Add new receiving lane on Cherry Ave.	• These improvements are already warranted under background future conditions which considers Banner Medical Center improvements and the University of Arizona campus expansion programs.
7	Helen St / Martin Ave	• Reconfigure Helen/Martin to four-way intersection. Consider a roundabout intersection in place of a four-way stop-controlled intersection.	• Recommended improvements by Speedway/Campbell project.
8	Helen & Cherry	• Add a 150' left-turn lane on westbound Helen St. • Restripe Cherry to add a 120' dedicated right-turn lane on northbound Cherry Ave.	• These improvements are already warranted under background future conditions which considers Banner Medical Center improvements and the University of Arizona campus expansion programs.

Parking Calculations and Reductions

This section provides a summary of the shared parking analysis for the proposed mixed-use development. The parking analysis uses Urban Land Institute (ULI) standard parking generation rates. ULI shared parking analysis typically include multiple components to evaluate reductions in demand, including:

1. **Time of Day Parking Demand Reductions** – This is the primary reduction mechanism within ULI and identifies how specific land uses peak within a mixture of uses. *For this analysis, ULI time of day factors were used for both weekend and weekday conditions*
2. **Internal Capture Reductions** – Similar to the internal capture estimated for vehicular trip generation. This reduction identifies a trend that users on site might frequent another use without generating new parking demand. *For a conservative estimate, the internal capture reduction was not included.*
3. **Multimodal Reductions** – This reduction assumes a percentage of trips are generated not only by automobile but rather by walking, biking, or transit trips. The location of the proposed development is likely to generate multi-modal trips as it is within the UA area and also adjacent to the streetcar terminus. *For this analysis, a multimodal reduction was not included*

Based on these inputs, the following results were determined for the shared parking capability of the proposed development:

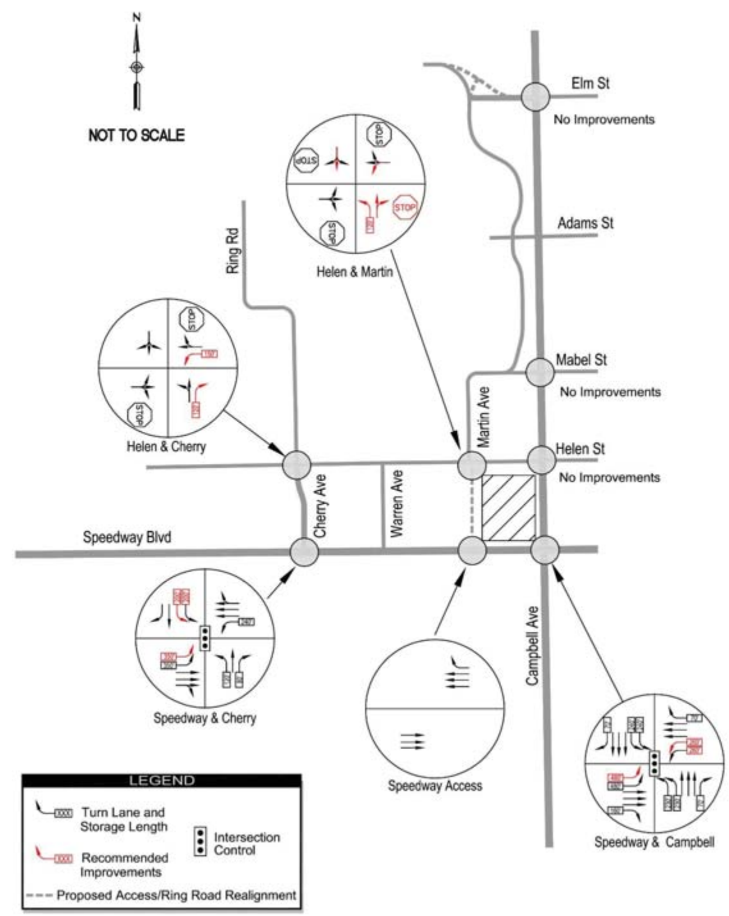
- The peak parking demand occurs on a weekday at 2 pm, with a total estimated parking demand of 1,373 parking spaces.
- Weekend peak demand occurs at 11 am with 1,015 spaces of demand.

Table 14 provides a summary of the parking analysis

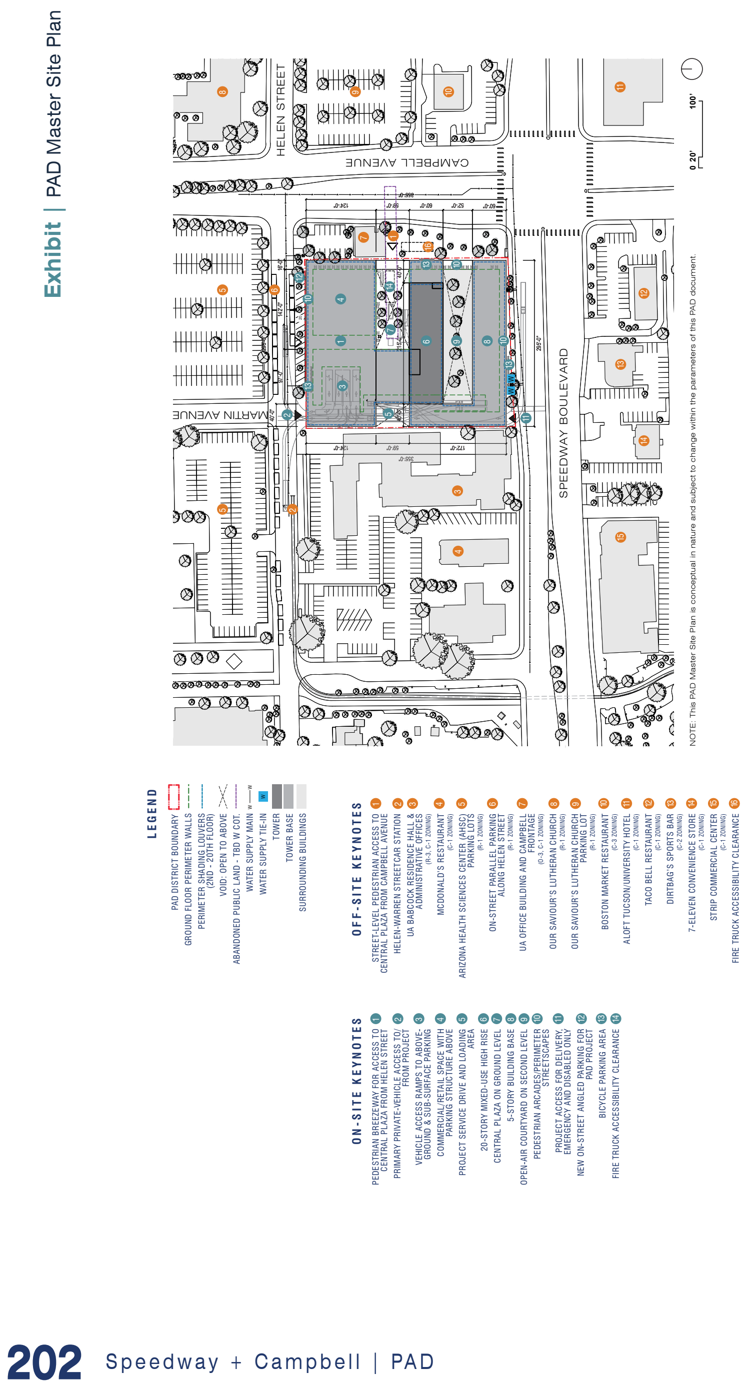
Table 14. Parking Analysis Summary

ULI Land Use			Weekday	Weekend
	Quantity	Unit	Estimated Parking Demand	Estimated Parking Demand
Community Shopping Center	40,000	SF GLA	144	120
Fine/Casual Restaurant	19,000	SF GLA	236	91
Hotel-Business	92	Rooms	60	50
Residential, Owned, Shared Spaces	28	Units	35	35
Office 25ksf to 100ksf	55,000	SF GLA	200	21
Medical/Dental Office	155,000	SF GLA	698	698
		Total	1,373	1,015
		Shared Parking Reduction	14%	37%

Figure 8. Recommended Improvements



Appendix A – Site Plan



Appendix B – Internal Capture Worksheet

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Speedway/Campbell Mixed-Use	Organization:	Kimley-Horn
Project Location:	NW Speedway / Campbell	Performed By:	
Scenario Description:		Date:	
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	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				457	369	88
Retail				136	84	52
Restaurant				210	116	94
Cinema/Entertainment				0		
Residential				10	2	8
Hotel				49	29	20
All Other Land Uses[2]				0		
Total				862	600	262

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% Transit	% Non-Motorized
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						
All Other Land Uses[2]						

Table 3-A: 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-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		25	27	0	0	0
Retail	15		7	0	0	0
Restaurant	29	7		0	0	1
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	2	0		0
Hotel	11	3	2	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	862	600	262
Internal Capture Percentage	30%	22%	49%
External Vehicle-Trips[3]	604	471	133
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	15%	59%
Retail	42%	42%
Restaurant	33%	39%
Cinema/Entertainment	N/A	N/A
Residential	0%	25%
Hotel	3%	80%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.
[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator
[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A
[4]Person-Trips
*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Banner UMC PAD Traffic Analysis

NCHRP 8-51 Internal Trip Capture Estimation Tool			
Project Name:	Speedway/Campbell Mixed-Use	Organization:	Kimley-Horn
Project Location:	NW Speedway / Campbell	Performed By:	
Scenario Description:		Date:	
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	Development Data (*For Information Only*)			Estimated Vehicle-Trips		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				637	169	468
Retail				379	193	186
Restaurant				191	115	76
Cinema/Entertainment				0		
Residential				11	7	4
Hotel				55	28	27
All Other Land Uses[2]				0		
Total				1273	512	761

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.	% Transit	% Non-Motorized	Veh. Occ.	% 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)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		15	2	0	0	0
Retail	4		33	0	3	5
Restaurant	2	31		0	1	5
Cinema/Entertainment	0	0	0		0	0
Residential	0	2	1	0		0
Hotel	0	4	6	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	1,273	512	761
Internal Capture Percentage	18%	22%	15%
External Vehicle-Trips[3]	1,045	398	647
External Transit-Trips[4]	0	0	0
External Non-Motorized Trips[4]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	4%	4%
Retail	27%	24%
Restaurant	37%	51%
Cinema/Entertainment	N/A	N/A
Residential	57%	75%
Hotel	36%	37%

[1]Land Use Codes (LUCs) from *Trip Generation Informational Report*, published by the Institute of Transportation Engineers.
[2]Total estimate for all other land uses at mixed-use development site-not subject to internal trip capture computations in this estimator
[3]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P
[4]Person-Trips
*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas Transportation Institute

Appendix C – Capacity Analysis Output Sheets

HCM 2010 Signalized Intersection Capacity Analysis
1: Campbell Ave & Elm St 08/29/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	107	24	53	92	89	38	132	925	21	69	1252	195
Future Volume (veh/h)	107	24	53	92	89	38	132	925	21	69	1252	195
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	116	26	58	100	97	41	143	1005	23	75	1361	212
Adj No. of Lanes	1	1	0	1	1	0	1	3	0	1	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	282	108	240	323	261	110	226	1648	38	559	2165	337
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
Prop Arrive On Green	0.21	0.21	0.21	0.21	0.21	0.21	0.05	0.32	0.32	0.22	0.49	0.49
Ln Grp Delay, s/veh	29.0	0.0	23.1	26.5	0.0	24.1	33.3	20.4	20.8	17.4	13.5	13.9
Ln Grp LOS	C		C	C		C	C	C	C	B	B	B
Approach Vol, veh/h		200			238			1171			1648	
Approach Delay, s/veh		26.6			25.1			22.1			13.8	
Approach LOS		C			C			C			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1		4	6	5		8
Case No	4.0	1.4		6.0	4.0	1.4		6.0
Phs Duration (G+Y+Rc), s	27.6	20.9		20.7	39.1	9.5		20.7
Change Period (Y+Rc), s	* 5.3	* 5.9		* 6.2	* 5.3	* 5.9		* 6.2
Max Green (Gmax), s	* 68	* 8.1		* 27	* 58	* 18		* 27
Max Allow Headway (MAH), s	5.2	3.8		4.8	5.3	3.8		4.8
Max Q Clear (g_c+I1), s	13.5	2.0		12.7	17.7	2.0		9.7
Green Ext Time (g_e), s	8.8	0.3		1.8	16.1	0.3		1.9
Prob of Phs Call (p_c)	1.00	0.76		1.00	1.00	0.94		1.00
Prob of Max Out (p_x)	0.00	0.18		0.04	0.18	0.00		0.02
Left-Turn Movement Data								
Assigned Mvmt		1		7		5		3
Mvmt Sat Flow, veh/h		1774		1246		1774		1308
Through Movement Data								
Assigned Mvmt	2			4	6			8
Mvmt Sat Flow, veh/h	5115			514	4440			1244
Right-Turn Movement Data								
Assigned Mvmt	12			14	16			18
Mvmt Sat Flow, veh/h	117			1146	691			526
Left Lane Group Data								
Assigned Mvmt	0	1	0	7	0	5	0	3
Lane Assignment		(Pr/Pm)				(Pr/Pm)		

Existing AM Peak Period 08/15/2012 AM Existing

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Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	75	0	116	0	143	0	100
Grp Sat Flow (s), veh/h/ln	0	1774	0	1246	0	1774	0	1308
Q Serve Time (g_s), s	0.0	0.0	0.0	6.1	0.0	0.0	0.0	4.8
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	10.7	0.0	0.0	0.0	7.7
Perm LT Sat Flow (s_l), veh/h/ln	0	546	0	1246	0	325	0	1308
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	20.3	0.0	14.5	0.0	22.3	0.0	14.5
Perm LT Serve Time (g_u), s	0.0	8.8	0.0	9.9	0.0	6.6	0.0	11.6
Perm LT Q Serve Time (g_ps), s	0.0	7.2	0.0	6.1	0.0	6.6	0.0	4.8
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	559	0	282	0	226	0	323
V/C Ratio (X)	0.00	0.13	0.00	0.41	0.00	0.63	0.00	0.31
Avail Cap (c_a), veh/h	0	559	0	503	0	598	0	555
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	17.3	0.0	28.1	0.0	30.4	0.0	26.0
Incr Delay (d2), s/veh	0.0	0.1	0.0	1.0	0.0	2.9	0.0	0.5
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	17.4	0.0	29.0	0.0	33.3	0.0	26.5
1st-Term Q (Q1), veh/ln	0.0	1.1	0.0	2.1	0.0	2.6	0.0	1.7
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.0	0.2	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.1	0.0	2.2	0.0	2.8	0.0	1.8
%ile Storage Ratio (RQ%)	0.00	0.20	0.00	0.69	0.00	0.70	0.00	0.90
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T				T			
Lanes in Grp	2	0	0	0	2	0	0	0
Grp Vol (v), veh/h	666	0	0	0	1039	0	0	0
Grp Sat Flow (s), veh/h/ln	1695	0	0	0	1695	0	0	0
Q Serve Time (g_s), s	11.5	0.0	0.0	0.0	15.7	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	11.5	0.0	0.0	0.0	15.7	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	1092	0	0	0	1654	0	0	0
V/C Ratio (X)	0.61	0.00	0.00	0.00	0.63	0.00	0.00	0.00
Avail Cap (c_a), veh/h	3313	0	0	0	2824	0	0	0
Upstream Filter (I)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	19.8	0.0	0.0	0.0	13.1	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.0	0.4	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	20.4	0.0	0.0	0.0	13.5	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	5.4	0.0	0.0	0.0	7.2	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	5.4	0.0	0.0	0.0	7.3	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.20	0.00	0.00	0.00	0.13	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	T+R			T+R	T+R			T+R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	362	0	0	84	534	0	0	138
Grp Sat Flow (s), veh/h/ln	1842	0	0	1660	1741	0	0	1770
Q Serve Time (g_s), s	11.5	0.0	0.0	2.9	15.7	0.0	0.0	4.6
Cycle Q Clear Time (g_c), s	11.5	0.0	0.0	2.9	15.7	0.0	0.0	4.6
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.06	0.00	0.00	0.69	0.40	0.00	0.00	0.30
Lane Grp Cap (c), veh/h	593	0	0	348	849	0	0	371
V/C Ratio (X)	0.61	0.00	0.00	0.24	0.63	0.00	0.00	0.37
Avail Cap (c_a), veh/h	1800	0	0	642	1450	0	0	685
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	19.8	0.0	0.0	22.8	13.1	0.0	0.0	23.5
Incr Delay (d2), s/veh	1.0	0.0	0.0	0.4	0.8	0.0	0.0	0.6
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	20.8	0.0	0.0	23.1	13.9	0.0	0.0	24.1
1st-Term Q (Q1), veh/ln	5.8	0.0	0.0	1.3	7.4	0.0	0.0	2.3
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	6.0	0.0	0.0	1.4	7.6	0.0	0.0	2.3
%ile Storage Ratio (RQ%)	0.22	0.00	0.00	0.13	0.14	0.00	0.00	0.08
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		18.4						
HCM 2010 LOS		B						

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	3	0	18	0	0	4	126	1272	40	19	1445	80
Future Vol, veh/h	3	0	18	0	0	4	126	1272	40	19	1445	80
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	190	-	-	106	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	3	0	20	0	0	4	137	1383	43	21	1571	87

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2482	3355	829	2348	3377	713	1658	0	0	1426	0	0
Stage 1	1655	1655	-	1678	1678	-	-	-	-	-	-	-
Stage 2	827	1700	-	670	1699	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	32	8	269	38	7	321	186	-	-	242	-	-
Stage 1	68	154	-	66	150	-	-	-	-	-	-	-
Stage 2	301	146	-	376	146	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	12	2	269	13	2	321	186	-	-	242	-	-
Mov Cap-2 Maneuver	12	2	-	13	2	-	-	-	-	-	-	-
Stage 1	18	141	-	17	40	-	-	-	-	-	-	-
Stage 2	78	38	-	318	133	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	86	16.4	5.7	0.3
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	186	-	-	66	321	242	-	-
HCM Lane V/C Ratio	0.736	-	-	0.346	0.014	0.085	-	-
HCM Control Delay (s)	64.7	-	-	86	16.4	21.3	-	-
HCM Lane LOS	F	-	-	F	C	C	-	-
HCM 95th %tile Q(veh)	4.7	-	-	1.3	0	0.3	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	31	0	0	11	0	1385	29	0	1286	77
Future Vol, veh/h	0	0	31	0	0	11	0	1385	29	0	1286	77
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	34	0	0	12	0	1505	32	0	1398	84

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	741	-	-	768	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	308	0	0	295	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	308	-	-	295	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.1	17.7	0	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	308	295	-	-
HCM Lane V/C Ratio	-	-	0.109	0.041	-	-
HCM Control Delay (s)	-	-	18.1	17.7	-	-
HCM Lane LOS	-	-	C	C	-	-
HCM 95th %tile Q(veh)	-	-	0.4	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	185	786	179	364	1419	168	373	981	129	258	974	208
Future Volume (veh/h)	185	786	179	364	1419	168	373	981	129	258	974	208
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	201	854	195	396	1542	183	405	1066	140	280	1059	226
Adj No. of Lanes	1	3	1	1	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	230	1062	331	471	1703	530	643	1526	475	546	1356	422
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
Prop Arrive On Green	0.10	0.21	0.21	0.22	0.33	0.33	0.14	0.30	0.30	0.10	0.27	0.27
Ln Grp Delay, s/veh	75.6	48.6	44.6	55.0	45.2	30.4	47.7	39.9	33.8	48.1	45.3	42.4
Ln Grp LOS	E	D	D	E	D	C	D	D	C	D	D	D
Approach Vol, veh/h		1250			2121			1611			1565	
Approach Delay, s/veh		52.3			45.8			41.3			45.4	
Approach LOS		D			D			D			D	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	6	5	8	7
Case No	3.0	1.4	3.0	1.4	3.0	1.4	3.0	1.4
Phs Duration (G+Y+Rc), s	41.0	17.3	30.1	31.6	37.0	21.3	45.2	16.5
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green (Gmax), s	36.0	9.0	29.0	26.0	32.0	13.0	41.0	14.0
Max Allow Headway (MAH), s	5.1	3.8	5.0	3.8	5.0	3.8	5.1	3.8
Max Q Clear (g_c+I1), s	24.3	4.2	21.2	22.1	25.1	8.9	36.7	11.3
Green Ext Time (g_e), s	6.1	1.2	3.9	0.8	4.2	1.1	3.5	0.2
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prob of Max Out (p_x)	0.00	0.70	0.70	0.96	0.00	0.91	1.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3		5		7
Mvmt Sat Flow, veh/h		3442		1774		3442		1774
Through Movement Data								
Assigned Mvmt	2		4		6		8	
Mvmt Sat Flow, veh/h	5085		5085		5085		5085	
Right-Turn Movement Data								
Assigned Mvmt	12		14		16		18	
Mvmt Sat Flow, veh/h	1583		1583		1583		1583	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	0	5	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)

Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	280	0	396	0	405	0	201
Grp Sat Flow (s), veh/h/ln	0	1721	0	1774	0	1721	0	1774
Q Serve Time (g_s), s	0.0	2.2	0.0	20.1	0.0	6.9	0.0	9.3
Cycle Q Clear Time (g_c), s	0.0	2.2	0.0	20.1	0.0	6.9	0.0	9.3
Perm LT Sat Flow (s_l), veh/h/ln	0	448	0	536	0	415	0	280
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	32.0	0.0	23.1	0.0	31.0	0.0	25.1
Perm LT Serve Time (g_u), s	0.0	9.7	0.0	3.9	0.0	7.9	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	9.7	0.0	3.9	0.0	7.9	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	546	0	471	0	643	0	230
V/C Ratio (X)	0.00	0.51	0.00	0.84	0.00	0.63	0.00	0.88
Avail Cap (c_a), veh/h	0	546	0	471	0	643	0	267
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	47.3	0.0	42.1	0.0	45.8	0.0	51.9
Incr Delay (d2), s/veh	0.0	0.8	0.0	12.9	0.0	2.0	0.0	23.7
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	48.1	0.0	55.0	0.0	47.7	0.0	75.6
1st-Term Q (Q1), veh/ln	0.0	4.2	0.0	12.4	0.0	6.2	0.0	6.5
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	1.7	0.0	0.2	0.0	1.5
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	4.3	0.0	14.1	0.0	6.4	0.0	8.0
%ile Storage Ratio (RQ%)	0.00	0.46	0.00	1.56	0.00	0.70	0.00	0.43
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	3	0	3	0	3	0	3	0
Grp Vol (v), veh/h	1066	0	854	0	1059	0	1542	0
Grp Sat Flow (s), veh/h/ln	1695	0	1695	0	1695	0	1695	0
Q Serve Time (g_s), s	22.3	0.0	19.2	0.0	23.1	0.0	34.7	0.0
Cycle Q Clear Time (g_c), s	22.3	0.0	19.2	0.0	23.1	0.0	34.7	0.0
Lane Grp Cap (c), veh/h	1526	0	1062	0	1356	0	1703	0
V/C Ratio (X)	0.70	0.00	0.80	0.00	0.78	0.00	0.91	0.00
Avail Cap (c_a), veh/h	1526	0	1229	0	1356	0	1737	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	37.2	0.0	45.1	0.0	40.8	0.0	38.1	0.0
Incr Delay (d2), s/veh	2.7	0.0	3.5	0.0	4.5	0.0	7.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	39.9	0.0	48.6	0.0	45.3	0.0	45.2	0.0
1st-Term Q (Q1), veh/ln	10.5	0.0	8.9	0.0	10.8	0.0	16.3	0.0

HCM 2010 Signalized Intersection Capacity Analysis
5: Campbell Ave & Speedway Blvd

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2nd-Term Q (Q2), veh/ln	0.4	0.0	0.3	0.0	0.6	0.0	1.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	10.8	0.0	9.3	0.0	11.4	0.0	17.4	0.0
%ile Storage Ratio (RQ%)	0.13	0.00	0.31	0.00	0.79	0.00	0.28	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	140	0	195	0	226	0	183	0
Grp Sat Flow (s), veh/h/ln	1583	0	1583	0	1583	0	1583	0
Q Serve Time (g_s), s	8.1	0.0	13.3	0.0	14.7	0.0	10.4	0.0
Cycle Q Clear Time (g_c), s	8.1	0.0	13.3	0.0	14.7	0.0	10.4	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	475	0	331	0	422	0	530	0
V/C Ratio (X)	0.29	0.00	0.59	0.00	0.54	0.00	0.35	0.00
Avail Cap (c_a), veh/h	475	0	383	0	422	0	541	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	32.3	0.0	42.8	0.0	37.6	0.0	30.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	1.8	0.0	4.8	0.0	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
Control Delay (d), s/veh	33.8	0.0	44.6	0.0	42.4	0.0	30.4	0.0
1st-Term Q (Q1), veh/ln	3.6	0.0	5.8	0.0	6.4	0.0	4.6	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.2	0.0	0.6	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	3.8	0.0	6.0	0.0	7.0	0.0	4.6	0.0
%ile Storage Ratio (RQ%)	1.37	0.00	0.93	0.00	2.53	0.00	1.78	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		45.8						
HCM 2010 LOS		D						

HCM 2010 TWSC
6: Speedway Blvd & Warren Ave

08/29/2017

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1289	1912	66	0	26
Future Vol, veh/h	0	1289	1912	66	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1401	2078	72	0	28

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	1075
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	185
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	185
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	27.9
HCM LOS			D

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	185
HCM Lane V/C Ratio	-	-	-	0.153
HCM Control Delay (s)	-	-	-	27.9
HCM Lane LOS	-	-	-	D
HCM 95th %tile Q(veh)	-	-	-	0.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	68	1177	166	72	1649	244	52	70	41	62	72	34
Future Volume (veh/h)	68	1177	166	72	1649	244	52	70	41	62	72	34
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	74	1279	180	78	1792	265	57	76	45	67	78	37
Adj No. of Lanes	1	3	0	1	3	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	164	1869	263	477	2565	376	331	435	369	330	435	369
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
Prop Arrive On Green	0.04	0.41	0.41	0.19	0.57	0.57	0.23	0.23	0.23	0.23	0.23	0.23
Ln Grp Delay, s/veh	43.8	23.1	23.7	25.2	14.9	15.5	32.7	29.8	29.2	33.2	29.8	28.9
Ln Grp LOS	D	C	C	C	B	B	C	C	C	C	C	C
Approach Vol, veh/h		1533			2135			178			182	
Approach Delay, s/veh		24.3			15.5			30.6			30.9	
Approach LOS		C			B			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2	4	3		6	8	7
Case No		5.0	4.0	1.4		5.0	4.0	1.4
Phs Duration (G+Y+Rc), s		27.0	44.1	23.2		27.0	59.0	8.3
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green (Gmax), s		22.0	74.0	9.0		22.0	72.0	11.0
Max Allow Headway (MAH), s		4.6	5.3	3.8		4.6	5.3	3.8
Max Q Clear (g_c+I1), s		8.7	23.9	2.0		9.3	29.2	2.0
Green Ext Time (g_e), s		1.2	15.2	0.2		1.2	24.8	0.1
Prob of Phs Call (p_c)		1.00	1.00	0.87		1.00	1.00	0.86
Prob of Max Out (p_x)		0.00	0.07	0.06		0.00	0.41	0.01
Left-Turn Movement Data								
Assigned Mvmt		5		3		1		7
Mvmt Sat Flow, veh/h		1272		1774		1265		1774
Through Movement Data								
Assigned Mvmt		2	4			6	8	
Mvmt Sat Flow, veh/h		1863	4507			1863	4480	
Right-Turn Movement Data								
Assigned Mvmt		12	14			16	18	
Mvmt Sat Flow, veh/h		1583	634			1583	657	
Left Lane Group Data								
Assigned Mvmt	0	5	0	3	0	1	0	7
Lane Assignment				(Pr/Pm)				(Pr/Pm)

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	57	0	78	0	67	0	74
Grp Sat Flow (s), veh/h/ln	0	1272	0	1774	0	1265	0	1774
Q Serve Time (g_s), s	0.0	3.5	0.0	0.0	0.0	4.2	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	6.7	0.0	0.0	0.0	7.3	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	1272	0	363	0	1265	0	203
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	22.0	0.0	37.1	0.0	22.0	0.0	39.1
Perm LT Serve Time (g_u), s	0.0	18.8	0.0	15.2	0.0	18.9	0.0	11.9
Perm LT Q Serve Time (g_ps), s	0.0	3.5	0.0	15.2	0.0	4.2	0.0	11.9
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	331	0	477	0	330	0	164
V/C Ratio (X)	0.00	0.17	0.00	0.16	0.00	0.20	0.00	0.45
Avail Cap (c_a), veh/h	0	331	0	477	0	330	0	309
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	31.6	0.0	25.0	0.0	31.8	0.0	41.9
Incr Delay (d2), s/veh	0.0	1.1	0.0	0.2	0.0	1.4	0.0	1.9
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	32.7	0.0	25.2	0.0	33.2	0.0	43.8
1st-Term Q (Q1), veh/ln	0.0	1.2	0.0	1.6	0.0	1.5	0.0	1.9
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.3	0.0	1.7	0.0	1.6	0.0	2.0
%ile Storage Ratio (RQ%)	0.00	0.28	0.00	0.18	0.00	0.51	0.00	0.14
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	4	0	0	6	8	0
Lane Assignment		T	T			T	T	
Lanes in Grp	0	1	2	0	0	1	2	0
Grp Vol (v), veh/h	0	76	962	0	0	78	1353	0
Grp Sat Flow (s), veh/h/ln	0	1863	1695	0	0	1863	1695	0
Q Serve Time (g_s), s	0.0	3.1	21.9	0.0	0.0	3.2	26.8	0.0
Cycle Q Clear Time (g_c), s	0.0	3.1	21.9	0.0	0.0	3.2	26.8	0.0
Lane Grp Cap (c), veh/h	0	435	1406	0	0	435	1941	0
V/C Ratio (X)	0.00	0.17	0.68	0.00	0.00	0.18	0.70	0.00
Avail Cap (c_a), veh/h	0	435	2660	0	0	435	2589	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	28.9	22.6	0.0	0.0	28.9	14.3	0.0
Incr Delay (d2), s/veh	0.0	0.9	0.6	0.0	0.0	0.9	0.5	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	29.8	23.1	0.0	0.0	29.8	14.9	0.0
1st-Term Q (Q1), veh/ln	0.0	1.6	10.2	0.0	0.0	1.6	12.4	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.7	10.3	0.0	0.0	1.7	12.5	0.0
%ile Storage Ratio (RQ%)	0.00	0.06	0.11	0.00	0.00	0.12	0.91	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	14	0	0	16	18	0
Lane Assignment		R	T+R			R	T+R	
Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	45	497	0	0	37	704	0
Grp Sat Flow (s), veh/h/ln	0	1583	1751	0	0	1583	1747	0
Q Serve Time (g_s), s	0.0	2.1	21.9	0.0	0.0	1.7	27.2	0.0
Cycle Q Clear Time (g_c), s	0.0	2.1	21.9	0.0	0.0	1.7	27.2	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.36	0.00	0.00	1.00	0.38	0.00
Lane Grp Cap (c), veh/h	0	369	726	0	0	369	1000	0
V/C Ratio (X)	0.00	0.12	0.68	0.00	0.00	0.10	0.70	0.00
Avail Cap (c_a), veh/h	0	369	1374	0	0	369	1334	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	28.5	22.6	0.0	0.0	28.4	14.4	0.0
Incr Delay (d2), s/veh	0.0	0.7	1.2	0.0	0.0	0.5	1.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	29.2	23.7	0.0	0.0	28.9	15.5	0.0
1st-Term Q (Q1), veh/ln	0.0	0.9	10.5	0.0	0.0	0.8	13.1	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.2	0.0	0.0	0.1	0.3	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.0	10.7	0.0	0.0	0.8	13.4	0.0
%ile Storage Ratio (RQ%)	0.00	0.32	0.12	0.00	0.00	0.26	0.97	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		20.2						
HCM 2010 LOS		C						

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	52	34	73	6	10	34
Future Vol, veh/h	52	34	73	6	10	34
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	57	37	79	7	11	37

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	86	0	-	0	233	83
Stage 1	-	-	-	-	83	-
Stage 2	-	-	-	-	150	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1510	-	-	-	755	976
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	878	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1510	-	-	-	726	976
Mov Cap-2 Maneuver	-	-	-	-	726	-
Stage 1	-	-	-	-	940	-
Stage 2	-	-	-	-	844	-

Approach	EB	WB	SB
HCM Control Delay, s	4.5	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1510	-	-	-	905
HCM Lane V/C Ratio	0.037	-	-	-	0.053
HCM Control Delay (s)	7.5	0	-	-	9.2
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	15	62	5	0	0	10	232	28	3	146	2
Future Vol, veh/h	9	15	62	5	0	0	10	232	28	3	146	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	10	16	67	5	0	0	11	252	30	3	159	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	455	470	160	497	456	267	161	0	0	283	0	0
Stage 1	166	166	-	289	289	-	-	-	-	-	-	-
Stage 2	289	304	-	208	167	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	515	492	885	483	501	772	1418	-	-	1279	-	-
Stage 1	836	761	-	719	673	-	-	-	-	-	-	-
Stage 2	719	663	-	794	760	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	510	486	885	431	495	772	1418	-	-	1279	-	-
Mov Cap-2 Maneuver	510	486	-	431	495	-	-	-	-	-	-	-
Stage 1	828	759	-	713	667	-	-	-	-	-	-	-
Stage 2	713	657	-	716	758	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.7	13.5	0.3	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1418	-	-	725	431	1279	-	-
HCM Lane V/C Ratio	0.008	-	-	0.129	0.013	0.003	-	-
HCM Control Delay (s)	7.6	0	-	10.7	13.5	7.8	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0	0	-	-

Intersection	
Int Delay, s/veh	4.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	4	0	0	87	0	100	270	12	10	168	35
Future Vol, veh/h	0	4	0	0	87	0	100	270	12	10	168	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	4	0	0	95	0	109	293	13	11	183	38

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	788	747	202	743	759	300	221	0	0	307	0	0
Stage 1	223	223	-	517	517	-	-	-	-	-	-	-
Stage 2	565	524	-	226	242	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	309	341	839	331	336	740	1348	-	-	1254	-	-
Stage 1	780	719	-	541	534	-	-	-	-	-	-	-
Stage 2	510	530	-	777	705	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	215	305	839	301	300	740	1348	-	-	1254	-	-
Mov Cap-2 Maneuver	215	305	-	301	300	-	-	-	-	-	-	-
Stage 1	704	712	-	488	482	-	-	-	-	-	-	-
Stage 2	370	478	-	765	698	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17	22.4	2.1	0.4
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1348	-	-	305	300	1254	-	-
HCM Lane V/C Ratio	0.081	-	-	0.014	0.315	0.009	-	-
HCM Control Delay (s)	7.9	0	-	17	22.4	7.9	0	-
HCM Lane LOS	A	A	-	C	C	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	0	1.3	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	330	121	139	62	24	80	70	1434	60	60	1066	35
Future Volume (veh/h)	330	121	139	62	24	80	70	1434	60	60	1066	35
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	359	132	151	67	26	87	76	1559	65	65	1159	38
Adj No. of Lanes	1	1	0	1	1	0	1	3	0	1	3	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	473	290	332	328	138	462	273	2211	92	176	2139	70
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
Prop Arrive On Green	0.37	0.37	0.37	0.37	0.37	0.37	0.05	0.44	0.44	0.03	0.42	0.42
Ln Grp Delay, s/veh	39.5	0.0	26.6	33.6	0.0	23.5	32.0	27.3	29.6	44.5	24.8	26.0
Ln Grp LOS	D		C	C		C	C	C	C	D	C	C
Approach Vol, veh/h		642			180			1700			1262	
Approach Delay, s/veh		33.8			27.3			28.3			26.2	
Approach LOS		C			C			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1		4	6	5		8
Case No	4.0	1.4		6.0	4.0	1.4		6.0
Phs Duration (G+Y+Rc), s	53.0	9.3		45.7	51.0	11.3		45.7
Change Period (Y+Rc), s	* 5.3	* 5.9		* 6.2	* 5.3	* 5.9		* 6.2
Max Green (Gmax), s	* 48	* 6.1		* 49	* 46	* 8.1		* 49
Max Allow Headway (MAH), s	5.3	3.8		4.8	5.3	3.8		4.8
Max Q Clear (g_c+I1), s	29.3	2.0		35.9	20.5	2.0		21.0
Green Ext Time (g_e), s	11.1	0.1		3.6	9.2	0.2		4.6
Prob of Phs Call (p_c)	1.00	0.86		1.00	1.00	0.90		1.00
Prob of Max Out (p_x)	0.00	0.76		0.24	0.00	0.12		0.02
Left-Turn Movement Data								
Assigned Mvmt		1		7		5		3
Mvmt Sat Flow, veh/h		1774		1275		1774		1092
Through Movement Data								
Assigned Mvmt	2			4	6			8
Mvmt Sat Flow, veh/h	5007			794	5058			377
Right-Turn Movement Data								
Assigned Mvmt	12			14	16			18
Mvmt Sat Flow, veh/h	209			908	166			1263
Left Lane Group Data								
Assigned Mvmt	0	1	0	7	0	5	0	3
Lane Assignment		(Pr/Pm)				(Pr/Pm)		

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	65	0	359	0	76	0	67
Grp Sat Flow (s), veh/h/ln	0	1774	0	1275	0	1774	0	1092
Q Serve Time (g_s), s	0.0	0.0	0.0	28.9	0.0	0.0	0.0	5.4
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	33.9	0.0	0.0	0.0	19.0
Perm LT Sat Flow (s_l), veh/h/ln	0	309	0	1275	0	466	0	1092
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	45.7	0.0	39.5	0.0	45.7	0.0	39.5
Perm LT Serve Time (g_u), s	0.0	18.4	0.0	34.4	0.0	27.2	0.0	25.8
Perm LT Q Serve Time (g_ps), s	0.0	18.4	0.0	28.9	0.0	14.7	0.0	5.4
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	176	0	473	0	273	0	328
V/C Ratio (X)	0.00	0.37	0.00	0.76	0.00	0.28	0.00	0.20
Avail Cap (c_a), veh/h	0	220	0	583	0	317	0	422
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	43.2	0.0	34.9	0.0	31.5	0.0	33.3
Incr Delay (d2), s/veh	0.0	1.3	0.0	4.6	0.0	0.5	0.0	0.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	44.5	0.0	39.5	0.0	32.0	0.0	33.6
1st-Term Q (Q1), veh/ln	0.0	1.9	0.0	10.2	0.0	1.9	0.0	1.6
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.6	0.0	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.9	0.0	10.8	0.0	1.9	0.0	1.6
%ile Storage Ratio (RQ%)	0.00	0.35	0.00	3.42	0.00	0.49	0.00	0.84
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	0	4	6	0	0	8
Lane Assignment	T				T			
Lanes in Grp	2	0	0	0	2	0	0	0
Grp Vol (v), veh/h	1055	0	0	0	777	0	0	0
Grp Sat Flow (s), veh/h/ln	1695	0	0	0	1695	0	0	0
Q Serve Time (g_s), s	27.3	0.0	0.0	0.0	18.5	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	27.3	0.0	0.0	0.0	18.5	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	1497	0	0	0	1434	0	0	0
V/C Ratio (X)	0.71	0.00	0.00	0.00	0.54	0.00	0.00	0.00
Avail Cap (c_a), veh/h	1497	0	0	0	1434	0	0	0
Upstream Filter (I)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	24.5	0.0	0.0	0.0	23.3	0.0	0.0	0.0
Incr Delay (d2), s/veh	2.8	0.0	0.0	0.0	1.5	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	27.3	0.0	0.0	0.0	24.8	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	12.8	0.0	0.0	0.0	8.6	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.6	0.0	0.0	0.0	0.3	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	13.3	0.0	0.0	0.0	8.9	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.50	0.00	0.00	0.00	0.16	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	12	0	0	14	16	0	0	18
Lane Assignment	T+R			T+R	T+R			T+R
Lanes in Grp	1	0	0	1	1	0	0	1
Grp Vol (v), veh/h	569	0	0	283	420	0	0	113
Grp Sat Flow (s), veh/h/ln	1826	0	0	1702	1833	0	0	1640
Q Serve Time (g_s), s	27.3	0.0	0.0	13.7	18.5	0.0	0.0	5.1
Cycle Q Clear Time (g_c), s	27.3	0.0	0.0	13.7	18.5	0.0	0.0	5.1
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.11	0.00	0.00	0.53	0.09	0.00	0.00	0.77
Lane Grp Cap (c), veh/h	806	0	0	623	776	0	0	600
V/C Ratio (X)	0.71	0.00	0.00	0.45	0.54	0.00	0.00	0.19
Avail Cap (c_a), veh/h	806	0	0	769	776	0	0	741
Upstream Filter (I)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	24.5	0.0	0.0	26.1	23.3	0.0	0.0	23.3
Incr Delay (d2), s/veh	5.1	0.0	0.0	0.5	2.7	0.0	0.0	0.2
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	29.6	0.0	0.0	26.6	26.0	0.0	0.0	23.5
1st-Term Q (Q1), veh/ln	13.7	0.0	0.0	6.4	9.3	0.0	0.0	2.3
2nd-Term Q (Q2), veh/ln	1.2	0.0	0.0	0.1	0.6	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	14.9	0.0	0.0	6.5	9.9	0.0	0.0	2.3
%ile Storage Ratio (RQ%)	0.56	0.00	0.00	0.63	0.18	0.00	0.00	0.08
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	28.5
HCM 2010 LOS	C

Notes

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	6.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	11	0	105	0	0	17	60	1583	10	28	1446	14
Future Vol, veh/h	11	0	105	0	0	17	60	1583	10	28	1446	14
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	190	-	-	106	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	12	0	114	0	0	18	65	1721	11	30	1572	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2459	3502	793	2547	3505	866	1587	0	0	1732	0	0
Stage 1	1640	1640	-	1857	1857	-	-	-	-	-	-	-
Stage 2	819	1862	-	690	1648	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	33	6	284	29	6	255	202	-	-	171	-	-
Stage 1	70	157	-	49	122	-	-	-	-	-	-	-
Stage 2	304	121	-	365	155	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	20	3	284	11	3	255	202	-	-	171	-	-
Mov Cap-2 Maneuver	20	3	-	11	3	-	-	-	-	-	-	-
Stage 1	47	129	-	33	83	-	-	-	-	-	-	-
Stage 2	191	82	-	180	128	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	147.2	20.2	1.1	0.6
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	202	-	-	126	255	171	-	-
HCM Lane V/C Ratio	0.323	-	-	1.001	0.072	0.178	-	-
HCM Control Delay (s)	31.1	-	-	147.2	20.2	30.6	-	-
HCM Lane LOS	D	-	-	F	C	D	-	-
HCM 95th %tile Q(veh)	1.3	-	-	6.9	0.2	0.6	-	-

HCM 2010 TWSC
4: Campbell Ave & Helen St

08/29/2017

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations			↱			↱		↑↑↱			↑↑↱	
Traffic Vol, veh/h	0	0	122	0	0	25	0	1570	17	0	1459	33
Future Vol, veh/h	0	0	122	0	0	25	0	1570	17	0	1459	33
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	133	0	0	27	0	1707	18	0	1586	36

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	811	-	-	863	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	277	0	0	256	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	277	-	-	256	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	29.4	20.7	0	0
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	277	256	-	-
HCM Lane V/C Ratio	-	-	0.479	0.106	-	-
HCM Control Delay (s)	-	-	29.4	20.7	-	-
HCM Lane LOS	-	-	D	C	-	-
HCM 95th %tile Q(veh)	-	-	2.4	0.4	-	-

HCM 2010 Signalized Intersection Capacity Analysis
5: Campbell Ave & Speedway Blvd

08/29/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↑	↱	↰↰	↑↑↑	↱	↰↰	↑↑↑	↱
Traffic Volume (veh/h)	307	1448	239	310	1227	158	341	1035	251	450	990	190
Future Volume (veh/h)	307	1448	239	310	1227	158	341	1035	251	450	990	190
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	334	1574	260	337	1334	172	371	1125	273	489	1076	207
Adj No. of Lanes	1	3	1	1	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	398	1610	501	341	1487	463	487	1314	409	500	1356	422
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
Prop Arrive On Green	0.18	0.32	0.32	0.16	0.29	0.29	0.09	0.26	0.26	0.10	0.27	0.27
Ln Grp Delay, s/veh	59.6	57.9	34.5	94.2	48.1	34.2	57.4	49.7	48.2	86.4	45.8	41.1
Ln Grp LOS	E	E	C	F	D	C	E	D	D	F	D	D
Approach Vol, veh/h		2168			1843			1769			1772	
Approach Delay, s/veh		55.3			55.2			51.1			56.4	
Approach LOS		E			E			D			E	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	6	5	8	7
Case No	3.0	1.4	3.0	1.4	3.0	1.4	3.0	1.4
Phs Duration (G+Y+Rc), s	36.0	17.0	43.0	24.0	37.0	16.0	40.1	26.9
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green (Gmax), s	31.0	12.0	38.0	19.0	32.0	11.0	36.0	21.0
Max Allow Headway (MAH), s	5.0	3.8	5.1	3.8	5.0	3.8	5.1	3.8
Max Q Clear (g_c+I1), s	27.3	13.6	38.8	20.7	25.6	8.5	32.2	18.6
Green Ext Time (g_e), s	2.6	0.0	0.0	0.0	4.0	0.9	2.9	0.6
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prob of Max Out (p_x)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3		5		7
Mvmt Sat Flow, veh/h		3442		1774		3442		1774
Through Movement Data								
Assigned Mvmt	2		4		6		8	
Mvmt Sat Flow, veh/h	5085		5085		5085		5085	
Right-Turn Movement Data								
Assigned Mvmt	12		14		16		18	
Mvmt Sat Flow, veh/h	1583		1583		1583		1583	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	0	5	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)

Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	489	0	337	0	371	0	334
Grp Sat Flow (s), veh/h/ln	0	1721	0	1774	0	1721	0	1774
Q Serve Time (g_s), s	0.0	11.6	0.0	18.7	0.0	6.5	0.0	16.6
Cycle Q Clear Time (g_c), s	0.0	11.6	0.0	18.7	0.0	6.5	0.0	16.6
Perm LT Sat Flow (s_l), veh/h/ln	0	373	0	252	0	416	0	346
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	31.0	0.0	35.1	0.0	31.0	0.0	35.1
Perm LT Serve Time (g_u), s	0.0	5.7	0.0	0.0	0.0	7.4	0.0	4.9
Perm LT Q Serve Time (g_ps), s	0.0	5.7	0.0	0.0	0.0	7.4	0.0	4.9
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	500	0	341	0	487	0	398
V/C Ratio (X)	0.00	0.98	0.00	0.99	0.00	0.76	0.00	0.84
Avail Cap (c_a), veh/h	0	500	0	341	0	487	0	398
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	51.8	0.0	48.7	0.0	50.4	0.0	44.9
Incr Delay (d2), s/veh	0.0	34.6	0.0	45.5	0.0	7.0	0.0	14.6
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	86.4	0.0	94.2	0.0	57.4	0.0	59.6
1st-Term Q (Q1), veh/ln	0.0	8.1	0.0	11.1	0.0	5.9	0.0	10.6
2nd-Term Q (Q2), veh/ln	0.0	2.4	0.0	4.3	0.0	0.5	0.0	1.6
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	10.5	0.0	15.5	0.0	6.4	0.0	12.2
%ile Storage Ratio (RQ%)	0.00	1.11	0.00	1.71	0.00	0.71	0.00	0.65
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	3	0	3	0	3	0	3	0
Grp Vol (v), veh/h	1125	0	1574	0	1076	0	1334	0
Grp Sat Flow (s), veh/h/ln	1695	0	1695	0	1695	0	1695	0
Q Serve Time (g_s), s	25.3	0.0	36.8	0.0	23.6	0.0	30.2	0.0
Cycle Q Clear Time (g_c), s	25.3	0.0	36.8	0.0	23.6	0.0	30.2	0.0
Lane Grp Cap (c), veh/h	1314	0	1610	0	1356	0	1487	0
V/C Ratio (X)	0.86	0.00	0.98	0.00	0.79	0.00	0.90	0.00
Avail Cap (c_a), veh/h	1314	0	1610	0	1356	0	1526	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	42.4	0.0	40.6	0.0	40.9	0.0	40.7	0.0
Incr Delay (d2), s/veh	7.3	0.0	17.3	0.0	4.8	0.0	7.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	49.7	0.0	57.9	0.0	45.8	0.0	48.1	0.0
1st-Term Q (Q1), veh/ln	11.8	0.0	17.2	0.0	11.1	0.0	14.1	0.0

2nd-Term Q (Q2), veh/ln	0.9	0.0	2.6	0.0	0.6	0.0	1.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	12.7	0.0	19.8	0.0	11.7	0.0	15.1	0.0
%ile Storage Ratio (RQ%)	0.16	0.00	0.67	0.00	0.81	0.00	0.24	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	273	0	260	0	207	0	172	0
Grp Sat Flow (s), veh/h/ln	1583	0	1583	0	1583	0	1583	0
Q Serve Time (g_s), s	18.5	0.0	16.1	0.0	13.2	0.0	10.3	0.0
Cycle Q Clear Time (g_c), s	18.5	0.0	16.1	0.0	13.2	0.0	10.3	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	409	0	501	0	422	0	463	0
V/C Ratio (X)	0.67	0.00	0.52	0.00	0.49	0.00	0.37	0.00
Avail Cap (c_a), veh/h	409	0	501	0	422	0	475	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	39.9	0.0	33.5	0.0	37.1	0.0	33.7	0.0
Incr Delay (d2), s/veh	8.4	0.0	0.9	0.0	4.0	0.0	0.5	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	48.2	0.0	34.5	0.0	41.1	0.0	34.2	0.0
1st-Term Q (Q1), veh/ln	8.1	0.0	7.0	0.0	5.8	0.0	4.5	0.0
2nd-Term Q (Q2), veh/ln	1.0	0.0	0.1	0.0	0.5	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	9.1	0.0	7.1	0.0	6.3	0.0	4.6	0.0
%ile Storage Ratio (RQ%)	3.29	0.00	1.11	0.00	2.28	0.00	1.77	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		54.6						
HCM 2010 LOS		D						

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2130	1673	73	0	48
Future Vol, veh/h	0	2130	1673	73	0	48
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2315	1818	79	0	52

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	949
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	224
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	224
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	25.9
HCM LOS			D

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	224
HCM Lane V/C Ratio	-	-	-	0.233
HCM Control Delay (s)	-	-	-	25.9
HCM Lane LOS	-	-	-	D
HCM 95th %tile Q(veh)	-	-	-	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	41	1674	111	70	1554	59	172	76	159	206	64	90
Future Volume (veh/h)	41	1674	111	70	1554	59	172	76	159	206	64	90
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	45	1820	121	76	1689	64	187	83	173	224	70	98
Adj No. of Lanes	1	3	0	1	3	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	224	2334	155	158	2264	86	458	647	550	422	647	550
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
Prop Arrive On Green	0.06	0.48	0.48	0.03	0.45	0.45	0.35	0.35	0.35	0.35	0.35	0.35
Ln Grp Delay, s/veh	38.0	24.9	26.7	49.0	25.4	26.4	31.7	24.2	27.0	35.8	23.9	24.9
Ln Grp LOS	D	C	C	D	C	C	C	C	C	D	C	C
Approach Vol, veh/h		1986			1829			443			392	
Approach Delay, s/veh		25.8			26.7			28.4			31.0	
Approach LOS		C			C			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2	4	3		6	8	7
Case No		5.0	4.0	1.4		5.0	4.0	1.4
Phs Duration (G+Y+Rc), s		42.0	56.1	8.5		42.0	53.0	11.6
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green (Gmax), s		37.0	59.0	9.0		37.0	62.0	6.0
Max Allow Headway (MAH), s		4.4	5.3	3.8		4.4	5.3	3.8
Max Q Clear (g_c+I1), s		17.9	35.2	2.0		23.5	31.7	2.0
Green Ext Time (g_e), s		3.4	15.8	0.1		3.0	16.3	0.1
Prob of Phs Call (p_c)		1.00	1.00	0.89		1.00	1.00	0.74
Prob of Max Out (p_x)		0.00	0.58	0.04		0.00	0.38	0.83
Left-Turn Movement Data								
Assigned Mvmt		5		3		1		7
Mvmt Sat Flow, veh/h		1212		1774		1119		1774
Through Movement Data								
Assigned Mvmt		2	4			6	8	
Mvmt Sat Flow, veh/h		1863	4873			1863	5029	
Right-Turn Movement Data								
Assigned Mvmt		12	14			16	18	
Mvmt Sat Flow, veh/h		1583	323			1583	190	
Left Lane Group Data								
Assigned Mvmt	0	5	0	3	0	1	0	7
Lane Assignment				(Pr/Pm)				(Pr/Pm)

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	187	0	76	0	224	0	45
Grp Sat Flow (s), veh/h/ln	0	1212	0	1774	0	1119	0	1774
Q Serve Time (g_s), s	0.0	13.2	0.0	0.0	0.0	18.2	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	15.9	0.0	0.0	0.0	21.5	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	1212	0	227	0	1119	0	273
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	37.0	0.0	48.0	0.0	37.0	0.0	47.9
Perm LT Serve Time (g_u), s	0.0	34.3	0.0	14.8	0.0	33.8	0.0	18.2
Perm LT Q Serve Time (g_ps), s	0.0	13.2	0.0	14.8	0.0	18.2	0.0	16.1
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	458	0	158	0	422	0	224
V/C Ratio (X)	0.00	0.41	0.00	0.48	0.00	0.53	0.00	0.20
Avail Cap (c_a), veh/h	0	458	0	249	0	422	0	224
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	29.0	0.0	46.8	0.0	31.1	0.0	37.5
Incr Delay (d2), s/veh	0.0	2.7	0.0	2.3	0.0	4.7	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	31.7	0.0	49.0	0.0	35.8	0.0	38.0
1st-Term Q (Q1), veh/ln	0.0	4.4	0.0	2.2	0.0	5.6	0.0	1.2
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.1	0.0	0.6	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	4.8	0.0	2.3	0.0	6.2	0.0	1.2
%ile Storage Ratio (RQ%)	0.00	1.01	0.00	0.24	0.00	1.95	0.00	0.09
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	0	2	4	0	0	6	8	0
Lane Assignment		T	T			T	T	
Lanes in Grp	0	1	2	0	0	1	2	0
Grp Vol (v), veh/h	0	83	1265	0	0	70	1138	0
Grp Sat Flow (s), veh/h/ln	0	1863	1695	0	0	1863	1695	0
Q Serve Time (g_s), s	0.0	3.2	33.0	0.0	0.0	2.7	29.6	0.0
Cycle Q Clear Time (g_c), s	0.0	3.2	33.0	0.0	0.0	2.7	29.6	0.0
Lane Grp Cap (c), veh/h	0	647	1624	0	0	647	1526	0
V/C Ratio (X)	0.00	0.13	0.78	0.00	0.00	0.11	0.75	0.00
Avail Cap (c_a), veh/h	0	647	1877	0	0	647	1972	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	23.8	23.1	0.0	0.0	23.6	24.3	0.0
Incr Delay (d2), s/veh	0.0	0.4	1.9	0.0	0.0	0.3	1.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	24.2	24.9	0.0	0.0	23.9	25.4	0.0
1st-Term Q (Q1), veh/ln	0.0	1.7	15.5	0.0	0.0	1.4	13.8	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.4	0.0	0.0	0.1	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.7	15.9	0.0	0.0	1.5	14.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.06	0.17	0.00	0.00	0.10	1.02	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	0	12	14	0	0	16	18	0
Lane Assignment		R	T+R			R	T+R	
Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	173	676	0	0	98	615	0
Grp Sat Flow (s), veh/h/ln	0	1583	1806	0	0	1583	1829	0
Q Serve Time (g_s), s	0.0	8.5	33.2	0.0	0.0	4.6	29.7	0.0
Cycle Q Clear Time (g_c), s	0.0	8.5	33.2	0.0	0.0	4.6	29.7	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.18	0.00	0.00	1.00	0.10	0.00
Lane Grp Cap (c), veh/h	0	550	865	0	0	550	823	0
V/C Ratio (X)	0.00	0.31	0.78	0.00	0.00	0.18	0.75	0.00
Avail Cap (c_a), veh/h	0	550	1000	0	0	550	1064	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	25.5	23.1	0.0	0.0	24.2	24.3	0.0
Incr Delay (d2), s/veh	0.0	1.5	3.5	0.0	0.0	0.7	2.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	27.0	26.7	0.0	0.0	24.9	26.4	0.0
1st-Term Q (Q1), veh/ln	0.0	3.7	16.5	0.0	0.0	2.0	14.9	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.9	0.0	0.0	0.1	0.5	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	4.0	17.4	0.0	0.0	2.1	15.3	0.0
%ile Storage Ratio (RQ%)	0.00	1.26	0.19	0.00	0.00	0.67	1.11	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	26.9
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	45	133	32	5	12	54
Future Vol, veh/h	45	133	32	5	12	54
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	49	145	35	5	13	59

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	40	0	-	0	280	38
Stage 1	-	-	-	-	38	-
Stage 2	-	-	-	-	242	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1570	-	-	-	710	1034
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	798	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1570	-	-	-	686	1034
Mov Cap-2 Maneuver	-	-	-	-	686	-
Stage 1	-	-	-	-	984	-
Stage 2	-	-	-	-	771	-

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	9.1
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1570	-	-	-	947
HCM Lane V/C Ratio	0.031	-	-	-	0.076
HCM Control Delay (s)	7.4	0	-	-	9.1
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	0	0	0	0	150	0	0	208	0
Future Vol, veh/h	0	0	0	0	0	0	0	150	0	0	208	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	0	163	0	0	226	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	389	389	226	389	389	163	226	0	0	163	0	0
Stage 1	226	226	-	163	163	-	-	-	-	-	-	-
Stage 2	163	163	-	226	226	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	570	546	813	570	546	882	1342	-	-	1416	-	-
Stage 1	777	717	-	839	763	-	-	-	-	-	-	-
Stage 2	839	763	-	777	717	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	570	546	813	570	546	882	1342	-	-	1416	-	-
Mov Cap-2 Maneuver	570	546	-	570	546	-	-	-	-	-	-	-
Stage 1	777	717	-	839	763	-	-	-	-	-	-	-
Stage 2	839	763	-	777	717	-	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1342	-	-	-	-	1416	-	-
HCM Lane V/C Ratio	-	-	-	-	-	-	-	-
HCM Control Delay (s)	0	-	-	0	0	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-	0	-	-

Intersection	
Intersection Delay, s/veh	14.2
Intersection LOS	B

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	36	67	0	29	171	0	400	35
Future Vol, veh/h	0	36	67	0	29	171	0	400	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	39	73	0	32	186	0	435	38
Number of Lanes	0	1	0	0	1	0	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay	9.4	9.1	17.6
HCM LOS	A	A	C

Lane	NBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	35%	100%	0%
Vol Thru, %	15%	0%	0%	100%
Vol Right, %	85%	65%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	200	103	400	35
LT Vol	0	36	400	0
Through Vol	29	0	0	35
RT Vol	171	67	0	0
Lane Flow Rate	217	112	435	38
Geometry Grp	5	2	7	7
Degree of Util (X)	0.266	0.164	0.663	0.053
Departure Headway (Hd)	4.397	5.262	5.487	4.984
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	813	678	657	716
Service Time	2.451	3.321	3.237	2.734
HCM Lane V/C Ratio	0.267	0.165	0.662	0.053
HCM Control Delay	9.1	9.4	18.4	8
HCM Lane LOS	A	A	C	A
HCM 95th-tile Q	1.1	0.6	5	0.2

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Lane Configurations									
Traffic Vol, veh/h	0	145	0	0	0	95	0	0	0
Future Vol, veh/h	0	145	0	0	0	95	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	158	0	0	0	103	0	0	0
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.9	7.6	0
HCM LOS	A	A	-

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	0%	0%	0%
Vol Thru, %	100%	100%	100%
Vol Right, %	0%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	0	145	95
LT Vol	0	0	0
Through Vol	0	145	95
RT Vol	0	0	0
Lane Flow Rate	0	158	103
Geometry Grp	1	1	1
Degree of Util (X)	0	0.176	0.116
Departure Headway (Hd)	4.491	4.011	4.051
Convergence, Y/N	Yes	Yes	Yes
Cap	0	895	884
Service Time	2.491	2.031	2.081
HCM Lane V/C Ratio	0	0.177	0.117
HCM Control Delay	7.5	7.9	7.6
HCM Lane LOS	N	A	A
HCM 95th-tile Q	0	0.6	0.4

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	54	12	20	0	130	0	0	0	208
Future Vol, veh/h	0	0	0	54	12	20	0	130	0	0	0	208
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	59	13	22	0	141	0	0	0	226

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	272	254	113	254	367	141	226	0	0	141	0	0
Stage 1	113	113	-	141	141	-	-	-	-	-	-	-
Stage 2	159	141	-	113	226	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	680	650	940	699	562	907	1342	-	-	1442	-	-
Stage 1	892	802	-	862	780	-	-	-	-	-	-	-
Stage 2	843	780	-	892	717	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	652	650	940	699	562	907	1342	-	-	1442	-	-
Mov Cap-2 Maneuver	652	650	-	699	562	-	-	-	-	-	-	-
Stage 1	892	802	-	862	780	-	-	-	-	-	-	-
Stage 2	809	780	-	892	717	-	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1342	-	-	-	713	1442	-	-
HCM Lane V/C Ratio	-	-	-	-	0.131	-	-	-
HCM Control Delay (s)	0	-	-	0	10.8	0	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.5	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	29	103	114	97	38	233	955	25	69	1420	258
Future Volume (veh/h)	142	29	103	114	97	38	233	955	25	69	1420	258
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	154	32	112	124	105	41	253	1038	27	75	1543	280
Adj No. of Lanes	2	1	0	1	1	0	1	3	0	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	488	52	184	231	176	69	378	1621	42	645	2248	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.06	0.14	0.12	0.05	0.14	0.11	0.17	0.32	0.30	0.30	0.44	0.44
Ln Grp Delay, s/veh	36.7	0.0	37.7	39.5	0.0	37.2	27.6	25.6	26.2	19.9	19.6	7.3
Ln Grp LOS	D		D	D		D	C	C	C	B	B	A
Approach Vol, veh/h		298			270			1318			1898	
Approach Delay, s/veh		37.2			38.3			26.1			17.8	
Approach LOS		D			D			C			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	5	6	8	7
Case No	4.0	1.3	4.0	1.4	1.2	3.0	4.0	1.4
Phs Duration (G+Y+Rc), s	31.2	29.3	16.3	8.6	18.1	42.4	15.8	9.2
Change Period (Y+Rc), s	* 5.3	* 5.9	6.2	* 5	* 5.9	* 5.9	6.2	* 5
Max Green (Gmax), s	* 57	* 6.5	49.0	* 5	* 17	* 47	50.0	* 4
Max Allow Headway (MAH), s	5.2	5.0	5.6	3.9	3.8	5.0	5.5	3.9
Max Q Clear (g_c+I1), s	16.9	2.0	9.1	2.0	11.9	22.8	8.6	2.0
Green Ext Time (g_e), s	9.0	3.7	1.0	0.1	0.3	13.7	1.0	0.2
Prob of Phs Call (p_c)	1.00	0.83	1.00	0.95	1.00	1.00	1.00	0.97
Prob of Max Out (p_x)	0.02	1.00	0.00	1.00	0.39	0.47	0.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3	5			7
Mvmt Sat Flow, veh/h		1774		1774	1774			3442
Through Movement Data								
Assigned Mvmt	2		4			6	8	
Mvmt Sat Flow, veh/h	5097		364			5085	1276	
Right-Turn Movement Data								
Assigned Mvmt	12		14			16	18	
Mvmt Sat Flow, veh/h	133		1274			1583	498	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	5	0	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)	(Pr/Pm)			(Pr/Pm)

Lanes in Grp	0	1	0	1	1	0	0	2
Grp Vol (v), veh/h	0	75	0	124	253	0	0	154
Grp Sat Flow (s), veh/h/ln	0	1774	0	1774	1774	0	0	1721
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	9.9	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	9.9	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	528	0	1239	255	0	0	1200
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	5.8	0.0	10.6	11.7	0.0	0.0	10.6
Perm LT Serve Time (g_u), s	0.0	5.8	0.0	3.5	0.0	0.0	0.0	4.0
Perm LT Q Serve Time (g_ps), s	0.0	5.8	0.0	3.5	0.0	0.0	0.0	4.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	645	0	231	378	0	0	488
V/C Ratio (X)	0.00	0.12	0.00	0.54	0.67	0.00	0.00	0.32
Avail Cap (c_a), veh/h	0	645	0	259	479	0	0	488
Upstream Filter (I)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	19.8	0.0	37.5	25.1	0.0	0.0	36.3
Incr Delay (d2), s/veh	0.0	0.1	0.0	1.9	2.5	0.0	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	19.9	0.0	39.5	27.6	0.0	0.0	36.7
1st-Term Q (Q1), veh/ln	0.0	1.3	0.0	2.8	4.8	0.0	0.0	1.7
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.3	0.0	2.9	5.1	0.0	0.0	1.7
%ile Storage Ratio (RQ%)	0.00	0.23	0.00	1.46	1.30	0.00	0.00	0.55
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	0	6	8	0
Lane Assignment	T					T		
Lanes in Grp	2	0	0	0	0	3	0	0
Grp Vol (v), veh/h	690	0	0	0	0	1543	0	0
Grp Sat Flow (s), veh/h/ln	1695	0	0	0	0	1695	0	0
Q Serve Time (g_s), s	14.9	0.0	0.0	0.0	0.0	20.8	0.0	0.0
Cycle Q Clear Time (g_c), s	14.9	0.0	0.0	0.0	0.0	20.8	0.0	0.0
Lane Grp Cap (c), veh/h	1078	0	0	0	0	2248	0	0
V/C Ratio (X)	0.64	0.00	0.00	0.00	0.00	0.69	0.00	0.00
Avail Cap (c_a), veh/h	2316	0	0	0	0	2844	0	0
Upstream Filter (I)	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	25.0	0.0	0.0	0.0	0.0	19.1	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	25.6	0.0	0.0	0.0	0.0	19.6	0.0	0.0
1st-Term Q (Q1), veh/ln	6.9	0.0	0.0	0.0	0.0	9.7	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	7.0	0.0	0.0	0.0	0.0	9.8	0.0	0.0
%ile Storage Ratio (RQ%)	0.26	0.00	0.00	0.00	0.00	0.18	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	12	0	14	0	0	16	18	0
Lane Assignment	T+R		T+R			R	T+R	
Lanes in Grp	1	0	1	0	0	1	1	0
Grp Vol (v), veh/h	375	0	144	0	0	280	146	0
Grp Sat Flow (s), veh/h/ln	1839	0	1638	0	0	1583	1775	0
Q Serve Time (g_s), s	14.9	0.0	7.1	0.0	0.0	6.7	6.6	0.0
Cycle Q Clear Time (g_c), s	14.9	0.0	7.1	0.0	0.0	6.7	6.6	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.07	0.00	0.78	0.00	0.00	1.00	0.28	0.00
Lane Grp Cap (c), veh/h	585	0	236	0	0	700	245	0
V/C Ratio (X)	0.64	0.00	0.61	0.00	0.00	0.40	0.60	0.00
Avail Cap (c_a), veh/h	1257	0	981	0	0	885	1084	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	25.0	0.0	35.2	0.0	0.0	7.0	34.9	0.0
Incr Delay (d2), s/veh	1.2	0.0	2.5	0.0	0.0	0.4	2.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	26.2	0.0	37.7	0.0	0.0	7.3	37.2	0.0
1st-Term Q (Q1), veh/ln	7.5	0.0	3.2	0.0	0.0	3.7	3.3	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.2	0.0	0.0	0.1	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	7.7	0.0	3.4	0.0	0.0	3.7	3.4	0.0
%ile Storage Ratio (RQ%)	0.29	0.00	0.35	0.00	0.00	0.07	0.12	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary		
HCM 2010 Ctrl Delay		23.7
HCM 2010 LOS		C

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection												
Int Delay, s/veh	7.8											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	0	21	0	0	4	143	1395	40	19	1658	108
Future Vol, veh/h	17	0	21	0	0	4	143	1395	40	19	1658	108
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	190	-	-	106	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	0	23	0	0	4	155	1516	43	21	1802	117

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2819	3773	960	2611	3810	780	1920	0	0	1560	0	0
Stage 1	1902	1902	-	1849	1849	-	-	-	-	-	-	-
Stage 2	917	1871	-	762	1961	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	19	4	221	26	4	290	~ 137	-	-	208	-	-
Stage 1	45	116	-	50	123	-	-	-	-	-	-	-
Stage 2	265	120	-	330	108	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	0	221	-	0	290	~ 137	-	-	208	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	45	104	-	50	0	-	-	-	-	-	-	-
Stage 2	-	0	-	266	97	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			16.4	0.3
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	~ 137	-	-	-	-	208	-	-
HCM Lane V/C Ratio	1.135	-	-	-	-	0.099	-	-
HCM Control Delay (s)	181.3	-	-	-	-	24.2	-	-
HCM Lane LOS	F	-	-	-	-	C	-	-
HCM 95th %tile Q(veh)	8.9	-	-	-	-	0.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection												
Int Delay, s/veh	0.4											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	47	0	0	11	0	1524	29	0	1450	129
Future Vol, veh/h	0	0	47	0	0	11	0	1524	29	0	1450	129
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	51	0	0	12	0	1657	32	0	1576	140

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	858	-	-	844	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	258	0	0	263	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	258	-	-	263	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.4	19.3	0	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	258	263	-	-
HCM Lane V/C Ratio	-	-	0.198	0.045	-	-
HCM Control Delay (s)	-	-	22.4	19.3	-	-
HCM Lane LOS	-	-	C	C	-	-
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	827	211	364	1604	224	573	1042	129	285	1016	319
Future Volume (veh/h)	207	827	211	364	1604	224	573	1042	129	285	1016	319
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	225	899	229	396	1743	243	623	1133	140	310	1104	347
Adj No. of Lanes	1	3	1	1	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	237	1100	343	507	1822	567	656	1653	515	461	1314	409
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.20	0.43	0.43	0.24	0.36	0.36	0.15	0.32	0.32	0.08	0.26	0.26
Ln Grp Delay, s/veh	90.1	35.7	34.1	47.5	50.0	29.7	72.0	37.5	31.3	54.3	48.8	61.5
Ln Grp LOS	F	D	C	D	D	C	E	D	C	D	D	E
Approach Vol, veh/h		1353			2382			1896			1761	
Approach Delay, s/veh		44.5			47.5			48.4			52.2	
Approach LOS		D			D			D			D	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	6	5	8	7
Case No	3.0	1.4	3.0	1.4	3.0	1.4	3.0	1.4
Phs Duration (G+Y+Rc), s	43.0	14.0	30.0	33.0	35.0	22.0	47.0	16.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green (Gmax), s	38.0	9.0	29.0	24.0	30.0	17.0	42.0	11.0
Max Allow Headway (MAH), s	5.1	3.8	5.0	3.8	4.9	3.8	5.1	3.8
Max Q Clear (g_c+I1), s	25.2	6.2	20.6	21.3	27.0	18.6	42.2	12.9
Green Ext Time (g_e), s	6.8	1.1	4.3	0.6	2.2	0.0	0.0	0.0
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prob of Max Out (p_x)	0.00	1.00	0.68	1.00	0.00	1.00	1.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3		5		7
Mvmt Sat Flow, veh/h		3442		1774		3442		1774
Through Movement Data								
Assigned Mvmt	2		4		6		8	
Mvmt Sat Flow, veh/h	5085		5085		5085		5085	
Right-Turn Movement Data								
Assigned Mvmt	12		14		16		18	
Mvmt Sat Flow, veh/h	1583		1583		1583		1583	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	0	5	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)

Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	310	0	396	0	623	0	225
Grp Sat Flow (s), veh/h/ln	0	1721	0	1774	0	1721	0	1774
Q Serve Time (g_s), s	0.0	4.2	0.0	19.3	0.0	16.6	0.0	10.9
Cycle Q Clear Time (g_c), s	0.0	4.2	0.0	19.3	0.0	16.6	0.0	10.9
Perm LT Sat Flow (s_l), veh/h/ln	0	420	0	497	0	354	0	217
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	31.0	0.0	23.0	0.0	28.0	0.0	26.0
Perm LT Serve Time (g_u), s	0.0	7.8	0.0	4.3	0.0	3.3	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	7.8	0.0	4.3	0.0	3.3	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	461	0	507	0	656	0	237
V/C Ratio (X)	0.00	0.67	0.00	0.78	0.00	0.95	0.00	0.95
Avail Cap (c_a), veh/h	0	461	0	507	0	656	0	237
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	50.5	0.0	39.8	0.0	48.5	0.0	46.1
Incr Delay (d2), s/veh	0.0	3.8	0.0	7.7	0.0	23.5	0.0	44.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	54.3	0.0	47.5	0.0	72.0	0.0	90.1
1st-Term Q (Q1), veh/ln	0.0	4.9	0.0	12.1	0.0	10.2	0.0	7.3
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	1.1	0.0	2.1	0.0	2.9
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.2	0.0	13.2	0.0	12.3	0.0	10.2
%ile Storage Ratio (RQ%)	0.00	0.55	0.00	1.46	0.00	1.36	0.00	0.54
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	3	0	3	0	3	0	3	0
Grp Vol (v), veh/h	1133	0	899	0	1104	0	1743	0
Grp Sat Flow (s), veh/h/ln	1695	0	1695	0	1695	0	1695	0
Q Serve Time (g_s), s	23.2	0.0	18.6	0.0	24.7	0.0	40.2	0.0
Cycle Q Clear Time (g_c), s	23.2	0.0	18.6	0.0	24.7	0.0	40.2	0.0
Lane Grp Cap (c), veh/h	1653	0	1100	0	1314	0	1822	0
V/C Ratio (X)	0.69	0.00	0.82	0.00	0.84	0.00	0.96	0.00
Avail Cap (c_a), veh/h	1653	0	1271	0	1314	0	1822	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	35.2	0.0	32.0	0.0	42.2	0.0	37.6	0.0
Incr Delay (d2), s/veh	2.3	0.0	3.8	0.0	6.6	0.0	12.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	37.5	0.0	35.7	0.0	48.8	0.0	50.0	0.0
1st-Term Q (Q1), veh/ln	10.8	0.0	8.7	0.0	11.6	0.0	18.7	0.0

HCM 2010 Signalized Intersection Capacity Analysis
5: Campbell Ave & Speedway Blvd

08/29/2017

2nd-Term Q (Q2), veh/ln	0.4	0.0	0.4	0.0	0.8	0.0	2.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	11.2	0.0	9.0	0.0	12.4	0.0	20.8	0.0
%ile Storage Ratio (RQ%)	0.14	0.00	0.30	0.00	0.86	0.00	0.33	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	140	0	229	0	347	0	243	0
Grp Sat Flow (s), veh/h/ln	1583	0	1583	0	1583	0	1583	0
Q Serve Time (g_s), s	7.9	0.0	13.9	0.0	25.0	0.0	14.0	0.0
Cycle Q Clear Time (g_c), s	7.9	0.0	13.9	0.0	25.0	0.0	14.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	515	0	343	0	409	0	567	0
V/C Ratio (X)	0.27	0.00	0.67	0.00	0.85	0.00	0.43	0.00
Avail Cap (c_a), veh/h	515	0	396	0	409	0	567	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	30.0	0.0	30.6	0.0	42.3	0.0	29.2	0.0
Incr Delay (d2), s/veh	1.3	0.0	3.5	0.0	19.2	0.0	0.5	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	31.3	0.0	34.1	0.0	61.5	0.0	29.7	0.0
1st-Term Q (Q1), veh/ln	3.4	0.0	6.0	0.0	10.9	0.0	6.1	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.3	0.0	2.2	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	3.6	0.0	6.3	0.0	13.1	0.0	6.2	0.0
%ile Storage Ratio (RQ%)	1.31	0.00	0.98	0.00	4.74	0.00	2.37	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	48.3
HCM 2010 LOS	D

HCM 2010 TWSC
6: Speedway Blvd & Warren Ave

08/29/2017

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1384	2358	117	0	31
Future Vol, veh/h	0	1384	2358	117	0	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1504	2563	127	0	34

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	1345
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	121
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	121
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	45.9
HCM LOS			E

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	121
HCM Lane V/C Ratio	-	-	-	0.278
HCM Control Delay (s)	-	-	-	45.9
HCM Lane LOS	-	-	-	E
HCM 95th %tile Q(veh)	-	-	-	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	307	1179	166	72	1836	507	52	70	41	155	72	79
Future Volume (veh/h)	307	1179	166	72	1836	507	52	70	41	155	72	79
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	334	1282	180	78	1996	551	57	76	45	168	78	86
Adj No. of Lanes	1	3	0	1	3	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	260	2818	396	374	2440	642	250	357	303	259	357	303
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
Prop Arrive On Green	0.10	0.63	0.62	0.08	0.61	0.60	0.19	0.19	0.19	0.19	0.19	0.19
Ln Grp Delay, s/veh	205.9	12.5	13.3	17.3	21.7	28.9	46.9	42.2	41.4	61.1	42.3	43.8
Ln Grp LOS	F	B	B	B	C	C	D	D	D	E	D	D
Approach Vol, veh/h		1796			2625			178			332	
Approach Delay, s/veh		48.7			24.0			43.5			52.2	
Approach LOS		D			C			D			D	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2	4	3		6	8	7
Case No		5.0	4.0	1.4		5.0	4.0	1.4
Phs Duration (G+Y+Rc), s		27.0	79.0	14.0		27.0	77.0	16.0
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green (Gmax), s		22.0	74.0	9.0		22.0	72.0	11.0
Max Allow Headway (MAH), s		4.4	5.3	3.8		4.4	5.3	3.8
Max Q Clear (g_c+I1), s		11.2	20.0	2.0		21.6	53.5	14.0
Green Ext Time (g_e), s		1.6	15.5	0.8		0.1	16.2	0.0
Prob of Phs Call (p_c)		1.00	1.00	1.00		1.00	1.00	1.00
Prob of Max Out (p_x)		0.00	0.00	0.00		0.00	0.00	0.00
Left-Turn Movement Data								
Assigned Mvmt		5		3		1		7
Mvmt Sat Flow, veh/h		1217		1774		1265		1774
Through Movement Data								
Assigned Mvmt		2	4			6	8	
Mvmt Sat Flow, veh/h		1863	4508			1863	4011	
Right-Turn Movement Data								
Assigned Mvmt		12	14			16	18	
Mvmt Sat Flow, veh/h		1583	633			1583	1055	
Left Lane Group Data								
Assigned Mvmt	0	5	0	3	0	1	0	7
Lane Assignment				(Pr/Pm)				(Pr/Pm)

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	57	0	78	0	168	0	334
Grp Sat Flow (s), veh/h/ln	0	1217	0	1774	0	1265	0	1774
Q Serve Time (g_s), s	0.0	5.0	0.0	0.0	0.0	15.5	0.0	12.0
Cycle Q Clear Time (g_c), s	0.0	9.2	0.0	0.0	0.0	19.6	0.0	12.0
Perm LT Sat Flow (s_l), veh/h/ln	0	1217	0	361	0	1265	0	125
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	23.0	0.0	73.0	0.0	23.0	0.0	73.0
Perm LT Serve Time (g_u), s	0.0	18.8	0.0	55.0	0.0	18.9	0.0	21.5
Perm LT Q Serve Time (g_ps), s	0.0	5.0	0.0	15.1	0.0	15.5	0.0	21.5
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	250	0	374	0	259	0	260
V/C Ratio (X)	0.00	0.23	0.00	0.21	0.00	0.65	0.00	1.29
Avail Cap (c_a), veh/h	0	250	0	374	0	259	0	260
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	44.8	0.0	16.1	0.0	49.1	0.0	51.2
Incr Delay (d2), s/veh	0.0	2.1	0.0	1.3	0.0	11.9	0.0	154.7
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	46.9	0.0	17.3	0.0	61.1	0.0	205.9
1st-Term Q (Q1), veh/ln	0.0	1.7	0.0	1.5	0.0	5.4	0.0	8.6
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.1	0.0	0.9	0.0	11.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.8	0.0	1.6	0.0	6.3	0.0	19.7
%ile Storage Ratio (RQ%)	0.00	0.39	0.00	0.17	0.00	1.99	0.00	1.43
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.6
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Middle Lane Group Data								
Assigned Mvmt	0	2	4	0	0	6	8	0
Lane Assignment		T	T			T	T	
Lanes in Grp	0	1	2	0	0	1	2	0
Grp Vol (v), veh/h	0	76	964	0	0	78	1672	0
Grp Sat Flow (s), veh/h/ln	0	1863	1695	0	0	1863	1695	0
Q Serve Time (g_s), s	0.0	4.1	17.9	0.0	0.0	4.2	45.7	0.0
Cycle Q Clear Time (g_c), s	0.0	4.1	17.9	0.0	0.0	4.2	45.7	0.0
Lane Grp Cap (c), veh/h	0	357	2119	0	0	357	2062	0
V/C Ratio (X)	0.00	0.21	0.45	0.00	0.00	0.22	0.81	0.00
Avail Cap (c_a), veh/h	0	357	2119	0	0	357	2062	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	40.9	11.8	0.0	0.0	40.9	18.2	0.0
Incr Delay (d2), s/veh	0.0	1.4	0.7	0.0	0.0	1.4	3.6	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	42.2	12.5	0.0	0.0	42.3	21.7	0.0
1st-Term Q (Q1), veh/ln	0.0	2.1	8.3	0.0	0.0	2.2	21.1	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.2	0.0	0.0	0.1	1.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	2.3	8.5	0.0	0.0	2.3	22.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.08	0.09	0.00	0.00	0.16	1.61	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	14	0	0	16	18	0
Lane Assignment		R	T+R			R	T+R	
Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	45	498	0	0	86	875	0
Grp Sat Flow (s), veh/h/ln	0	1583	1751	0	0	1583	1677	0
Q Serve Time (g_s), s	0.0	2.8	18.0	0.0	0.0	5.6	51.5	0.0
Cycle Q Clear Time (g_c), s	0.0	2.8	18.0	0.0	0.0	5.6	51.5	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.36	0.00	0.00	1.00	0.63	0.00
Lane Grp Cap (c), veh/h	0	303	1094	0	0	303	1020	0
V/C Ratio (X)	0.00	0.15	0.45	0.00	0.00	0.28	0.86	0.00
Avail Cap (c_a), veh/h	0	303	1094	0	0	303	1020	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	40.4	11.9	0.0	0.0	41.5	19.6	0.0
Incr Delay (d2), s/veh	0.0	1.0	1.4	0.0	0.0	2.3	9.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	41.4	13.3	0.0	0.0	43.8	28.9	0.0
1st-Term Q (Q1), veh/ln	0.0	1.2	8.6	0.0	0.0	2.4	23.6	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.4	0.0	0.0	0.2	2.6	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.3	9.0	0.0	0.0	2.6	26.3	0.0
%ile Storage Ratio (RQ%)	0.00	0.42	0.10	0.00	0.00	0.84	1.91	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		35.6						
HCM 2010 LOS		D						

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	73	50	125	6	10	78
Future Vol, veh/h	73	50	125	6	10	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	79	54	136	7	11	85

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	142	0	-	0	352	139
Stage 1	-	-	-	-	139	-
Stage 2	-	-	-	-	213	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1441	-	-	-	646	909
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	823	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1441	-	-	-	609	909
Mov Cap-2 Maneuver	-	-	-	-	609	-
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	776	-

Approach	EB	WB	SB
HCM Control Delay, s	4.5	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1441	-	-	-	861
HCM Lane V/C Ratio	0.055	-	-	-	0.111
HCM Control Delay (s)	7.6	0	-	-	9.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4

Intersection	
Intersection Delay, s/veh	17.1
Intersection LOS	C

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	5	516	0	40	63	0	258	28
Future Vol, veh/h	0	5	516	0	40	63	0	258	28
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	5	561	0	43	68	0	280	30
Number of Lanes	0	1	0	0	1	0	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay	19.4	10	15.6
HCM LOS	C	A	C

Lane	NBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	1%	100%	0%
Vol Thru, %	39%	0%	0%	100%
Vol Right, %	61%	99%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	103	521	258	28
LT Vol	0	5	258	0
Through Vol	40	0	0	28
RT Vol	63	516	0	0
Lane Flow Rate	112	566	280	30
Geometry Grp	5	2	7	7
Degree of Util (X)	0.177	0.734	0.517	0.052
Departure Headway (Hd)	5.685	4.663	6.643	6.135
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	629	782	541	583
Service Time	3.741	2.663	4.389	3.88
HCM Lane V/C Ratio	0.178	0.724	0.518	0.051
HCM Control Delay	10	19.4	16.3	9.2
HCM Lane LOS	A	C	C	A
HCM 95th-tile Q	0.6	6.6	2.9	0.2

Intersection	
Int Delay, s/veh	14.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	6	56	68	50	33	207	298	196	4	48	146
Future Vol, veh/h	0	6	56	68	50	33	207	298	196	4	48	146
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	7	61	74	54	36	225	324	213	4	52	159

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1066	1127	132	1054	1100	430	211	0	0	537	0	0
Stage 1	140	140	-	880	880	-	-	-	-	-	-	-
Stage 2	926	987	-	174	220	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	200	205	917	204	212	625	1360	-	-	1031	-	-
Stage 1	863	781	-	342	365	-	-	-	-	-	-	-
Stage 2	322	325	-	828	721	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	114	154	917	149	160	625	1360	-	-	1031	-	-
Mov Cap-2 Maneuver	114	154	-	149	160	-	-	-	-	-	-	-
Stage 1	652	778	-	259	276	-	-	-	-	-	-	-
Stage 2	184	246	-	763	718	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.5	92.2	2.4	0.2
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1360	-	-	620	184	1031	-	-
HCM Lane V/C Ratio	0.165	-	-	0.109	0.892	0.004	-	-
HCM Control Delay (s)	8.2	0	-	11.5	92.2	8.5	0	-
HCM Lane LOS	A	A	-	B	F	A	A	-
HCM 95th %tile Q(veh)	0.6	-	-	0.4	6.7	0	-	-

Intersection	
Intersection Delay, s/veh	7.5
Intersection LOS	A

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Lane Configurations									
Traffic Vol, veh/h	0	26	0	0	26	81	0	6	60
Future Vol, veh/h	0	26	0	0	26	81	0	6	60
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	28	0	0	28	88	0	7	65
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.3	7.8	7
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	9%	0%	24%
Vol Thru, %	0%	100%	76%
Vol Right, %	91%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	66	26	107
LT Vol	6	0	26
Through Vol	0	26	81
RT Vol	60	0	0
Lane Flow Rate	72	28	116
Geometry Grp	1	1	1
Degree of Util (X)	0.073	0.033	0.133
Departure Headway (Hd)	3.654	4.149	4.13
Convergence, Y/N	Yes	Yes	Yes
Cap	967	859	868
Service Time	1.727	2.193	2.155
HCM Lane V/C Ratio	0.074	0.033	0.134
HCM Control Delay	7	7.3	7.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0.1	0.5

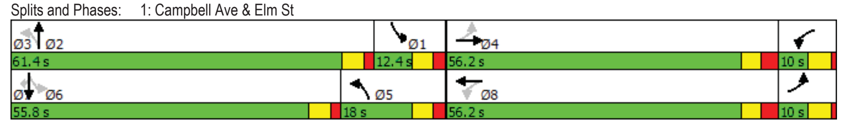
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	415	132	250	65	29	80	135	1570	78	69	1277	76
Future Volume (vph)	415	132	250	65	29	80	135	1570	78	69	1277	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	80		0	50		0	100		0	140		0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	1.00
Frt		0.902			0.890			0.993				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1680	0	1770	1658	0	1770	5050	0	1770	5085	1583
Flt Permitted	0.527			0.417			0.093			0.089		
Satd. Flow (perm)	1904	1680	0	777	1658	0	173	5050	0	166	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		78			87			6				151
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		357			758			743			1453	
Travel Time (s)		9.7			20.7			16.9			33.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	451	143	272	71	32	87	147	1707	85	75	1388	83
Shared Lane Traffic (%)												
Lane Group Flow (vph)	451	415	0	71	119	0	147	1792	0	75	1388	83
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			20			20	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	100		20	100		20	100		20	100	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	9.0	45.2		9.0	56.2		9.9	46.3		9.9	46.3	46.3
Total Split (s)	10.0	56.2		10.0	56.2		18.0	61.4		12.4	55.8	55.8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	7.1%	40.1%		7.1%	40.1%		12.9%	43.9%		8.9%	39.9%	39.9%
Maximum Green (s)	5.0	50.0		5.0	50.0		12.1	56.1		6.5	50.5	50.5
Yellow Time (s)	4.0	3.2		4.0	3.2		3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	3.0		1.0	3.0		2.3	1.7		2.3	1.7	1.7
Lost Time Adjust (s)	-1.0	-2.2		-1.0	-2.2		-1.9	-1.3		-1.9	-1.3	-1.3
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lead		Lag	Lead		Lag	Lead		Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		32.0			43.0			34.0			34.0	34.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	39.8	32.5		17.2	10.9		63.8	54.9		52.7	44.3	44.3
Actuated g/C Ratio	0.36	0.29		0.15	0.10		0.57	0.49		0.47	0.40	0.40
v/c Ratio	0.45	0.77		0.41	0.50		0.47	0.72		0.38	0.69	0.12
Control Delay	31.7	40.7		37.6	26.3		41.1	27.5		36.5	31.9	0.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	31.7	40.7		37.6	26.3		41.1	27.5		36.5	31.9	0.3
LOS	C	D		D	C		D	C		D	C	A
Approach Delay		36.0			30.5			28.6			30.4	
Approach LOS		D			C			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 112.1
Natural Cycle: 125
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 30.7 Intersection LOS: C
Intersection Capacity Utilization 75.1% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 1: Campbell Ave & Elm St



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	415	132	250	65	29	80	135	1570	78	69	1277	76
Future Volume (veh/h)	415	132	250	65	29	80	135	1570	78	69	1277	76
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	451	143	272	71	32	87	147	1707	85	75	1388	83
Adj No. of Lanes	2	1	0	1	1	0	1	3	0	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	920	173	329	135	52	141	342	2267	113	186	1918	597
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
Prop Arrive On Green	0.22	0.30	0.28	0.04	0.12	0.10	0.13	0.46	0.44	0.05	0.38	0.38
Ln Grp Delay, s/veh	33.6	0.0	38.3	51.7	0.0	48.1	38.9	25.0	26.4	46.8	28.7	21.6
Ln Grp LOS	C		D	D		D	D	C	C	D	C	C
Approach Vol, veh/h		866			190			1939			1546	
Approach Delay, s/veh		35.9			49.4			26.5			29.2	
Approach LOS		D			D			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	6	5	8	7
Case No	4.0	1.4	4.0	1.4	3.0	1.4	4.0	1.4
Phs Duration (G+Y+Rc), s	51.9	9.4	35.6	7.9	43.6	17.8	16.2	27.3
Change Period (Y+Rc), s	* 5.3	* 5.9	6.2	* 5	* 5.3	* 5.9	6.2	* 5
Max Green (Gmax), s	* 56	* 6.5	50.0	* 5	* 51	* 12	50.0	* 5
Max Allow Headway (MAH), s	5.3	3.8	5.6	3.9	5.2	3.8	5.6	3.9
Max Q Clear (g_c+I1), s	31.9	2.0	26.4	2.0	26.5	3.2	9.3	8.8
Green Ext Time (g_e), s	14.7	0.2	3.0	0.1	11.7	0.4	0.8	0.0
Prob of Phs Call (p_c)	1.00	0.89	1.00	0.87	1.00	0.99	1.00	1.00
Prob of Max Out (p_x)	0.50	0.60	0.01	1.00	0.29	0.02	0.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3		5		7
Mvmt Sat Flow, veh/h		1774		1774		1774		3442
Through Movement Data								
Assigned Mvmt	2		4		6		8	
Mvmt Sat Flow, veh/h	4962		575		5085		444	
Right-Turn Movement Data								
Assigned Mvmt	12		14		16		18	
Mvmt Sat Flow, veh/h	247		1094		1583		1206	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	0	5	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)

HCM 2010 Signalized Intersection Capacity Analysis
1: Campbell Ave & Elm St 08/29/2017

Lanes in Grp	0	1	0	1	0	1	0	2
Grp Vol (v), veh/h	0	75	0	71	0	147	0	451
Grp Sat Flow (s), veh/h/ln	0	1774	0	1774	0	1774	0	1721
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	1.2	0.0	6.8
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	1.2	0.0	6.8
Perm LT Sat Flow (s_l), veh/h/ln	0	263	0	967	0	358	0	1230
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	40.2	0.0	11.0	0.0	36.3	0.0	8.0
Perm LT Serve Time (g_u), s	0.0	10.2	0.0	0.0	0.0	11.7	0.0	0.8
Perm LT Q Serve Time (g_ps), s	0.0	10.2	0.0	0.0	0.0	11.7	0.0	0.8
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	186	0	135	0	342	0	920
V/C Ratio (X)	0.00	0.40	0.00	0.52	0.00	0.43	0.00	0.49
Avail Cap (c_a), veh/h	0	236	0	170	0	346	0	920
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	45.4	0.0	48.6	0.0	38.0	0.0	33.2
Incr Delay (d2), s/veh	0.0	1.4	0.0	3.1	0.0	0.9	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	46.8	0.0	51.7	0.0	38.9	0.0	33.6
1st-Term Q (Q1), veh/ln	0.0	2.1	0.0	2.0	0.0	3.8	0.0	5.5
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.1	0.0	2.1	0.0	3.8	0.0	5.6
%ile Storage Ratio (RQ%)	0.00	0.39	0.00	1.07	0.00	0.97	0.00	1.77
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T				T			
Lanes in Grp	2	0	0	0	3	0	0	0
Grp Vol (v), veh/h	1166	0	0	0	1388	0	0	0
Grp Sat Flow (s), veh/h/ln	1695	0	0	0	1695	0	0	0
Q Serve Time (g_s), s	29.8	0.0	0.0	0.0	24.5	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	29.8	0.0	0.0	0.0	24.5	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	1549	0	0	0	1918	0	0	0
V/C Ratio (X)	0.75	0.00	0.00	0.00	0.72	0.00	0.00	0.00
Avail Cap (c_a), veh/h	1856	0	0	0	2512	0	0	0
Upstream Filter (I)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	23.6	0.0	0.0	0.0	28.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	0.0	0.7	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	25.0	0.0	0.0	0.0	28.7	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	13.9	0.0	0.0	0.0	11.4	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	14.2	0.0	0.0	0.0	11.6	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.54	0.00	0.00	0.00	0.21	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	T+R		T+R		R		T+R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	626	0	415	0	83	0	119	0
Grp Sat Flow (s), veh/h/ln	1819	0	1670	0	1583	0	1650	0
Q Serve Time (g_s), s	29.9	0.0	24.4	0.0	3.6	0.0	7.3	0.0
Cycle Q Clear Time (g_c), s	29.9	0.0	24.4	0.0	3.6	0.0	7.3	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.14	0.00	0.66	0.00	1.00	0.00	0.73	0.00
Lane Grp Cap (c), veh/h	831	0	503	0	597	0	193	0
V/C Ratio (X)	0.75	0.00	0.83	0.00	0.14	0.00	0.62	0.00
Avail Cap (c_a), veh/h	996	0	831	0	782	0	821	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	23.7	0.0	34.8	0.0	21.5	0.0	44.9	0.0
Incr Delay (d2), s/veh	2.7	0.0	3.5	0.0	0.1	0.0	3.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	26.4	0.0	38.3	0.0	21.6	0.0	48.1	0.0
1st-Term Q (Q1), veh/ln	15.0	0.0	11.2	0.0	1.6	0.0	3.3	0.0
2nd-Term Q (Q2), veh/ln	0.6	0.0	0.5	0.0	0.0	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	15.6	0.0	11.7	0.0	1.6	0.0	3.5	0.0
%ile Storage Ratio (RQ%)	0.59	0.00	1.19	0.00	0.03	0.00	0.13	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.2
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	74	0	120	0	0	17	63	1740	10	28	1584	18
Future Volume (vph)	74	0	120	0	0	17	63	1740	10	28	1584	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	190		0	106		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.916			0.865			0.999			0.998	
Flt Protected		0.981					0.950			0.950		
Satd. Flow (prot)	0	1674	0	0	1611	0	1770	5080	0	1770	5075	0
Flt Permitted		0.981					0.950			0.950		
Satd. Flow (perm)	0	1674	0	0	1611	0	1770	5080	0	1770	5075	0
Link Speed (mph)		20			20			30			30	
Link Distance (ft)		159			832			467			720	
Travel Time (s)		5.4			28.4			10.6			16.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	80	0	130	0	0	18	68	1891	11	30	1722	20
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	210	0	0	18	0	68	1902	0	30	1742	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			20			20	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 65.3% ICU Level of Service C
Analysis Period (min) 15

HCM 2010 TWSC
3: Campbell Ave & Mabel St
08/29/2017

Intersection	
Int Delay, s/veh	165

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	74	0	120	0	0	17	63	1740	10	28	1584	18
Future Vol, veh/h	74	0	120	0	0	17	63	1740	10	28	1584	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	190	-	-	106	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	80	0	130	0	0	18	68	1891	11	30	1722	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2685	3831	871	2784	3836	951	1741	0	0	1902	0	0
Stage 1	1792	1792	-	2034	2034	-	-	-	-	-	-	-
Stage 2	893	2039	-	750	1802	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	~ 23	4	253	20	4	224	169	-	-	140	-	-
Stage 1	~ 55	131	-	36	99	-	-	-	-	-	-	-
Stage 2	274	99	-	336	130	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 12	2	253	6	2	224	169	-	-	140	-	-
Mov Cap-2 Maneuver	~ 12	2	-	6	2	-	-	-	-	-	-	-
Stage 1	~ 33	103	-	22	59	-	-	-	-	-	-	-
Stage 2	150	59	-	128	102	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 3088.5	22.5	1.4	0.6
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	169	-	-	29	224	140	-	-
HCM Lane V/C Ratio	0.405	-	-	7.271	0.082	0.217	-	-
HCM Control Delay (s)	40.1	-		$ 3088.5	22.5	37.7	-	-
HCM Lane LOS	E	-	-	F	C	E	-	-
HCM 95th %tile Q(veh)	1.8	-	-	25.8	0.3	0.8	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Lanes, Volumes, Timings
4: Campbell Ave & Helen St
08/29/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	186	0	0	25	0	1729	17	0	1603	41
Future Volume (vph)	0	0	186	0	0	25	0	1729	17	0	1603	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865			0.865		0.999			0.996	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	5080	0	0	5065	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	5080	0	0	5065	0
Link Speed (mph)		20			20			30			30	
Link Distance (ft)		402			822			468			467	
Travel Time (s)		13.7			28.0			10.6			10.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	202	0	0	27	0	1879	18	0	1742	45
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	202	0	0	27	0	1897	0	0	1787	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			32			32	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 50.1%	ICU Level of Service A
Analysis Period (min) 15	

Intersection												
Int Delay, s/veh	3.5											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	186	0	0	25	0	1729	17	0	1603	41
Future Vol, veh/h	0	0	186	0	0	25	0	1729	17	0	1603	41
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	202	0	0	27	0	1879	18	0	1742	45

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	893	-	-	949	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	244	0	0	224	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	244	-	-	224	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	64.8	23.3	0	0
HCM LOS	F	C		

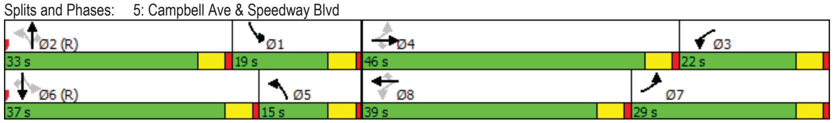
Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	244	224	-	-
HCM Lane V/C Ratio	-	-	0.829	0.121	-	-
HCM Control Delay (s)	-	-	64.8	23.3	-	-
HCM Lane LOS	-	-	F	C	-	-
HCM 95th %tile Q(veh)	-	-	6.5	0.4	-	-

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	399	1611	367	310	1264	190	381	1070	251	518	1112	209
Future Volume (vph)	399	1611	367	310	1264	190	381	1070	251	518	1112	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	480		164	230		66	230		70	240		70
Storage Lanes	1		1	1		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.103			0.114			0.138			0.121		
Satd. Flow (perm)	192	5085	1583	212	5085	1583	499	5085	1583	437	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			217			155			155			155
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		862			1684			2128			468	
Travel Time (s)		19.6			38.3			48.4			10.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	434	1751	399	337	1374	207	414	1163	273	563	1209	227
Shared Lane Traffic (%)												
Lane Group Flow (vph)	434	1751	399	337	1374	207	414	1163	273	563	1209	227
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		20			20			32			32	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	100	20	20	100	20	20	100	20	20	100	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	21.0	21.0	9.0	21.0	21.0	9.0	21.0	21.0	9.0	21.0	21.0
Total Split (s)	29.0	46.0	46.0	22.0	39.0	39.0	15.0	33.0	33.0	19.0	37.0	37.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	24.2%	38.3%	38.3%	18.3%	32.5%	32.5%	12.5%	27.5%	27.5%	15.8%	30.8%	30.8%
Maximum Green (s)	24.0	41.0	41.0	17.0	34.0	34.0	10.0	28.0	28.0	14.0	32.0	32.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	64.0	42.0	42.0	53.0	35.0	35.0	40.0	29.0	29.0	48.0	33.0	33.0
Actuated g/C Ratio	0.53	0.35	0.35	0.44	0.29	0.29	0.33	0.24	0.24	0.40	0.28	0.28
v/c Ratio	1.01	0.98	0.57	1.03	0.93	0.36	0.95	0.95	0.55	1.03	0.86	0.41
Control Delay	88.2	56.8	17.4	101.3	52.9	11.5	79.0	60.7	21.2	91.6	49.0	14.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	88.2	56.8	17.4	101.3	52.9	11.5	79.0	60.7	21.2	91.6	49.0	14.4
LOS	F	E	B	F	D	B	E	E	C	F	D	B
Approach Delay		56.0			56.9			59.0			57.1	
Approach LOS		E			E			E			E	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 57.1	Intersection LOS: E
Intersection Capacity Utilization 97.1%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 5: Campbell Ave & Speedway Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↑	↱	↰	↑↑↑	↱	↰↰	↑↑↑	↱	↰↰	↑↑↑	↱
Traffic Volume (veh/h)	399	1611	367	310	1264	190	381	1070	251	518	1112	209
Future Volume (veh/h)	399	1611	367	310	1264	190	381	1070	251	518	1112	209
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	434	1751	399	337	1374	207	414	1163	273	563	1209	227
Adj No. of Lanes	1	3	1	1	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	432	1780	554	326	1480	461	447	1229	383	550	1398	435
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
Prop Arrive On Green	0.21	0.35	0.35	0.15	0.29	0.29	0.09	0.24	0.24	0.13	0.28	0.28
Ln Grp Delay, s/veh	90.2	56.2	38.4	108.1	51.9	35.4	77.8	60.4	52.5	95.2	48.7	41.2
Ln Grp LOS	F	E	D	F	D	D	E	E	D	F	D	D
Approach Vol, veh/h		2584			1918			1850			1999	
Approach Delay, s/veh		59.2			60.0			63.1			61.0	
Approach LOS		E			E			E			E	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	6	5	8	7
Case No	3.0	1.4	3.0	1.4	3.0	1.4	3.0	1.4
Phs Duration (G+Y+Rc), s	33.0	19.0	46.0	22.0	37.0	15.0	38.9	29.1
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green (Gmax), s	28.0	14.0	41.0	17.0	32.0	10.0	34.0	24.0
Max Allow Headway (MAH), s	5.0	3.8	5.0	3.8	5.1	3.8	5.1	3.8
Max Q Clear (g_c+I1), s	29.0	17.0	43.0	20.0	29.1	11.7	33.5	27.1
Green Ext Time (g_e), s	0.0	0.0	0.0	0.0	2.1	0.0	0.4	0.0
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prob of Max Out (p_x)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3		5		7
Mvmt Sat Flow, veh/h		3442		1774		3442		1774
Through Movement Data								
Assigned Mvmt	2		4		6		8	
Mvmt Sat Flow, veh/h	5085		5085		5085		5085	
Right-Turn Movement Data								
Assigned Mvmt	12		14		16		18	
Mvmt Sat Flow, veh/h	1583		1583		1583		1583	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	0	5	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)

Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	563	0	337	0	414	0	434
Grp Sat Flow (s), veh/h/ln	0	1721	0	1774	0	1721	0	1774
Q Serve Time (g_s), s	0.0	15.0	0.0	18.0	0.0	9.7	0.0	25.1
Cycle Q Clear Time (g_c), s	0.0	15.0	0.0	18.0	0.0	9.7	0.0	25.1
Perm LT Sat Flow (s_l), veh/h/ln	0	359	0	185	0	359	0	322
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	27.0	0.0	34.9	0.0	29.0	0.0	31.9
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.4
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	1.9	0.0	0.4
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	550	0	326	0	447	0	432
V/C Ratio (X)	0.00	1.02	0.00	1.03	0.00	0.93	0.00	1.00
Avail Cap (c_a), veh/h	0	550	0	326	0	447	0	432
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	50.9	0.0	49.3	0.0	52.3	0.0	45.7
Incr Delay (d2), s/veh	0.0	44.3	0.0	58.7	0.0	25.5	0.0	44.5
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	95.2	0.0	108.1	0.0	77.8	0.0	90.2
1st-Term Q (Q1), veh/ln	0.0	9.1	0.0	10.8	0.0	6.8	0.0	14.3
2nd-Term Q (Q2), veh/ln	0.0	3.4	0.0	5.3	0.0	1.6	0.0	5.3
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	12.5	0.0	16.1	0.0	8.4	0.0	19.6
%ile Storage Ratio (RQ%)	0.00	1.32	0.00	1.78	0.00	0.92	0.00	1.04
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	3.2	0.0	2.7	0.0	0.0	0.0	0.5
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.3
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	3	0	3	0	3	0	3	0
Grp Vol (v), veh/h	1163	0	1751	0	1209	0	1374	0
Grp Sat Flow (s), veh/h/ln	1695	0	1695	0	1695	0	1695	0
Q Serve Time (g_s), s	27.0	0.0	41.0	0.0	27.1	0.0	31.5	0.0
Cycle Q Clear Time (g_c), s	27.0	0.0	41.0	0.0	27.1	0.0	31.5	0.0
Lane Grp Cap (c), veh/h	1229	0	1780	0	1398	0	1480	0
V/C Ratio (X)	0.95	0.00	0.98	0.00	0.86	0.00	0.93	0.00
Avail Cap (c_a), veh/h	1229	0	1780	0	1398	0	1483	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	44.7	0.0	38.7	0.0	41.4	0.0	41.3	0.0
Incr Delay (d2), s/veh	15.7	0.0	17.6	0.0	7.3	0.0	10.5	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	60.4	0.0	56.2	0.0	48.7	0.0	51.9	0.0
1st-Term Q (Q1), veh/ln	12.6	0.0	19.1	0.0	12.6	0.0	14.8	0.0

2nd-Term Q (Q2), veh/ln	1.8	0.0	2.9	0.0	0.9	0.0	1.4	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	14.4	0.0	22.0	0.0	13.6	0.0	16.2	0.0
%ile Storage Ratio (RQ%)	0.18	0.00	0.74	0.00	0.94	0.00	0.26	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	273	0	399	0	227	0	207	0
Grp Sat Flow (s), veh/h/ln	1583	0	1583	0	1583	0	1583	0
Q Serve Time (g_s), s	19.0	0.0	26.3	0.0	14.6	0.0	12.8	0.0
Cycle Q Clear Time (g_c), s	19.0	0.0	26.3	0.0	14.6	0.0	12.8	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	383	0	554	0	435	0	461	0
V/C Ratio (X)	0.71	0.00	0.72	0.00	0.52	0.00	0.45	0.00
Avail Cap (c_a), veh/h	383	0	554	0	435	0	462	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	41.7	0.0	33.9	0.0	36.8	0.0	34.7	0.0
Incr Delay (d2), s/veh	10.8	0.0	4.5	0.0	4.4	0.0	0.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	52.5	0.0	38.4	0.0	41.2	0.0	35.4	0.0
1st-Term Q (Q1), veh/ln	8.3	0.0	11.4	0.0	6.4	0.0	5.6	0.0
2nd-Term Q (Q2), veh/ln	1.1	0.0	0.7	0.0	0.5	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	9.4	0.0	12.1	0.0	6.9	0.0	5.7	0.0
%ile Storage Ratio (RQ%)	3.42	0.00	1.88	0.00	2.50	0.00	2.18	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		60.7						
HCM 2010 LOS		E						

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	2513	1761	81	0	70
Future Volume (vph)	0	2513	1761	81	0	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	0.91	1.00	1.00
Frt			0.993			0.865
Flt Protected						
Satd. Flow (prot)	0	5085	5050	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	5085	5050	0	0	1611
Link Speed (mph)		30	30		20	
Link Distance (ft)		422	862		472	
Travel Time (s)		9.6	19.6		16.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	2732	1914	88	0	76
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	2732	2002	0	0	76
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		27	27		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 51.9% ICU Level of Service A

Analysis Period (min) 15

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2513	1761	81	0	70
Future Vol, veh/h	0	2513	1761	81	0	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2732	1914	88	0	76

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	1001
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	207
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	207
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	32.2
HCM LOS			D

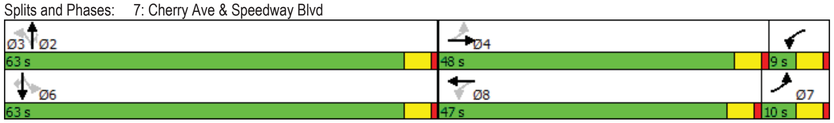
Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	207
HCM Lane V/C Ratio	-	-	-	0.368
HCM Control Delay (s)	-	-	-	32.2
HCM Lane LOS	-	-	-	D
HCM 95th %tile Q(veh)	-	-	-	1.6

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑↱		↰	↑↑↱		↰	↑	↱	↰	↑	↱
Traffic Volume (vph)	109	1675	111	70	1606	117	172	76	159	588	64	218
Future Volume (vph)	109	1675	111	70	1606	117	172	76	159	588	64	218
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	350		0	240		0	120		80	80		80
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.990				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5040	0	1770	5034	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.087			0.093			0.711			0.703		
Satd. Flow (perm)	162	5040	0	173	5034	0	1324	1863	1583	1310	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			11				96			96
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2369			422			812			473	
Travel Time (s)		53.8			9.6			18.5			10.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	1821	121	76	1746	127	187	83	173	639	70	237
Shared Lane Traffic (%)												
Lane Group Flow (vph)	118	1942	0	76	1873	0	187	83	173	639	70	237
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		27			27			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1	1	1	1	1
Detector Template	Left	Thru		Left	Thru		Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100	20	20	100	20
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0	0	0	0	0
Detector 1 Size(ft)	20	100		20	100		20	100	20	20	100	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Detector Phase	7	4		3	8		2	2	2	6	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	23.0		9.0	23.0		23.0	23.0	23.0	23.0	23.0	23.0
Total Split (s)	10.0	48.0		9.0	47.0		63.0	63.0	63.0	63.0	63.0	63.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	8.3%	40.0%		7.5%	39.2%		52.5%	52.5%	52.5%	52.5%	52.5%	52.5%
Maximum Green (s)	5.0	43.0		4.0	42.0		58.0	58.0	58.0	58.0	58.0	58.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead		Lag	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None		None	None		Max	Max	Max	Max	Max	Max
Walk Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effct Green (s)	50.6	45.8		48.0	43.0		59.0	59.0	59.0	59.0	59.0	59.0
Actuated g/C Ratio	0.42	0.38		0.40	0.36		0.49	0.49	0.49	0.49	0.49	0.49
v/c Ratio	0.80	1.01		0.56	1.03		0.29	0.09	0.21	0.99	0.08	0.29
Control Delay	78.4	59.4		53.4	68.5		19.6	16.6	8.4	64.8	16.5	11.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.4	59.4		53.4	68.5		19.6	16.6	8.4	64.8	16.5	11.4
LOS	E	E		D	E		B	B	A	E	B	B
Approach Delay		60.5			67.9			14.7			47.8	
Approach LOS		E			E			B			D	

Intersection Summary	
Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 57.2	Intersection LOS: E
Intersection Capacity Utilization 88.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 7: Cherry Ave & Speedway Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	109	1675	111	70	1606	117	172	76	159	588	64	218
Future Volume (veh/h)	109	1675	111	70	1606	117	172	76	159	588	64	218
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	118	1821	121	76	1746	127	187	83	173	639	70	237
Adj No. of Lanes	1	3	0	1	3	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	149	1787	118	134	1734	126	564	916	778	584	916	778
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
Prop Arrive On Green	0.05	0.37	0.36	0.04	0.36	0.35	0.49	0.49	0.49	0.49	0.49	0.49
Ln Grp Delay, s/veh	79.8	68.2	78.6	60.7	65.8	76.2	21.9	16.4	18.1	100.6	16.3	19.2
Ln Grp LOS	E	F	F	E	F	F	C	B	B	F	B	B
Approach Vol, veh/h		2060			1949			443			946	
Approach Delay, s/veh		72.3			69.1			19.4			74.0	
Approach LOS		E			E			B			E	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2	4	3		6	8	7
Case No		5.0	4.0	1.4		5.0	4.0	1.4
Phs Duration (G+Y+Rc), s		63.0	48.0	9.0		63.0	47.0	10.0
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green (Gmax), s		58.0	43.0	4.0		58.0	42.0	5.0
Max Allow Headway (MAH), s		4.4	5.3	3.8		4.4	5.3	3.8
Max Q Clear (g_c+I1), s		17.8	46.0	2.9		61.0	45.0	5.8
Green Ext Time (g_e), s		7.7	0.0	0.1		0.0	0.0	0.0
Prob of Phs Call (p_c)		1.00	1.00	0.92		1.00	1.00	0.98
Prob of Max Out (p_x)		0.00	1.00	1.00		0.00	1.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		5		3		1		7
Mvmt Sat Flow, veh/h		1068		1774		1119		1774
Through Movement Data								
Assigned Mvmt		2	4			6	8	
Mvmt Sat Flow, veh/h		1863	4873			1863	4840	
Right-Turn Movement Data								
Assigned Mvmt		12	14			16	18	
Mvmt Sat Flow, veh/h		1583	323			1583	351	
Left Lane Group Data								
Assigned Mvmt	0	5	0	3	0	1	0	7
Lane Assignment				(Pr/Pm)				(Pr/Pm)

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	187	0	76	0	639	0	118
Grp Sat Flow (s), veh/h/ln	0	1068	0	1774	0	1119	0	1774
Q Serve Time (g_s), s	0.0	13.5	0.0	0.9	0.0	56.2	0.0	3.8
Cycle Q Clear Time (g_c), s	0.0	15.8	0.0	0.9	0.0	59.0	0.0	3.8
Perm LT Sat Flow (s_l), veh/h/ln	0	1068	0	227	0	1119	0	243
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	59.0	0.0	43.0	0.0	59.0	0.0	43.0
Perm LT Serve Time (g_u), s	0.0	56.6	0.0	0.0	0.0	56.2	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	13.5	0.0	0.0	0.0	56.2	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	564	0	134	0	584	0	149
V/C Ratio (X)	0.00	0.33	0.00	0.57	0.00	1.09	0.00	0.79
Avail Cap (c_a), veh/h	0	564	0	134	0	584	0	149
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	20.3	0.0	55.2	0.0	34.8	0.0	55.0
Incr Delay (d2), s/veh	0.0	1.6	0.0	5.5	0.0	65.8	0.0	24.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	21.9	0.0	60.7	0.0	100.6	0.0	79.8
1st-Term Q (Q1), veh/ln	0.0	3.9	0.0	2.4	0.0	19.3	0.0	3.8
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.2	0.0	10.7	0.0	1.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	4.2	0.0	2.6	0.0	30.0	0.0	4.9
%ile Storage Ratio (RQ%)	0.00	0.89	0.00	0.28	0.00	9.51	0.00	0.35
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	13.8	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	4	0	0	6	8	0
Lane Assignment		T	T			T	T	
Lanes in Grp	0	1	2	0	0	1	2	0
Grp Vol (v), veh/h	0	83	1266	0	0	70	1222	0
Grp Sat Flow (s), veh/h/ln	0	1863	1695	0	0	1863	1695	0
Q Serve Time (g_s), s	0.0	2.8	44.0	0.0	0.0	2.4	43.0	0.0
Cycle Q Clear Time (g_c), s	0.0	2.8	44.0	0.0	0.0	2.4	43.0	0.0
Lane Grp Cap (c), veh/h	0	916	1243	0	0	916	1215	0
V/C Ratio (X)	0.00	0.09	1.02	0.00	0.00	0.08	1.01	0.00
Avail Cap (c_a), veh/h	0	916	1243	0	0	916	1215	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	16.2	38.0	0.0	0.0	16.1	38.5	0.0
Incr Delay (d2), s/veh	0.0	0.2	30.2	0.0	0.0	0.2	27.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	16.4	68.2	0.0	0.0	16.3	65.8	0.0
1st-Term Q (Q1), veh/ln	0.0	1.5	20.5	0.0	0.0	1.2	20.1	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.0	5.2	0.0	0.0	0.0	4.6	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.5	25.8	0.0	0.0	1.3	24.7	0.0
%ile Storage Ratio (RQ%)	0.00	0.05	0.28	0.00	0.00	0.09	1.79	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	5.6	0.0	0.0	0.0	1.8	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	14	0	0	16	18	0
Lane Assignment		R	T+R			R	T+R	
Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	173	676	0	0	237	651	0
Grp Sat Flow (s), veh/h/ln	0	1583	1806	0	0	1583	1801	0
Q Serve Time (g_s), s	0.0	7.5	44.0	0.0	0.0	10.7	43.0	0.0
Cycle Q Clear Time (g_c), s	0.0	7.5	44.0	0.0	0.0	10.7	43.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.18	0.00	0.00	1.00	0.20	0.00
Lane Grp Cap (c), veh/h	0	778	662	0	0	778	645	0
V/C Ratio (X)	0.00	0.22	1.02	0.00	0.00	0.30	1.01	0.00
Avail Cap (c_a), veh/h	0	778	662	0	0	778	645	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	17.4	38.1	0.0	0.0	18.2	38.6	0.0
Incr Delay (d2), s/veh	0.0	0.7	40.5	0.0	0.0	1.0	37.6	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	18.1	78.6	0.0	0.0	19.2	76.2	0.0
1st-Term Q (Q1), veh/ln	0.0	3.3	21.9	0.0	0.0	4.7	21.3	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	7.5	0.0	0.0	0.2	6.7	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	3.4	29.3	0.0	0.0	4.9	28.1	0.0
%ile Storage Ratio (RQ%)	0.00	1.08	0.32	0.00	0.00	1.55	2.04	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	3.6	0.0	0.0	0.0	1.4	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	67.1
HCM 2010 LOS	E

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	142	197	40	5	12	61
Future Volume (vph)	142	197	40	5	12	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.986		0.887	
Flt Protected		0.980			0.992	
Satd. Flow (prot)	0	1825	1837	0	1639	0
Flt Permitted		0.980			0.992	
Satd. Flow (perm)	0	1825	1837	0	1639	0
Link Speed (mph)		20	20		20	
Link Distance (ft)		450	402		475	
Travel Time (s)		15.3	13.7		16.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	154	214	43	5	13	66
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	368	48	0	79	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 36.0% ICU Level of Service A

Analysis Period (min) 15

HCM 2010 TWSC
8: Helen St & Martin Ave 08/29/2017

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	142	197	40	5	12	61
Future Vol, veh/h	142	197	40	5	12	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	154	214	43	5	13	66

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	49	0	-	0	569	46
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	523	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1558	-	-	-	484	1023
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	595	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1558	-	-	-	430	1023
Mov Cap-2 Maneuver	-	-	-	-	430	-
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	528	-

Approach	EB	WB	SB
HCM Control Delay, s	3.2	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1558	-	-	-	834
HCM Lane V/C Ratio	0.099	-	-	-	0.095
HCM Control Delay (s)	7.6	0	-	-	9.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.3	-	-	-	0.3

Lanes, Volumes, Timings
11: Ring Rd & Elm St 08/29/2017

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	2	176	29	197	581	35
Future Volume (vph)	2	176	29	197	581	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	70	
Storage Lanes	1	0		0	1	
Taper Length (ft)	25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.866		0.883			
Flt Protected	0.999				0.950	
Satd. Flow (prot)	1612	0	1645	0	1770	1863
Flt Permitted	0.999				0.950	
Satd. Flow (perm)	1612	0	1645	0	1770	1863
Link Speed (mph)	20		20			20
Link Distance (ft)	357		859			268
Travel Time (s)	12.2		29.3			9.1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	191	32	214	632	38
Shared Lane Traffic (%)						
Lane Group Flow (vph)	193	0	246	0	632	38
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	36		12			12
Link Offset(ft)	0		0			0
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane			Yes			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Stop			Stop

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 66.9%	ICU Level of Service C
Analysis Period (min) 15	

Intersection	
Intersection Delay, s/veh	43.9
Intersection LOS	E

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Lane Configurations									
Traffic Vol, veh/h	0	2	176	0	29	197	0	581	35
Future Vol, veh/h	0	2	176	0	29	197	0	581	35
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	2	191	0	32	214	0	632	38
Number of Lanes	0	1	0	0	1	0	0	1	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	2	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	2	1	0
HCM Control Delay	11.2	10.6	65.5
HCM LOS	B	B	F

Lane	NBLn1	WBLn1	SBLn1	SBLn2
Vol Left, %	0%	1%	100%	0%
Vol Thru, %	13%	0%	0%	100%
Vol Right, %	87%	99%	0%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	226	178	581	35
LT Vol	0	2	581	0
Through Vol	29	0	0	35
RT Vol	197	176	0	0
Lane Flow Rate	246	193	632	38
Geometry Grp	5	2	7	7
Degree of Util (X)	0.336	0.301	1.033	0.057
Departure Headway (Hd)	5.086	5.75	5.89	5.386
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	712	629	619	669
Service Time	3.086	3.75	3.59	3.086
HCM Lane V/C Ratio	0.346	0.307	1.021	0.057
HCM Control Delay	10.6	11.2	68.9	8.4
HCM Lane LOS	B	B	F	A
HCM 95th-tile Q	1.5	1.3	16.7	0.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	28	254	211	14	20	31	196	30	7	99	208
Future Volume (vph)	0	28	254	211	14	20	31	196	30	7	99	208
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.878			0.989			0.984			0.911	
Flt Protected					0.959			0.994			0.999	
Satd. Flow (prot)	0	1635	0	0	1767	0	0	1822	0	0	1695	0
Flt Permitted					0.959			0.994			0.999	
Satd. Flow (perm)	0	1635	0	0	1767	0	0	1822	0	0	1695	0
Link Speed (mph)		20			20			20			20	
Link Distance (ft)		927			464			473			486	
Travel Time (s)		31.6			15.8			16.1			16.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	30	276	229	15	22	34	213	33	8	108	226
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	306	0	0	266	0	0	280	0	0	342	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			6			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type:	Other
Control Type: Unsignalized	
Intersection Capacity Utilization 69.6%	ICU Level of Service C
Analysis Period (min) 15	

HCM 2010 TWSC
25: Cherry Ave & Helen St 08/29/2017

Intersection												
Int Delay, s/veh	33.7											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	28	254	211	14	20	31	196	30	7	99	208
Future Vol, veh/h	0	28	254	211	14	20	31	196	30	7	99	208
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	30	276	229	15	22	34	213	33	8	108	226

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	551	549	221	686	646	229	334	0	0	246	0	0
Stage 1	236	236	-	297	297	-	-	-	-	-	-	-
Stage 2	315	313	-	389	349	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	445	443	819	362	390	810	1225	-	-	1320	-	-
Stage 1	767	710	-	712	668	-	-	-	-	-	-	-
Stage 2	696	657	-	635	633	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	407	425	819	~ 220	374	810	1225	-	-	1320	-	-
Mov Cap-2 Maneuver	407	425	-	~ 220	374	-	-	-	-	-	-	-
Stage 1	742	704	-	689	647	-	-	-	-	-	-	-
Stage 2	640	636	-	400	628	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.1	134.6	1	0.2
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1225	-	-	750	240	1320	-	-
HCM Lane V/C Ratio	0.028	-	-	0.409	1.11	0.006	-	-
HCM Control Delay (s)	8	0	-	13.1	134.6	7.7	0	-
HCM Lane LOS	A	A	-	B	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2	11.8	0	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 Signalized Intersection Capacity Analysis
1: Campbell Ave & Elm St 08/29/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	29	103	114	97	38	233	955	25	69	1420	258
Future Volume (veh/h)	142	29	103	114	97	38	233	955	25	69	1420	258
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	154	32	112	124	105	41	253	1038	27	75	1543	280
Adj No. of Lanes	2	1	0	1	1	0	1	3	0	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	488	52	184	231	176	69	378	1621	42	645	2248	700
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.06	0.14	0.12	0.05	0.14	0.11	0.17	0.32	0.30	0.30	0.44	0.44
Ln Grp Delay, s/veh	36.7	0.0	37.7	39.5	0.0	37.2	27.6	25.6	26.2	19.9	19.6	7.3
Ln Grp LOS	D		D	D		D	C	C	C	B	B	A
Approach Vol, veh/h		298			270			1318			1898	
Approach Delay, s/veh		37.2			38.3			26.1			17.8	
Approach LOS		D			D			C			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	5	6	8	7
Case No	4.0	1.3	4.0	1.4	1.2	3.0	4.0	1.4
Phs Duration (G+Y+Rc), s	31.2	29.3	16.3	8.6	18.1	42.4	15.8	9.2
Change Period (Y+Rc), s	* 5.3	* 5.9	6.2	* 5	* 5.9	* 5.9	6.2	* 5
Max Green (Gmax), s	* 57	* 6.5	49.0	* 5	* 17	* 47	50.0	* 4
Max Allow Headway (MAH), s	5.2	5.0	5.6	3.9	3.8	5.0	5.5	3.9
Max Q Clear (g_c+I1), s	16.9	2.0	9.1	2.0	11.9	22.8	8.6	2.0
Green Ext Time (g_e), s	9.0	3.7	1.0	0.1	0.3	13.7	1.0	0.2
Prob of Phs Call (p_c)	1.00	0.83	1.00	0.95	1.00	1.00	1.00	0.97
Prob of Max Out (p_x)	0.02	1.00	0.00	1.00	0.39	0.47	0.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3	5			7
Mvmt Sat Flow, veh/h		1774		1774	1774			3442
Through Movement Data								
Assigned Mvmt	2		4			6	8	
Mvmt Sat Flow, veh/h	5097		364			5085	1276	
Right-Turn Movement Data								
Assigned Mvmt	12		14			16	18	
Mvmt Sat Flow, veh/h	133		1274			1583	498	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	5	0	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)	(Pr/Pm)			(Pr/Pm)

Lanes in Grp	0	1	0	1	1	0	0	2
Grp Vol (v), veh/h	0	75	0	124	253	0	0	154
Grp Sat Flow (s), veh/h/ln	0	1774	0	1774	1774	0	0	1721
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	9.9	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	9.9	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	528	0	1239	255	0	0	1200
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	5.8	0.0	10.6	11.7	0.0	0.0	10.6
Perm LT Serve Time (g_u), s	0.0	5.8	0.0	3.5	0.0	0.0	0.0	4.0
Perm LT Q Serve Time (g_ps), s	0.0	5.8	0.0	3.5	0.0	0.0	0.0	4.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	645	0	231	378	0	0	488
V/C Ratio (X)	0.00	0.12	0.00	0.54	0.67	0.00	0.00	0.32
Avail Cap (c_a), veh/h	0	645	0	259	479	0	0	488
Upstream Filter (I)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	19.8	0.0	37.5	25.1	0.0	0.0	36.3
Incr Delay (d2), s/veh	0.0	0.1	0.0	1.9	2.5	0.0	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	19.9	0.0	39.5	27.6	0.0	0.0	36.7
1st-Term Q (Q1), veh/ln	0.0	1.3	0.0	2.8	4.8	0.0	0.0	1.7
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.3	0.0	2.9	5.1	0.0	0.0	1.7
%ile Storage Ratio (RQ%)	0.00	0.23	0.00	1.46	1.30	0.00	0.00	0.55
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	0	6	8	0
Lane Assignment	T					T		
Lanes in Grp	2	0	0	0	0	3	0	0
Grp Vol (v), veh/h	690	0	0	0	0	1543	0	0
Grp Sat Flow (s), veh/h/ln	1695	0	0	0	0	1695	0	0
Q Serve Time (g_s), s	14.9	0.0	0.0	0.0	0.0	20.8	0.0	0.0
Cycle Q Clear Time (g_c), s	14.9	0.0	0.0	0.0	0.0	20.8	0.0	0.0
Lane Grp Cap (c), veh/h	1078	0	0	0	0	2248	0	0
V/C Ratio (X)	0.64	0.00	0.00	0.00	0.00	0.69	0.00	0.00
Avail Cap (c_a), veh/h	2316	0	0	0	0	2844	0	0
Upstream Filter (I)	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	25.0	0.0	0.0	0.0	0.0	19.1	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	25.6	0.0	0.0	0.0	0.0	19.6	0.0	0.0
1st-Term Q (Q1), veh/ln	6.9	0.0	0.0	0.0	0.0	9.7	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	7.0	0.0	0.0	0.0	0.0	9.8	0.0	0.0
%ile Storage Ratio (RQ%)	0.26	0.00	0.00	0.00	0.00	0.18	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	12	0	14	0	0	16	18	0
Lane Assignment	T+R		T+R			R	T+R	
Lanes in Grp	1	0	1	0	0	1	1	0
Grp Vol (v), veh/h	375	0	144	0	0	280	146	0
Grp Sat Flow (s), veh/h/ln	1839	0	1638	0	0	1583	1775	0
Q Serve Time (g_s), s	14.9	0.0	7.1	0.0	0.0	6.7	6.6	0.0
Cycle Q Clear Time (g_c), s	14.9	0.0	7.1	0.0	0.0	6.7	6.6	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.07	0.00	0.78	0.00	0.00	1.00	0.28	0.00
Lane Grp Cap (c), veh/h	585	0	236	0	0	700	245	0
V/C Ratio (X)	0.64	0.00	0.61	0.00	0.00	0.40	0.60	0.00
Avail Cap (c_a), veh/h	1257	0	981	0	0	885	1084	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	25.0	0.0	35.2	0.0	0.0	7.0	34.9	0.0
Incr Delay (d2), s/veh	1.2	0.0	2.5	0.0	0.0	0.4	2.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	26.2	0.0	37.7	0.0	0.0	7.3	37.2	0.0
1st-Term Q (Q1), veh/ln	7.5	0.0	3.2	0.0	0.0	3.7	3.3	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.2	0.0	0.0	0.1	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	7.7	0.0	3.4	0.0	0.0	3.7	3.4	0.0
%ile Storage Ratio (RQ%)	0.29	0.00	0.35	0.00	0.00	0.07	0.12	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary		
HCM 2010 Ctrl Delay		23.7
HCM 2010 LOS		C

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	7.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	17	0	21	0	0	4	143	1395	40	19	1658	108
Future Vol, veh/h	17	0	21	0	0	4	143	1395	40	19	1658	108
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	190	-	-	106	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	18	0	23	0	0	4	155	1516	43	21	1802	117

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2819	3773	960	2611	3810	780	1920	0	0	1560	0	0
Stage 1	1902	1902	-	1849	1849	-	-	-	-	-	-	-
Stage 2	917	1871	-	762	1961	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	19	4	221	26	4	290	~ 137	-	-	208	-	-
Stage 1	45	116	-	50	123	-	-	-	-	-	-	-
Stage 2	265	120	-	330	108	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	0	221	-	0	290	~ 137	-	-	208	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	45	104	-	50	0	-	-	-	-	-	-	-
Stage 2	-	0	-	266	97	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			16.4	0.3
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	~ 137	-	-	-	-	208	-	-
HCM Lane V/C Ratio	1.135	-	-	-	-	0.099	-	-
HCM Control Delay (s)	181.3	-	-	-	-	24.2	-	-
HCM Lane LOS	F	-	-	-	-	C	-	-
HCM 95th %tile Q(veh)	8.9	-	-	-	-	0.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	47	0	0	11	0	1524	29	0	1450	129
Future Vol, veh/h	0	0	47	0	0	11	0	1524	29	0	1450	129
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	51	0	0	12	0	1657	32	0	1576	140

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	858	-	-	844	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	258	0	0	263	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	258	-	-	263	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	22.4	19.3	0	0
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	258	263	-	-
HCM Lane V/C Ratio	-	-	0.198	0.045	-	-
HCM Control Delay (s)	-	-	22.4	19.3	-	-
HCM Lane LOS	-	-	C	C	-	-
HCM 95th %tile Q(veh)	-	-	0.7	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	827	211	364	1604	224	573	1042	129	285	1016	319
Future Volume (veh/h)	207	827	211	364	1604	224	573	1042	129	285	1016	319
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	225	899	229	396	1743	243	623	1133	140	310	1104	347
Adj No. of Lanes	1	3	1	1	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	237	1102	343	500	1822	567	656	1610	501	488	1314	409
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
Prop Arrive On Green	0.10	0.22	0.22	0.24	0.36	0.36	0.15	0.32	0.32	0.09	0.26	0.26
Ln Grp Delay, s/veh	96.1	49.0	47.2	48.6	50.0	29.7	72.0	38.7	32.1	52.3	48.8	61.5
Ln Grp LOS	F	D	D	D	D	C	E	D	C	D	D	E
Approach Vol, veh/h		1353			2382			1896			1761	
Approach Delay, s/veh		56.5			47.7			49.1			51.9	
Approach LOS		E			D			D			D	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	6	5	8	7
Case No	3.0	1.4	3.0	1.4	3.0	1.4	3.0	1.4
Phs Duration (G+Y+Rc), s	42.0	15.0	30.0	33.0	35.0	22.0	47.0	16.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green (Gmax), s	37.0	10.0	27.0	26.0	30.0	17.0	42.0	11.0
Max Allow Headway (MAH), s	5.1	3.8	5.0	3.8	4.9	3.8	5.1	3.8
Max Q Clear (g_c+I1), s	25.5	6.2	22.2	21.9	27.0	18.6	42.2	13.0
Green Ext Time (g_e), s	6.3	1.5	2.8	0.9	2.2	0.0	0.0	0.0
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prob of Max Out (p_x)	0.00	1.00	1.00	0.90	0.00	1.00	1.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3		5		7
Mvmt Sat Flow, veh/h		3442		1774		3442		1774
Through Movement Data								
Assigned Mvmt	2		4		6		8	
Mvmt Sat Flow, veh/h	5085		5085		5085		5085	
Right-Turn Movement Data								
Assigned Mvmt	12		14		16		18	
Mvmt Sat Flow, veh/h	1583		1583		1583		1583	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	0	5	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)

Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	310	0	396	0	623	0	225
Grp Sat Flow (s), veh/h/ln	0	1721	0	1774	0	1721	0	1774
Q Serve Time (g_s), s	0.0	4.2	0.0	19.9	0.0	16.6	0.0	11.0
Cycle Q Clear Time (g_c), s	0.0	4.2	0.0	19.9	0.0	16.6	0.0	11.0
Perm LT Sat Flow (s_l), veh/h/ln	0	420	0	497	0	354	0	217
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	31.0	0.0	23.0	0.0	28.0	0.0	26.0
Perm LT Serve Time (g_u), s	0.0	7.5	0.0	2.8	0.0	3.3	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	7.5	0.0	2.8	0.0	3.3	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	488	0	500	0	656	0	237
V/C Ratio (X)	0.00	0.64	0.00	0.79	0.00	0.95	0.00	0.95
Avail Cap (c_a), veh/h	0	488	0	500	0	656	0	237
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	49.6	0.0	40.2	0.0	48.5	0.0	52.1
Incr Delay (d2), s/veh	0.0	2.7	0.0	8.4	0.0	23.5	0.0	44.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	52.3	0.0	48.6	0.0	72.0	0.0	96.1
1st-Term Q (Q1), veh/ln	0.0	4.9	0.0	12.1	0.0	10.2	0.0	7.4
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	1.2	0.0	2.1	0.0	2.9
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.0	0.0	13.3	0.0	12.3	0.0	10.3
%ile Storage Ratio (RQ%)	0.00	0.53	0.00	1.47	0.00	1.36	0.00	0.54
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	3	0	3	0	3	0	3	0
Grp Vol (v), veh/h	1133	0	899	0	1104	0	1743	0
Grp Sat Flow (s), veh/h/ln	1695	0	1695	0	1695	0	1695	0
Q Serve Time (g_s), s	23.5	0.0	20.2	0.0	24.7	0.0	40.2	0.0
Cycle Q Clear Time (g_c), s	23.5	0.0	20.2	0.0	24.7	0.0	40.2	0.0
Lane Grp Cap (c), veh/h	1610	0	1102	0	1314	0	1822	0
V/C Ratio (X)	0.70	0.00	0.82	0.00	0.84	0.00	0.96	0.00
Avail Cap (c_a), veh/h	1610	0	1187	0	1314	0	1822	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	36.0	0.0	44.7	0.0	42.2	0.0	37.6	0.0
Incr Delay (d2), s/veh	2.6	0.0	4.3	0.0	6.6	0.0	12.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	38.7	0.0	49.0	0.0	48.8	0.0	50.0	0.0
1st-Term Q (Q1), veh/ln	11.0	0.0	9.4	0.0	11.6	0.0	18.7	0.0

2nd-Term Q (Q2), veh/ln	0.4	0.0	0.4	0.0	0.8	0.0	2.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	11.4	0.0	9.8	0.0	12.4	0.0	20.8	0.0
%ile Storage Ratio (RQ%)	0.14	0.00	0.33	0.00	0.86	0.00	0.33	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	140	0	229	0	347	0	243	0
Grp Sat Flow (s), veh/h/ln	1583	0	1583	0	1583	0	1583	0
Q Serve Time (g_s), s	8.0	0.0	15.9	0.0	25.0	0.0	14.0	0.0
Cycle Q Clear Time (g_c), s	8.0	0.0	15.9	0.0	25.0	0.0	14.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	501	0	343	0	409	0	567	0
V/C Ratio (X)	0.28	0.00	0.67	0.00	0.85	0.00	0.43	0.00
Avail Cap (c_a), veh/h	501	0	369	0	409	0	567	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	30.7	0.0	43.0	0.0	42.3	0.0	29.2	0.0
Incr Delay (d2), s/veh	1.4	0.0	4.1	0.0	19.2	0.0	0.5	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	32.1	0.0	47.2	0.0	61.5	0.0	29.7	0.0
1st-Term Q (Q1), veh/ln	3.5	0.0	6.9	0.0	10.9	0.0	6.1	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.4	0.0	2.2	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	3.7	0.0	7.3	0.0	13.1	0.0	6.2	0.0
%ile Storage Ratio (RQ%)	1.33	0.00	1.13	0.00	4.74	0.00	2.37	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	50.7
HCM 2010 LOS	D

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1384	2358	117	0	31
Future Vol, veh/h	0	1384	2358	117	0	31
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1504	2563	127	0	34

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	1345
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	121
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	121
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	45.9
HCM LOS			E

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	121
HCM Lane V/C Ratio	-	-	-	0.278
HCM Control Delay (s)	-	-	-	45.9
HCM Lane LOS	-	-	-	E
HCM 95th %tile Q(veh)	-	-	-	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	307	1179	166	72	1836	507	52	70	41	155	72	79
Future Volume (veh/h)	307	1179	166	72	1836	507	52	70	41	155	72	79
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	334	1282	180	78	1996	551	57	76	45	168	78	86
Adj No. of Lanes	2	3	0	1	3	0	1	1	1	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	455	1865	262	632	2441	642	250	342	291	505	342	291
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
Prop Arrive On Green	0.09	0.41	0.40	0.29	0.61	0.60	0.18	0.18	0.18	0.18	0.18	0.18
Ln Grp Delay, s/veh	46.3	25.4	26.2	20.9	18.0	23.9	41.5	37.4	36.6	41.9	37.5	39.0
Ln Grp LOS	D	C	C	C	B	C	D	D	D	D	D	D
Approach Vol, veh/h		1796			2625			178			332	
Approach Delay, s/veh		29.5			20.1			38.5			40.1	
Approach LOS		C			C			D			D	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2	4	3		6	8	7
Case No		5.0	4.0	1.4		5.0	4.0	1.4
Phs Duration (G+Y+Rc), s		23.0	46.8	33.6		23.0	66.9	13.5
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green (Gmax), s		18.0	82.0	5.0		18.0	64.0	23.0
Max Allow Headway (MAH), s		4.5	5.3	3.8		4.5	5.3	3.8
Max Q Clear (g_c+I1), s		10.0	26.1	2.0		12.1	46.4	7.5
Green Ext Time (g_e), s		1.4	15.6	0.5		1.2	15.5	1.0
Prob of Phs Call (p_c)		1.00	1.00	0.89		1.00	1.00	1.00
Prob of Max Out (p_x)		0.00	0.05	1.00		0.00	0.88	0.00
Left-Turn Movement Data								
Assigned Mvmt		5		3		1		7
Mvmt Sat Flow, veh/h		1217		1774		2455		3442
Through Movement Data								
Assigned Mvmt		2	4			6	8	
Mvmt Sat Flow, veh/h		1863	4508			1863	4011	
Right-Turn Movement Data								
Assigned Mvmt		12	14			16	18	
Mvmt Sat Flow, veh/h		1583	633			1583	1055	
Left Lane Group Data								
Assigned Mvmt	0	5	0	3	0	1	0	7
Lane Assignment				(Pr/Pm)				(Pr/Pm)

Lanes in Grp	0	1	0	1	0	2	0	2
Grp Vol (v), veh/h	0	57	0	78	0	168	0	334
Grp Sat Flow (s), veh/h/ln	0	1217	0	1774	0	1227	0	1721
Q Serve Time (g_s), s	0.0	4.3	0.0	0.0	0.0	6.5	0.0	5.5
Cycle Q Clear Time (g_c), s	0.0	8.0	0.0	0.0	0.0	10.1	0.0	5.5
Perm LT Sat Flow (s_l), veh/h/ln	0	1217	0	361	0	1227	0	121
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	19.0	0.0	39.8	0.0	19.0	0.0	42.8
Perm LT Serve Time (g_u), s	0.0	15.3	0.0	15.6	0.0	15.4	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	4.3	0.0	15.6	0.0	6.5	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	250	0	632	0	505	0	455
V/C Ratio (X)	0.00	0.23	0.00	0.12	0.00	0.33	0.00	0.73
Avail Cap (c_a), veh/h	0	250	0	632	0	505	0	938
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	39.4	0.0	20.8	0.0	40.2	0.0	44.0
Incr Delay (d2), s/veh	0.0	2.1	0.0	0.1	0.0	1.8	0.0	2.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	41.5	0.0	20.9	0.0	41.9	0.0	46.3
1st-Term Q (Q1), veh/ln	0.0	1.5	0.0	1.6	0.0	2.2	0.0	4.6
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.6	0.0	1.6	0.0	2.3	0.0	4.7
%ile Storage Ratio (RQ%)	0.00	0.34	0.00	0.17	0.00	0.74	0.00	0.34
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	4	0	0	6	8	0
Lane Assignment		T	T			T	T	
Lanes in Grp	0	1	2	0	0	1	2	0
Grp Vol (v), veh/h	0	76	964	0	0	78	1672	0
Grp Sat Flow (s), veh/h/ln	0	1863	1695	0	0	1863	1695	0
Q Serve Time (g_s), s	0.0	3.6	24.1	0.0	0.0	3.7	39.4	0.0
Cycle Q Clear Time (g_c), s	0.0	3.6	24.1	0.0	0.0	3.7	39.4	0.0
Lane Grp Cap (c), veh/h	0	342	1403	0	0	342	2063	0
V/C Ratio (X)	0.00	0.22	0.69	0.00	0.00	0.23	0.81	0.00
Avail Cap (c_a), veh/h	0	342	2722	0	0	342	2131	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	35.9	24.8	0.0	0.0	35.9	15.6	0.0
Incr Delay (d2), s/veh	0.0	1.5	0.6	0.0	0.0	1.5	2.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	37.4	25.4	0.0	0.0	37.5	18.0	0.0
1st-Term Q (Q1), veh/ln	0.0	1.8	11.2	0.0	0.0	1.9	18.1	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.1	0.0	0.0	0.1	0.7	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	2.0	11.4	0.0	0.0	2.1	18.8	0.0
%ile Storage Ratio (RQ%)	0.00	0.07	0.12	0.00	0.00	0.14	1.40	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	14	0	0	16	18	0
Lane Assignment		R	T+R			R	T+R	
Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	45	498	0	0	86	875	0
Grp Sat Flow (s), veh/h/ln	0	1583	1751	0	0	1583	1677	0
Q Serve Time (g_s), s	0.0	2.5	24.1	0.0	0.0	4.8	44.4	0.0
Cycle Q Clear Time (g_c), s	0.0	2.5	24.1	0.0	0.0	4.8	44.4	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.36	0.00	0.00	1.00	0.63	0.00
Lane Grp Cap (c), veh/h	0	291	724	0	0	291	1020	0
V/C Ratio (X)	0.00	0.15	0.69	0.00	0.00	0.30	0.86	0.00
Avail Cap (c_a), veh/h	0	291	1406	0	0	291	1054	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	35.4	25.0	0.0	0.0	36.4	16.9	0.0
Incr Delay (d2), s/veh	0.0	1.1	1.2	0.0	0.0	2.6	7.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	36.6	26.2	0.0	0.0	39.0	23.9	0.0
1st-Term Q (Q1), veh/ln	0.0	1.1	11.6	0.0	0.0	2.1	20.2	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.2	0.0	0.0	0.2	2.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.2	11.9	0.0	0.0	2.3	22.2	0.0
%ile Storage Ratio (RQ%)	0.00	0.37	0.13	0.00	0.00	0.74	1.66	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	25.5
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	73	50	125	6	10	78
Future Vol, veh/h	73	50	125	6	10	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	79	54	136	7	11	85

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	142	0	-	0	352	139
Stage 1	-	-	-	-	139	-
Stage 2	-	-	-	-	213	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1441	-	-	-	646	909
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	823	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1441	-	-	-	609	909
Mov Cap-2 Maneuver	-	-	-	-	609	-
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	776	-

Approach	EB	WB	SB
HCM Control Delay, s	4.5	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1441	-	-	-	861
HCM Lane V/C Ratio	0.055	-	-	-	0.111
HCM Control Delay (s)	7.6	0	-	-	9.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4

Intersection	
Int Delay, s/veh	10.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	6	56	68	50	33	207	298	196	4	48	146
Future Vol, veh/h	0	6	56	68	50	33	207	298	196	4	48	146
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	7	61	74	54	36	225	324	213	4	52	159

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	959	914	132	948	994	324	211	0	0	324	0	0
Stage 1	140	140	-	774	774	-	-	-	-	-	-	-
Stage 2	819	774	-	174	220	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	237	273	917	241	245	717	1360	-	-	1236	-	-
Stage 1	863	781	-	391	408	-	-	-	-	-	-	-
Stage 2	369	408	-	828	721	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	142	206	917	178	184	717	1360	-	-	1236	-	-
Mov Cap-2 Maneuver	142	206	-	178	184	-	-	-	-	-	-	-
Stage 1	652	778	-	296	308	-	-	-	-	-	-	-
Stage 2	218	308	-	763	718	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.8	60.5	2.4	0.2
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1360	-	-	687	216	1236	-	-
HCM Lane V/C Ratio	0.165	-	-	0.098	0.76	0.004	-	-
HCM Control Delay (s)	8.2	0	-	10.8	60.5	7.9	0	-
HCM Lane LOS	A	A	-	B	F	A	A	-
HCM 95th %tile Q(veh)	0.6	-	-	0.3	5.2	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	415	132	250	65	29	80	135	1570	78	69	1277	76
Future Volume (veh/h)	415	132	250	65	29	80	135	1570	78	69	1277	76
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	451	143	272	71	32	87	147	1707	85	75	1388	83
Adj No. of Lanes	2	1	0	1	1	0	1	3	0	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	920	173	329	135	52	141	342	2267	113	186	1918	597
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
Prop Arrive On Green	0.22	0.30	0.28	0.04	0.12	0.10	0.13	0.46	0.44	0.05	0.38	0.38
Ln Grp Delay, s/veh	33.6	0.0	38.3	51.7	0.0	48.1	38.9	25.0	26.4	46.8	28.7	21.6
Ln Grp LOS	C		D	D		D	D	C	C	D	C	C
Approach Vol, veh/h		866			190			1939			1546	
Approach Delay, s/veh		35.9			49.4			26.5			29.2	
Approach LOS		D			D			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	6	5	8	7
Case No	4.0	1.4	4.0	1.4	3.0	1.4	4.0	1.4
Phs Duration (G+Y+Rc), s	51.9	9.4	35.6	7.9	43.6	17.8	16.2	27.3
Change Period (Y+Rc), s	* 5.3	* 5.9	6.2	* 5	* 5.3	* 5.9	6.2	* 5
Max Green (Gmax), s	* 56	* 6.5	50.0	* 5	* 51	* 12	50.0	* 5
Max Allow Headway (MAH), s	5.3	3.8	5.6	3.9	5.2	3.8	5.6	3.9
Max Q Clear (g_c+I1), s	31.9	2.0	26.4	2.0	26.5	3.2	9.3	8.8
Green Ext Time (g_e), s	14.7	0.2	3.0	0.1	11.7	0.4	0.8	0.0
Prob of Phs Call (p_c)	1.00	0.89	1.00	0.87	1.00	0.99	1.00	1.00
Prob of Max Out (p_x)	0.50	0.60	0.01	1.00	0.29	0.02	0.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3		5		7
Mvmt Sat Flow, veh/h		1774		1774		1774		3442
Through Movement Data								
Assigned Mvmt	2		4		6		8	
Mvmt Sat Flow, veh/h	4962		575		5085		444	
Right-Turn Movement Data								
Assigned Mvmt	12		14		16		18	
Mvmt Sat Flow, veh/h	247		1094		1583		1206	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	0	5	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)

Lanes in Grp	0	1	0	1	0	1	0	2
Grp Vol (v), veh/h	0	75	0	71	0	147	0	451
Grp Sat Flow (s), veh/h/ln	0	1774	0	1774	0	1774	0	1721
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	1.2	0.0	6.8
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	1.2	0.0	6.8
Perm LT Sat Flow (s_l), veh/h/ln	0	263	0	967	0	358	0	1230
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	40.2	0.0	11.0	0.0	36.3	0.0	8.0
Perm LT Serve Time (g_u), s	0.0	10.2	0.0	0.0	0.0	11.7	0.0	0.8
Perm LT Q Serve Time (g_ps), s	0.0	10.2	0.0	0.0	0.0	11.7	0.0	0.8
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	186	0	135	0	342	0	920
V/C Ratio (X)	0.00	0.40	0.00	0.52	0.00	0.43	0.00	0.49
Avail Cap (c_a), veh/h	0	236	0	170	0	346	0	920
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	45.4	0.0	48.6	0.0	38.0	0.0	33.2
Incr Delay (d2), s/veh	0.0	1.4	0.0	3.1	0.0	0.9	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	46.8	0.0	51.7	0.0	38.9	0.0	33.6
1st-Term Q (Q1), veh/ln	0.0	2.1	0.0	2.0	0.0	3.8	0.0	5.5
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.1	0.0	2.1	0.0	3.8	0.0	5.6
%ile Storage Ratio (RQ%)	0.00	0.39	0.00	1.07	0.00	0.97	0.00	1.77
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T				T			
Lanes in Grp	2	0	0	0	3	0	0	0
Grp Vol (v), veh/h	1166	0	0	0	1388	0	0	0
Grp Sat Flow (s), veh/h/ln	1695	0	0	0	1695	0	0	0
Q Serve Time (g_s), s	29.8	0.0	0.0	0.0	24.5	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	29.8	0.0	0.0	0.0	24.5	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	1549	0	0	0	1918	0	0	0
V/C Ratio (X)	0.75	0.00	0.00	0.00	0.72	0.00	0.00	0.00
Avail Cap (c_a), veh/h	1856	0	0	0	2512	0	0	0
Upstream Filter (I)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	23.6	0.0	0.0	0.0	28.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	0.0	0.7	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	25.0	0.0	0.0	0.0	28.7	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	13.9	0.0	0.0	0.0	11.4	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.3	0.0	0.0	0.0	0.1	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	14.2	0.0	0.0	0.0	11.6	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.54	0.00	0.00	0.00	0.21	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	T+R		T+R		R		T+R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	626	0	415	0	83	0	119	0
Grp Sat Flow (s), veh/h/ln	1819	0	1670	0	1583	0	1650	0
Q Serve Time (g_s), s	29.9	0.0	24.4	0.0	3.6	0.0	7.3	0.0
Cycle Q Clear Time (g_c), s	29.9	0.0	24.4	0.0	3.6	0.0	7.3	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.14	0.00	0.66	0.00	1.00	0.00	0.73	0.00
Lane Grp Cap (c), veh/h	831	0	503	0	597	0	193	0
V/C Ratio (X)	0.75	0.00	0.83	0.00	0.14	0.00	0.62	0.00
Avail Cap (c_a), veh/h	996	0	831	0	782	0	821	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	23.7	0.0	34.8	0.0	21.5	0.0	44.9	0.0
Incr Delay (d2), s/veh	2.7	0.0	3.5	0.0	0.1	0.0	3.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	26.4	0.0	38.3	0.0	21.6	0.0	48.1	0.0
1st-Term Q (Q1), veh/ln	15.0	0.0	11.2	0.0	1.6	0.0	3.3	0.0
2nd-Term Q (Q2), veh/ln	0.6	0.0	0.5	0.0	0.0	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	15.6	0.0	11.7	0.0	1.6	0.0	3.5	0.0
%ile Storage Ratio (RQ%)	0.59	0.00	1.19	0.00	0.03	0.00	0.13	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.2
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	165

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	74	0	120	0	0	17	63	1740	10	28	1584	18
Future Vol, veh/h	74	0	120	0	0	17	63	1740	10	28	1584	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	190	-	-	106	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	80	0	130	0	0	18	68	1891	11	30	1722	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2685	3831	871	2784	3836	951	1741	0	0	1902	0	0
Stage 1	1792	1792	-	2034	2034	-	-	-	-	-	-	-
Stage 2	893	2039	-	750	1802	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	~ 23	4	253	20	4	224	169	-	-	140	-	-
Stage 1	~ 55	131	-	36	99	-	-	-	-	-	-	-
Stage 2	274	99	-	336	130	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 12	2	253	6	2	224	169	-	-	140	-	-
Mov Cap-2 Maneuver	~ 12	2	-	6	2	-	-	-	-	-	-	-
Stage 1	~ 33	103	-	22	59	-	-	-	-	-	-	-
Stage 2	150	59	-	128	102	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 3088.5	22.5	1.4	0.6
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	169	-	-	29	224	140	-	-
HCM Lane V/C Ratio	0.405	-	-	7.271	0.082	0.217	-	-
HCM Control Delay (s)	40.1	-		$ 3088.5	22.5	37.7	-	-
HCM Lane LOS	E	-	-	F	C	E	-	-
HCM 95th %tile Q(veh)	1.8	-	-	25.8	0.3	0.8	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	186	0	0	25	0	1729	17	0	1603	41
Future Vol, veh/h	0	0	186	0	0	25	0	1729	17	0	1603	41
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	202	0	0	27	0	1879	18	0	1742	45

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	893	-	-	949	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	244	0	0	224	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	244	-	-	224	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	64.8	23.3	0	0
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	244	224	-	-
HCM Lane V/C Ratio	-	-	0.829	0.121	-	-
HCM Control Delay (s)	-	-	64.8	23.3	-	-
HCM Lane LOS	-	-	F	C	-	-
HCM 95th %tile Q(veh)	-	-	6.5	0.4	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	399	1611	367	310	1264	190	381	1070	251	518	1112	209
Future Volume (veh/h)	399	1611	367	310	1264	190	381	1070	251	518	1112	209
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	434	1751	399	337	1374	207	414	1163	273	563	1209	227
Adj No. of Lanes	2	3	1	1	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	761	1780	554	326	1661	517	447	1229	383	550	1398	435
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
Prop Arrive On Green	0.17	0.35	0.35	0.15	0.33	0.33	0.09	0.24	0.24	0.13	0.28	0.28
Ln Grp Delay, s/veh	43.3	56.2	38.4	108.1	40.5	31.8	77.8	60.4	52.5	95.2	48.7	41.2
Ln Grp LOS	D	E	D	F	D	C	E	E	D	F	D	D
Approach Vol, veh/h		2584			1918			1850			1999	
Approach Delay, s/veh		51.3			51.4			63.1			61.0	
Approach LOS		D			D			E			E	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	6	5	8	7
Case No	3.0	1.4	3.0	1.4	3.0	1.4	3.0	1.4
Phs Duration (G+Y+Rc), s	33.0	19.0	46.0	22.0	37.0	15.0	43.2	24.8
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green (Gmax), s	28.0	14.0	41.0	17.0	32.0	10.0	41.0	17.0
Max Allow Headway (MAH), s	5.0	3.8	5.0	3.8	5.1	3.8	5.1	3.8
Max Q Clear (g_c+I1), s	29.0	17.0	43.0	20.0	29.1	11.7	31.9	9.8
Green Ext Time (g_e), s	0.0	0.0	0.0	0.0	2.1	0.0	6.3	1.8
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prob of Max Out (p_x)	0.00	1.00	1.00	1.00	0.00	1.00	0.79	0.33
Left-Turn Movement Data								
Assigned Mvmt		1		3		5		7
Mvmt Sat Flow, veh/h		3442		1774		3442		3442
Through Movement Data								
Assigned Mvmt	2		4		6		8	
Mvmt Sat Flow, veh/h	5085		5085		5085		5085	
Right-Turn Movement Data								
Assigned Mvmt	12		14		16		18	
Mvmt Sat Flow, veh/h	1583		1583		1583		1583	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	0	5	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)

Lanes in Grp	0	2	0	1	0	2	0	2
Grp Vol (v), veh/h	0	563	0	337	0	414	0	434
Grp Sat Flow (s), veh/h/ln	0	1721	0	1774	0	1721	0	1721
Q Serve Time (g_s), s	0.0	15.0	0.0	18.0	0.0	9.7	0.0	7.8
Cycle Q Clear Time (g_c), s	0.0	15.0	0.0	18.0	0.0	9.7	0.0	7.8
Perm LT Sat Flow (s_l), veh/h/ln	0	359	0	185	0	359	0	313
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	27.0	0.0	39.2	0.0	29.0	0.0	38.4
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	1.9	0.0	8.4
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	1.9	0.0	8.4
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	550	0	326	0	447	0	761
V/C Ratio (X)	0.00	1.02	0.00	1.03	0.00	0.93	0.00	0.57
Avail Cap (c_a), veh/h	0	550	0	326	0	447	0	761
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	50.9	0.0	49.3	0.0	52.3	0.0	42.3
Incr Delay (d2), s/veh	0.0	44.3	0.0	58.7	0.0	25.5	0.0	1.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	95.2	0.0	108.1	0.0	77.8	0.0	43.3
1st-Term Q (Q1), veh/ln	0.0	9.1	0.0	10.8	0.0	6.8	0.0	6.4
2nd-Term Q (Q2), veh/ln	0.0	3.4	0.0	5.3	0.0	1.6	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	12.5	0.0	16.1	0.0	8.4	0.0	6.5
%ile Storage Ratio (RQ%)	0.00	1.32	0.00	1.78	0.00	0.92	0.00	0.34
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	3.2	0.0	2.7	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.3	0.0	0.3	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	3	0	3	0	3	0	3	0
Grp Vol (v), veh/h	1163	0	1751	0	1209	0	1374	0
Grp Sat Flow (s), veh/h/ln	1695	0	1695	0	1695	0	1695	0
Q Serve Time (g_s), s	27.0	0.0	41.0	0.0	27.1	0.0	29.9	0.0
Cycle Q Clear Time (g_c), s	27.0	0.0	41.0	0.0	27.1	0.0	29.9	0.0
Lane Grp Cap (c), veh/h	1229	0	1780	0	1398	0	1661	0
V/C Ratio (X)	0.95	0.00	0.98	0.00	0.86	0.00	0.83	0.00
Avail Cap (c_a), veh/h	1229	0	1780	0	1398	0	1780	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	44.7	0.0	38.7	0.0	41.4	0.0	37.3	0.0
Incr Delay (d2), s/veh	15.7	0.0	17.6	0.0	7.3	0.0	3.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	60.4	0.0	56.2	0.0	48.7	0.0	40.5	0.0
1st-Term Q (Q1), veh/ln	12.6	0.0	19.1	0.0	12.6	0.0	14.0	0.0

2nd-Term Q (Q2), veh/ln	1.8	0.0	2.9	0.0	0.9	0.0	0.5	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	14.4	0.0	22.0	0.0	13.6	0.0	14.5	0.0
%ile Storage Ratio (RQ%)	0.18	0.00	0.74	0.00	0.94	0.00	0.23	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	273	0	399	0	227	0	207	0
Grp Sat Flow (s), veh/h/ln	1583	0	1583	0	1583	0	1583	0
Q Serve Time (g_s), s	19.0	0.0	26.3	0.0	14.6	0.0	12.2	0.0
Cycle Q Clear Time (g_c), s	19.0	0.0	26.3	0.0	14.6	0.0	12.2	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	383	0	554	0	435	0	517	0
V/C Ratio (X)	0.71	0.00	0.72	0.00	0.52	0.00	0.40	0.00
Avail Cap (c_a), veh/h	383	0	554	0	435	0	554	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	41.7	0.0	33.9	0.0	36.8	0.0	31.3	0.0
Incr Delay (d2), s/veh	10.8	0.0	4.5	0.0	4.4	0.0	0.5	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	52.5	0.0	38.4	0.0	41.2	0.0	31.8	0.0
1st-Term Q (Q1), veh/ln	8.3	0.0	11.4	0.0	6.4	0.0	5.3	0.0
2nd-Term Q (Q2), veh/ln	1.1	0.0	0.7	0.0	0.5	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	9.4	0.0	12.1	0.0	6.9	0.0	5.4	0.0
%ile Storage Ratio (RQ%)	3.42	0.00	1.88	0.00	2.50	0.00	2.08	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	56.3
HCM 2010 LOS	E

Intersection	
Int Delay, s/veh	0.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2513	1761	81	0	70
Future Vol, veh/h	0	2513	1761	81	0	70
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2732	1914	88	0	76

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	1001
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	207
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	207
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	32.2
HCM LOS			D

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	207
HCM Lane V/C Ratio	-	-	-	0.368
HCM Control Delay (s)	-	-	-	32.2
HCM Lane LOS	-	-	-	D
HCM 95th %tile Q(veh)	-	-	-	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	109	1675	111	70	1606	117	172	76	159	588	64	218
Future Volume (veh/h)	109	1675	111	70	1606	117	172	76	159	588	64	218
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	118	1821	121	76	1746	127	187	83	173	639	70	237
Adj No. of Lanes	2	3	0	1	3	0	1	1	1	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	403	2253	149	166	2136	155	454	722	614	910	722	614
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
Prop Arrive On Green	0.06	0.46	0.45	0.04	0.44	0.43	0.39	0.39	0.39	0.39	0.39	0.39
Ln Grp Delay, s/veh	45.8	28.3	30.9	50.5	30.2	33.1	29.9	22.1	24.5	36.8	21.9	26.3
Ln Grp LOS	D	C	C	D	C	C	C	C	C	D	C	C
Approach Vol, veh/h		2060			1949			443			946	
Approach Delay, s/veh		30.2			32.0			26.3			33.0	
Approach LOS		C			C			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2	4	3		6	8	7
Case No		5.0	4.0	1.4		5.0	4.0	1.4
Phs Duration (G+Y+Rc), s		47.0	55.3	8.6		47.0	52.9	10.9
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green (Gmax), s		42.0	55.0	8.0		42.0	52.0	11.0
Max Allow Headway (MAH), s		4.5	5.3	3.8		4.5	5.3	3.8
Max Q Clear (g_c+I1), s		19.6	37.7	2.0		34.8	37.1	2.0
Green Ext Time (g_e), s		7.1	12.5	0.3		3.8	10.9	0.4
Prob of Phs Call (p_c)		1.00	1.00	0.90		1.00	1.00	0.97
Prob of Max Out (p_x)		0.00	0.71	0.16		0.00	0.73	0.01
Left-Turn Movement Data								
Assigned Mvmt		5		3		1		7
Mvmt Sat Flow, veh/h		1068		1774		2171		3442
Through Movement Data								
Assigned Mvmt		2	4			6	8	
Mvmt Sat Flow, veh/h		1863	4873			1863	4840	
Right-Turn Movement Data								
Assigned Mvmt		12	14			16	18	
Mvmt Sat Flow, veh/h		1583	323			1583	351	
Left Lane Group Data								
Assigned Mvmt	0	5	0	3	0	1	0	7
Lane Assignment				(Pr/Pm)				(Pr/Pm)

Lanes in Grp	0	1	0	1	0	2	0	2
Grp Vol (v), veh/h	0	187	0	76	0	639	0	118
Grp Sat Flow (s), veh/h/ln	0	1068	0	1774	0	1085	0	1721
Q Serve Time (g_s), s	0.0	15.0	0.0	0.0	0.0	29.6	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	17.6	0.0	0.0	0.0	32.8	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	1068	0	227	0	1085	0	235
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	43.0	0.0	48.9	0.0	43.0	0.0	48.6
Perm LT Serve Time (g_u), s	0.0	40.3	0.0	13.2	0.0	39.8	0.0	13.5
Perm LT Q Serve Time (g_ps), s	0.0	15.0	0.0	13.2	0.0	29.6	0.0	13.5
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	454	0	166	0	910	0	403
V/C Ratio (X)	0.00	0.41	0.00	0.46	0.00	0.70	0.00	0.29
Avail Cap (c_a), veh/h	0	454	0	236	0	910	0	560
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	27.2	0.0	48.6	0.0	32.3	0.0	45.4
Incr Delay (d2), s/veh	0.0	2.8	0.0	2.0	0.0	4.5	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	29.9	0.0	50.5	0.0	36.8	0.0	45.8
1st-Term Q (Q1), veh/ln	0.0	4.4	0.0	2.2	0.0	8.9	0.0	1.7
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.1	0.0	0.6	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	4.8	0.0	2.3	0.0	9.4	0.0	1.7
%ile Storage Ratio (RQ%)	0.00	1.01	0.00	0.25	0.00	0.96	0.00	0.13
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	4	0	0	6	8	0
Lane Assignment		T	T			T	T	
Lanes in Grp	0	1	2	0	0	1	2	0
Grp Vol (v), veh/h	0	83	1266	0	0	70	1222	0
Grp Sat Flow (s), veh/h/ln	0	1863	1695	0	0	1863	1695	0
Q Serve Time (g_s), s	0.0	3.2	35.5	0.0	0.0	2.7	34.9	0.0
Cycle Q Clear Time (g_c), s	0.0	3.2	35.5	0.0	0.0	2.7	34.9	0.0
Lane Grp Cap (c), veh/h	0	722	1567	0	0	722	1496	0
V/C Ratio (X)	0.00	0.11	0.81	0.00	0.00	0.10	0.82	0.00
Avail Cap (c_a), veh/h	0	722	1712	0	0	722	1621	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	21.7	25.6	0.0	0.0	21.6	27.0	0.0
Incr Delay (d2), s/veh	0.0	0.3	2.8	0.0	0.0	0.3	3.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	22.1	28.3	0.0	0.0	21.9	30.2	0.0
1st-Term Q (Q1), veh/ln	0.0	1.6	16.5	0.0	0.0	1.4	16.3	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.1	0.6	0.0	0.0	0.1	0.7	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.7	17.1	0.0	0.0	1.4	17.0	0.0
%ile Storage Ratio (RQ%)	0.00	0.06	0.19	0.00	0.00	0.10	1.27	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	14	0	0	16	18	0
Lane Assignment		R	T+R			R	T+R	
Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	173	676	0	0	237	651	0
Grp Sat Flow (s), veh/h/ln	0	1583	1806	0	0	1583	1801	0
Q Serve Time (g_s), s	0.0	8.3	35.7	0.0	0.0	11.9	35.1	0.0
Cycle Q Clear Time (g_c), s	0.0	8.3	35.7	0.0	0.0	11.9	35.1	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.18	0.00	0.00	1.00	0.20	0.00
Lane Grp Cap (c), veh/h	0	614	835	0	0	614	795	0
V/C Ratio (X)	0.00	0.28	0.81	0.00	0.00	0.39	0.82	0.00
Avail Cap (c_a), veh/h	0	614	912	0	0	614	861	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	23.3	25.7	0.0	0.0	24.4	27.2	0.0
Incr Delay (d2), s/veh	0.0	1.1	5.2	0.0	0.0	1.8	5.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	24.5	30.9	0.0	0.0	26.3	33.1	0.0
1st-Term Q (Q1), veh/ln	0.0	3.6	17.7	0.0	0.0	5.2	17.4	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.2	1.2	0.0	0.0	0.3	1.3	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	3.8	18.9	0.0	0.0	5.5	18.7	0.0
%ile Storage Ratio (RQ%)	0.00	1.22	0.21	0.00	0.00	1.75	1.39	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	31.0
HCM 2010 LOS	C

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	142	197	40	5	12	61
Future Vol, veh/h	142	197	40	5	12	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	154	214	43	5	13	66

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	49	0	-	0	569	46
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	523	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1558	-	-	-	484	1023
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	595	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1558	-	-	-	430	1023
Mov Cap-2 Maneuver	-	-	-	-	430	-
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	528	-

Approach	EB	WB	SB
HCM Control Delay, s	3.2	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1558	-	-	-	834
HCM Lane V/C Ratio	0.099	-	-	-	0.095
HCM Control Delay (s)	7.6	0	-	-	9.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.3	-	-	-	0.3

HCM 2010 TWSC
25: Cherry Ave & Helen St 08/29/2017

Intersection												
Int Delay, s/veh	25.1											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	28	254	211	14	20	31	196	30	7	99	208
Future Vol, veh/h	0	28	254	211	14	20	31	196	30	7	99	208
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	30	276	229	15	22	34	213	33	8	108	226

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	535	516	221	669	629	213	334	0	0	213	0	0
Stage 1	236	236	-	280	280	-	-	-	-	-	-	-
Stage 2	299	280	-	389	349	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	456	463	819	371	399	827	1225	-	-	1357	-	-
Stage 1	767	710	-	727	679	-	-	-	-	-	-	-
Stage 2	710	679	-	635	633	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	418	445	819	~ 226	384	827	1225	-	-	1357	-	-
Mov Cap-2 Maneuver	418	445	-	~ 226	384	-	-	-	-	-	-	-
Stage 1	742	705	-	704	657	-	-	-	-	-	-	-
Stage 2	654	657	-	400	629	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13	96	1	0.2
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1225	-	-	756	226	561	1357	-	-
HCM Lane V/C Ratio	0.028	-	-	0.405	1.015	0.066	0.006	-	-
HCM Control Delay (s)	8	0	-	13	109.6	11.9	7.7	0	-
HCM Lane LOS	A	A	-	B	F	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2	9.5	0.2	0	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

PM Background (Improvements) 08/15/2012 PM Background (Improvements) Synchro 9 Report
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Lanes, Volumes, Timings
1: Campbell Ave & Elm St 08/29/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	142	29	103	114	97	38	233	978	26	69	1507	258
Future Volume (vph)	142	29	103	114	97	38	233	978	26	69	1507	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	80		0	50		0	100		0	140		0
Storage Lanes	2		0	1		0	1		0	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	1.00
Frt		0.883			0.958			0.996				0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	3433	1645	0	1770	1785	0	1770	5065	0	1770	5085	1583
Flt Permitted	0.440			0.472			0.181			0.250		
Satd. Flow (perm)	1590	1645	0	879	1785	0	337	5065	0	466	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		112			16			3				200
Link Speed (mph)		25			25			30			30	
Link Distance (ft)		357			758			743			1453	
Travel Time (s)		9.7			20.7			16.9			33.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	154	32	112	124	105	41	253	1063	28	75	1638	280
Shared Lane Traffic (%)												
Lane Group Flow (vph)	154	144	0	124	146	0	253	1091	0	75	1638	280
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		24			24			20			20	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	1
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	Right
Leading Detector (ft)	20	100		20	100		20	100		20	100	20
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	0
Detector 1 Size(ft)	20	100		20	100		20	100		20	100	20
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Detector Phase	7	4		3	8		5	2		1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Minimum Split (s)	9.0	47.2		9.0	56.2		9.9	46.3		9.9	46.3	46.3
Total Split (s)	9.0	55.2		10.0	56.2		23.0	62.4		12.4	51.8	51.8

AM Total 08/15/2012 AM Total Synchro 9 Report
Page 1

Lanes, Volumes, Timings
1: Campbell Ave & Elm St

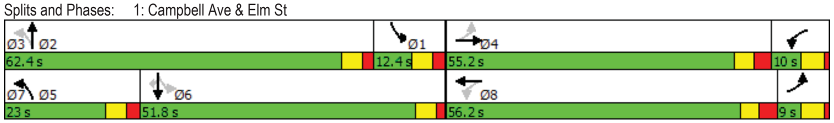
08/29/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	6.4%	39.4%		7.1%	40.1%		16.4%	44.6%		8.9%	37.0%	37.0%
Maximum Green (s)	4.0	49.0		5.0	50.0		17.1	57.1		6.5	46.5	46.5
Yellow Time (s)	4.0	3.2		4.0	3.2		3.6	3.6		3.6	3.6	3.6
All-Red Time (s)	1.0	3.0		1.0	3.0		2.3	1.7		2.3	1.7	1.7
Lost Time Adjust (s)	-1.0	-2.2		-1.0	-2.2		-1.9	-1.3		-1.9	-1.3	-1.3
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lead/Lag	Lag	Lead		Lag	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	Min		None	Min	Min
Walk Time (s)		7.0			7.0			7.0			7.0	7.0
Flash Dont Walk (s)		32.0			43.0			34.0			34.0	34.0
Pedestrian Calls (#/hr)		0			0			0			0	0
Act Effct Green (s)	15.4	10.3		23.7	14.9		39.9	39.9		46.5	46.5	46.5
Actuated g/C Ratio	0.15	0.10		0.23	0.15		0.40	0.40		0.46	0.46	0.46
v/c Ratio	0.46	0.54		0.43	0.53		0.64	0.54		0.13	0.70	0.33
Control Delay	38.2	21.0		40.2	42.8		34.4	28.0		20.6	24.0	6.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	0.0
Total Delay	38.2	21.0		40.2	42.8		34.4	28.0		20.6	24.0	6.8
LOS	D	C		D	D		C	C		C	C	A
Approach Delay		29.9			41.6			29.2			21.5	
Approach LOS		C			D			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 100.9
Natural Cycle: 125
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.70
Intersection Signal Delay: 26.2 — Intersection LOS: C
Intersection Capacity Utilization 69.5% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Campbell Ave & Elm St



HCM 2010 Signalized Intersection Capacity Analysis
1: Campbell Ave & Elm St

08/29/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	29	103	114	97	38	233	978	26	69	1507	258
Future Volume (veh/h)	142	29	103	114	97	38	233	978	26	69	1507	258
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	154	32	112	124	105	41	253	1063	28	75	1638	280
Adj No. of Lanes	2	1	0	1	1	0	1	3	0	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	475	52	181	224	174	68	371	1638	43	655	2303	717
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
Prop Arrive On Green	0.06	0.14	0.12	0.05	0.14	0.11	0.16	0.32	0.31	0.30	0.45	0.45
Ln Grp Delay, s/veh	38.0	0.0	39.0	40.9	0.0	38.5	28.5	26.2	26.8	19.8	20.1	7.3
Ln Grp LOS	D		D	D		D	C	C	C	B	C	A
Approach Vol, veh/h		298			270			1344			1993	
Approach Delay, s/veh		38.4			39.6			26.9			18.3	
Approach LOS		D			D			C			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	5	6	8	7
Case No	4.0	1.3	4.0	1.4	1.2	3.0	4.0	1.4
Phs Duration (G+Y+Rc), s	32.3	30.5	16.5	8.7	18.4	44.4	16.0	9.2
Change Period (Y+Rc), s	* 5.3	* 5.9	6.2	* 5	* 5.9	* 5.9	6.2	* 5
Max Green (Gmax), s	* 57	* 6.5	49.0	* 5	* 17	* 47	50.0	* 4
Max Allow Headway (MAH), s	5.2	5.0	5.6	3.9	3.8	5.0	5.5	3.9
Max Q Clear (g_c+I1), s	17.8	2.0	9.3	2.0	12.2	24.9	8.8	2.0
Green Ext Time (g_e), s	9.2	3.8	1.0	0.1	0.3	13.7	1.0	0.2
Prob of Phs Call (p_c)	1.00	0.84	1.00	0.95	1.00	1.00	1.00	0.98
Prob of Max Out (p_x)	0.03	1.00	0.00	1.00	0.46	0.55	0.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3	5			7
Mvmt Sat Flow, veh/h		1774		1774	1774			3442
Through Movement Data								
Assigned Mvmt	2		4			6	8	
Mvmt Sat Flow, veh/h	5095		364			5085	1276	
Right-Turn Movement Data								
Assigned Mvmt	12		14			16	18	
Mvmt Sat Flow, veh/h	134		1274			1583	498	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	5	0	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)	(Pr/Pm)			(Pr/Pm)

Lanes in Grp	0	1	0	1	1	0	0	2
Grp Vol (v), veh/h	0	75	0	124	253	0	0	154
Grp Sat Flow (s), veh/h/ln	0	1774	0	1774	1774	0	0	1721
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	10.2	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	10.2	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	515	0	1239	232	0	0	1200
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	6.6	0.0	10.8	12.5	0.0	0.0	10.8
Perm LT Serve Time (g_u), s	0.0	6.6	0.0	3.4	0.0	0.0	0.0	3.9
Perm LT Q Serve Time (g_ps), s	0.0	6.6	0.0	3.4	0.0	0.0	0.0	3.9
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	655	0	224	371	0	0	475
V/C Ratio (X)	0.00	0.11	0.00	0.55	0.68	0.00	0.00	0.32
Avail Cap (c_a), veh/h	0	655	0	251	465	0	0	475
Upstream Filter (I)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	19.8	0.0	38.8	25.6	0.0	0.0	37.6
Incr Delay (d2), s/veh	0.0	0.1	0.0	2.1	2.9	0.0	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	19.8	0.0	40.9	28.5	0.0	0.0	38.0
1st-Term Q (Q1), veh/ln	0.0	1.3	0.0	2.9	4.9	0.0	0.0	1.8
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.3	0.0	3.0	5.2	0.0	0.0	1.8
%ile Storage Ratio (RQ%)	0.00	0.23	0.00	1.52	1.33	0.00	0.00	0.57
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	0	6	8	0
Lane Assignment	T					T		
Lanes in Grp	2	0	0	0	0	3	0	0
Grp Vol (v), veh/h	707	0	0	0	0	1638	0	0
Grp Sat Flow (s), veh/h/ln	1695	0	0	0	0	1695	0	0
Q Serve Time (g_s), s	15.7	0.0	0.0	0.0	0.0	22.9	0.0	0.0
Cycle Q Clear Time (g_c), s	15.7	0.0	0.0	0.0	0.0	22.9	0.0	0.0
Lane Grp Cap (c), veh/h	1090	0	0	0	0	2303	0	0
V/C Ratio (X)	0.65	0.00	0.00	0.00	0.00	0.71	0.00	0.00
Avail Cap (c_a), veh/h	2250	0	0	0	0	2762	0	0
Upstream Filter (I)	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	25.6	0.0	0.0	0.0	0.0	19.4	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	26.2	0.0	0.0	0.0	0.0	20.1	0.0	0.0
1st-Term Q (Q1), veh/ln	7.4	0.0	0.0	0.0	0.0	10.6	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	7.5	0.0	0.0	0.0	0.0	10.8	0.0	0.0
%ile Storage Ratio (RQ%)	0.28	0.00	0.00	0.00	0.00	0.19	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	12	0	14	0	0	16	18	0
Lane Assignment	T+R		T+R			R	T+R	
Lanes in Grp	1	0	1	0	0	1	1	0
Grp Vol (v), veh/h	384	0	144	0	0	280	146	0
Grp Sat Flow (s), veh/h/ln	1839	0	1638	0	0	1583	1775	0
Q Serve Time (g_s), s	15.8	0.0	7.3	0.0	0.0	6.8	6.8	0.0
Cycle Q Clear Time (g_c), s	15.8	0.0	7.3	0.0	0.0	6.8	6.8	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.07	0.00	0.78	0.00	0.00	1.00	0.28	0.00
Lane Grp Cap (c), veh/h	591	0	233	0	0	717	242	0
V/C Ratio (X)	0.65	0.00	0.62	0.00	0.00	0.39	0.60	0.00
Avail Cap (c_a), veh/h	1220	0	953	0	0	860	1053	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	25.6	0.0	36.3	0.0	0.0	7.0	36.1	0.0
Incr Delay (d2), s/veh	1.2	0.0	2.6	0.0	0.0	0.3	2.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	26.8	0.0	39.0	0.0	0.0	7.3	38.5	0.0
1st-Term Q (Q1), veh/ln	8.0	0.0	3.3	0.0	0.0	2.9	3.3	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.2	0.0	0.0	0.1	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	8.2	0.0	3.5	0.0	0.0	3.0	3.5	0.0
%ile Storage Ratio (RQ%)	0.31	0.00	0.35	0.00	0.00	0.05	0.13	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary

HCM 2010 Ctrl Delay	24.3
HCM 2010 LOS	C

Notes

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

* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Lanes, Volumes, Timings
3: Campbell Ave & Mabel St

08/29/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	0	21	0	0	4	194	1395	40	19	1745	108
Future Volume (vph)	40	0	21	0	0	4	194	1395	40	19	1745	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	190		0	106		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt		0.953			0.865			0.996			0.991	
Flt Protected		0.968					0.950			0.950		
Satd. Flow (prot)	0	1718	0	0	1611	0	1770	5065	0	1770	5040	0
Flt Permitted		0.968					0.950			0.950		
Satd. Flow (perm)	0	1718	0	0	1611	0	1770	5065	0	1770	5040	0
Link Speed (mph)		20			20			30			30	
Link Distance (ft)		159			832			467			720	
Travel Time (s)		5.4			28.4			10.6			16.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	0	23	0	0	4	211	1516	43	21	1897	117
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	66	0	0	4	0	211	1559	0	21	2014	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			20			20	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary	
Area Type: Other	
Control Type: Unsignalized	
Intersection Capacity Utilization 67.0%	ICU Level of Service C
Analysis Period (min) 15	

HCM 2010 TWSC
3: Campbell Ave & Mabel St

08/29/2017

Intersection	
Int Delay, s/veh	22.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	0	21	0	0	4	194	1395	40	19	1745	108
Future Vol, veh/h	40	0	21	0	0	4	194	1395	40	19	1745	108
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	190	-	-	106	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	0	23	0	0	4	211	1516	43	21	1897	117

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	3025	3979	1007	2760	4015	780	2014	0	0	1560	0	0
Stage 1	1997	1997	-	1960	1960	-	-	-	-	-	-	-
Stage 2	1028	1982	-	800	2055	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	~ 14	3	205	21	3	290	~ 123	-	-	208	-	-
Stage 1	~ 39	104	-	41	108	-	-	-	-	-	-	-
Stage 2	226	105	-	313	97	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	0	205	-	0	290	~ 123	-	-	208	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	~ 39	94	-	41	0	-	-	-	-	-	-	-
Stage 2	-	0	-	250	87	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			49.4	0.2
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	~ 123	-	-	-	-	208	-	-
HCM Lane V/C Ratio	1.714	-	-	-	-	0.099	-	-
HCM Control Delay (s)	$ 415	-	-	-	-	24.2	-	-
HCM Lane LOS	F	-	-	-	-	C	-	-
HCM 95th %tile Q(veh)	15.9	-	-	-	-	0.3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Lanes, Volumes, Timings
4: Campbell Ave & Helen St

08/29/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	100	0	0	11	0	1575	29	0	1450	216
Future Volume (vph)	0	0	100	0	0	11	0	1575	29	0	1450	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.91	0.91
Frt			0.865			0.865		0.997			0.981	
Flt Protected												
Satd. Flow (prot)	0	0	1611	0	0	1611	0	5070	0	0	4989	0
Flt Permitted												
Satd. Flow (perm)	0	0	1611	0	0	1611	0	5070	0	0	4989	0
Link Speed (mph)		20			20			30			30	
Link Distance (ft)		402			822			468			467	
Travel Time (s)		13.7			28.0			10.6			10.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	109	0	0	12	0	1712	32	0	1576	235
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	109	0	0	12	0	1744	0	0	1811	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			32			32	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary		
Area Type:	Other	
Control Type: Unsignalized		
Intersection Capacity Utilization 45.7%		ICU Level of Service A
Analysis Period (min) 15		

HCM 2010 TWSC
4: Campbell Ave & Helen St

08/29/2017

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	100	0	0	11	0	1575	29	0	1450	216
Future Vol, veh/h	0	0	100	0	0	11	0	1575	29	0	1450	216
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	109	0	0	12	0	1712	32	0	1576	235

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	905	-	-	872	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	240	0	0	252	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	240	-	-	252	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.8	20	0	0
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	240	252	-	-
HCM Lane V/C Ratio	-	-	0.453	0.047	-	-
HCM Control Delay (s)	-	-	31.8	20	-	-
HCM Lane LOS	-	-	D	C	-	-
HCM 95th %tile Q(veh)	-	-	2.2	0.1	-	-

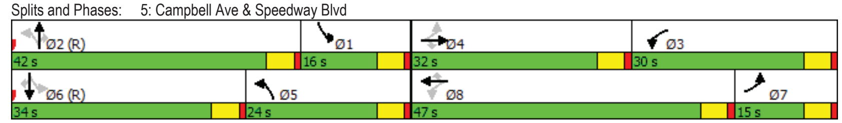
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	207	827	211	364	1655	275	664	1042	129	313	1041	319
Future Volume (vph)	207	827	211	364	1655	275	664	1042	129	313	1041	319
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	480		164	230		66	230		70	240		70
Storage Lanes	1		1	1		1	2		1	2		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	0.97	0.91	1.00	0.97	0.91	1.00
Frt			0.850			0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	5085	1583	1770	5085	1583	3433	5085	1583	3433	5085	1583
Flt Permitted	0.146			0.142			0.118			0.133		
Satd. Flow (perm)	272	5085	1583	265	5085	1583	426	5085	1583	481	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			206			155			155			200
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		862			1684			2128			468	
Travel Time (s)		19.6			38.3			48.4			10.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	225	899	229	396	1799	299	722	1133	140	340	1132	347
Shared Lane Traffic (%)												
Lane Group Flow (vph)	225	899	229	396	1799	299	722	1133	140	340	1132	347
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		20			20			32			32	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1	1	1	1	1	1	1	1
Detector Template	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Leading Detector (ft)	20	100	20	20	100	20	20	100	20	20	100	20
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Position(ft)	0	0	0	0	0	0	0	0	0	0	0	0
Detector 1 Size(ft)	20	100	20	20	100	20	20	100	20	20	100	20
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8		8	2		2	6		6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	21.0	21.0	9.0	21.0	21.0	9.0	21.0	21.0	9.0	21.0	21.0
Total Split (s)	15.0	32.0	32.0	30.0	47.0	47.0	24.0	42.0	42.0	16.0	34.0	34.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Split (%)	12.5%	26.7%	26.7%	25.0%	39.2%	39.2%	20.0%	35.0%	35.0%	13.3%	28.3%	28.3%
Maximum Green (s)	10.0	27.0	27.0	25.0	42.0	42.0	19.0	37.0	37.0	11.0	29.0	29.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	C-Max	C-Max	None	C-Max	C-Max
Walk Time (s)		5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0		0	0		0	0		0	0
Act Effct Green (s)	38.4	27.4	27.4	58.0	43.0	43.0	54.0	38.0	38.0	42.0	30.0	30.0
Actuated g/C Ratio	0.32	0.23	0.23	0.48	0.36	0.36	0.45	0.32	0.32	0.35	0.25	0.25
v/c Ratio	1.00	0.77	0.44	0.86	0.99	0.45	1.04	0.70	0.23	0.73	0.89	0.64
Control Delay	98.4	39.8	4.8	59.2	56.7	16.0	90.2	38.9	4.5	51.3	53.3	22.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	98.4	39.8	4.8	59.2	56.7	16.0	90.2	38.9	4.5	51.3	53.3	22.4
LOS	F	D	A	E	E	B	F	D	A	D	D	C
Approach Delay		43.6			52.2			55.0			47.1	
Approach LOS		D			D			E			D	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.04
Intersection Signal Delay: 50.2 Intersection LOS: D
Intersection Capacity Utilization 95.8% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 5: Campbell Ave & Speedway Blvd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	827	211	364	1655	275	664	1042	129	313	1041	319
Future Volume (veh/h)	207	827	211	364	1655	275	664	1042	129	313	1041	319
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	225	899	229	396	1799	299	722	1133	140	340	1132	347
Adj No. of Lanes	1	3	1	1	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	223	1074	334	498	1822	567	701	1610	501	510	1271	396
HCM Platoon Ratio	2.00	2.00	2.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.18	0.42	0.42	0.24	0.36	0.36	0.17	0.32	0.32	0.10	0.25	0.25
Ln Grp Delay, s/veh	110.7	37.8	36.0	49.1	56.3	31.4	90.2	38.7	32.1	52.6	53.0	66.1
Ln Grp LOS	F	D	D	D	E	C	F	D	C	D	D	E
Approach Vol, veh/h		1353			2494			1995			1819	
Approach Delay, s/veh		49.6			52.2			56.9			55.4	
Approach LOS		D			D			E			E	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	6	5	8	7
Case No	3.0	1.4	3.0	1.4	3.0	1.4	3.0	1.4
Phs Duration (G+Y+Rc), s	42.0	16.0	29.3	32.7	34.0	24.0	47.0	15.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green (Gmax), s	37.0	11.0	27.0	25.0	29.0	19.0	42.0	10.0
Max Allow Headway (MAH), s	5.1	3.8	5.0	3.8	5.0	3.8	5.1	3.8
Max Q Clear (g_c+I1), s	25.5	7.4	21.0	21.8	27.8	22.0	44.2	13.0
Green Ext Time (g_e), s	6.3	1.6	3.4	0.7	1.0	0.0	0.0	0.0
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prob of Max Out (p_x)	0.00	1.00	0.89	1.00	0.00	1.00	1.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3		5		7
Mvmt Sat Flow, veh/h		3442		1774		3442		1774
Through Movement Data								
Assigned Mvmt	2		4		6		8	
Mvmt Sat Flow, veh/h	5085		5085		5085		5085	
Right-Turn Movement Data								
Assigned Mvmt	12		14		16		18	
Mvmt Sat Flow, veh/h	1583		1583		1583		1583	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	0	5	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)

Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	340	0	396	0	722	0	225
Grp Sat Flow (s), veh/h/ln	0	1721	0	1774	0	1721	0	1774
Q Serve Time (g_s), s	0.0	5.4	0.0	19.8	0.0	20.0	0.0	11.0
Cycle Q Clear Time (g_c), s	0.0	5.4	0.0	19.8	0.0	20.0	0.0	11.0
Perm LT Sat Flow (s_l), veh/h/ln	0	420	0	497	0	345	0	195
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	30.0	0.0	22.3	0.0	27.0	0.0	25.3
Perm LT Serve Time (g_u), s	0.0	6.5	0.0	3.4	0.0	1.2	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	6.5	0.0	3.4	0.0	1.2	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	510	0	498	0	701	0	223
V/C Ratio (X)	0.00	0.67	0.00	0.80	0.00	1.03	0.00	1.01
Avail Cap (c_a), veh/h	0	510	0	498	0	701	0	223
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	49.3	0.0	40.4	0.0	48.2	0.0	47.5
Incr Delay (d2), s/veh	0.0	3.3	0.0	8.7	0.0	42.0	0.0	63.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Control Delay (d), s/veh	0.0	52.6	0.0	49.1	0.0	90.2	0.0	110.7
1st-Term Q (Q1), veh/ln	0.0	5.3	0.0	12.1	0.0	11.6	0.0	7.3
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	1.2	0.0	4.1	0.0	3.9
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.6	0.0	13.3	0.0	15.7	0.0	11.2
%ile Storage Ratio (RQ%)	0.00	0.59	0.00	1.47	0.00	1.73	0.00	0.59
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	5.3	0.0	0.6
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	3	0	3	0	3	0	3	0
Grp Vol (v), veh/h	1133	0	899	0	1132	0	1799	0
Grp Sat Flow (s), veh/h/ln	1695	0	1695	0	1695	0	1695	0
Q Serve Time (g_s), s	23.5	0.0	19.0	0.0	25.8	0.0	42.2	0.0
Cycle Q Clear Time (g_c), s	23.5	0.0	19.0	0.0	25.8	0.0	42.2	0.0
Lane Grp Cap (c), veh/h	1610	0	1074	0	1271	0	1822	0
V/C Ratio (X)	0.70	0.00	0.84	0.00	0.89	0.00	0.99	0.00
Avail Cap (c_a), veh/h	1610	0	1187	0	1271	0	1822	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	36.0	0.0	32.8	0.0	43.4	0.0	38.2	0.0
Incr Delay (d2), s/veh	2.6	0.0	5.0	0.0	9.6	0.0	18.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	38.7	0.0	37.8	0.0	53.0	0.0	56.3	0.0
1st-Term Q (Q1), veh/ln	11.0	0.0	8.8	0.0	12.1	0.0	19.7	0.0

2nd-Term Q (Q2), veh/ln	0.4	0.0	0.5	0.0	1.1	0.0	3.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	11.4	0.0	9.3	0.0	13.2	0.0	22.7	0.0
%ile Storage Ratio (RQ%)	0.14	0.00	0.31	0.00	0.91	0.00	0.36	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	140	0	229	0	347	0	299	0
Grp Sat Flow (s), veh/h/ln	1583	0	1583	0	1583	0	1583	0
Q Serve Time (g_s), s	8.0	0.0	14.1	0.0	25.3	0.0	17.9	0.0
Cycle Q Clear Time (g_c), s	8.0	0.0	14.1	0.0	25.3	0.0	17.9	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	501	0	334	0	396	0	567	0
V/C Ratio (X)	0.28	0.00	0.68	0.00	0.88	0.00	0.53	0.00
Avail Cap (c_a), veh/h	501	0	369	0	396	0	567	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	30.7	0.0	31.4	0.0	43.2	0.0	30.5	0.0
Incr Delay (d2), s/veh	1.4	0.0	4.6	0.0	22.9	0.0	0.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	32.1	0.0	36.0	0.0	66.1	0.0	31.4	0.0
1st-Term Q (Q1), veh/ln	3.5	0.0	6.1	0.0	11.0	0.0	7.8	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.4	0.0	2.5	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	3.7	0.0	6.5	0.0	13.5	0.0	8.0	0.0
%ile Storage Ratio (RQ%)	1.33	0.00	1.00	0.00	4.90	0.00	3.06	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	53.7
HCM 2010 LOS	D

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	0	1384	2358	117	0	49
Future Volume (vph)	0	1384	2358	117	0	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.91	0.91	0.91	1.00	1.00
Frt			0.993			0.865
Flt Protected						
Satd. Flow (prot)	0	5085	5050	0	0	1611
Flt Permitted						
Satd. Flow (perm)	0	5085	5050	0	0	1611
Link Speed (mph)		30	30		20	
Link Distance (ft)		422	862		472	
Travel Time (s)		9.6	19.6		16.1	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	1504	2563	127	0	53
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	1504	2690	0	0	53
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		27	27		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary
Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 58.2% ICU Level of Service B
Analysis Period (min) 15

HCM 2010 TWSC
6: Speedway Blvd & Warren Ave

08/29/2017

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1384	2358	117	0	49
Future Vol, veh/h	0	1384	2358	117	0	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1504	2563	127	0	53

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	1345
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	121
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	121
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	56.3
HCM LOS			F

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	121
HCM Lane V/C Ratio	-	-	-	0.44
HCM Control Delay (s)	-	-	-	56.3
HCM Lane LOS	-	-	-	F
HCM 95th %tile Q(veh)	-	-	-	1.9

Lanes, Volumes, Timings
7: Cherry Ave & Speedway Blvd

08/29/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	408	1179	166	72	1854	507	52	90	41	155	76	88
Future Volume (vph)	408	1179	166	72	1854	507	52	90	41	155	76	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	350		0	240		0	120		80	80		80
Storage Lanes	1		0	1		0	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982			0.968				0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	4994	0	1770	4923	0	1770	1863	1583	1770	1863	1583
Flt Permitted	0.062			0.135			0.674			0.633		
Satd. Flow (perm)	115	4994	0	251	4923	0	1255	1863	1583	1179	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		48			83				109			109
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2369			422			812			473	
Travel Time (s)		53.8			9.6			18.5			10.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	443	1282	180	78	2015	551	57	98	45	168	83	96
Shared Lane Traffic (%)												
Lane Group Flow (vph)	443	1462	0	78	2566	0	57	98	45	168	83	96
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		27			27			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2		2	6		6
Minimum Split (s)	9.0	21.0		9.0	21.0		21.0	21.0	21.0	21.0	21.0	21.0
Total Split (s)	31.0	86.0		10.0	65.0		24.0	24.0	24.0	24.0	24.0	24.0
Total Split (%)	25.8%	71.7%		8.3%	54.2%		20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
Maximum Green (s)	26.0	81.0		5.0	60.0		19.0	19.0	19.0	19.0	19.0	19.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	-1.0	-1.0		-1.0	-1.0		-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lead/Lag	Lag	Lead		Lag	Lead							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Walk Time (s)		5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0
Flash Dont Walk (s)		11.0			11.0		11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)		0			0		0	0	0	0	0	0
Act Effct Green (s)	92.0	82.0		67.0	61.0		20.0	20.0	20.0	20.0	20.0	20.0
Actuated g/C Ratio	0.77	0.68		0.56	0.51		0.17	0.17	0.17	0.17	0.17	0.17
v/c Ratio	0.96	0.43		0.36	1.01		0.27	0.32	0.13	0.86	0.27	0.27

Lanes, Volumes, Timings
7: Cherry Ave & Speedway Blvd

08/29/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Control Delay	73.8	8.6		11.9	52.8		47.7	47.2	0.7	85.1	46.3	8.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.8	8.6		11.9	52.8		47.7	47.2	0.7	85.1	46.3	8.2
LOS	E	A		B	D		D	D	A	F	D	A
Approach Delay		23.8			51.6			36.9			54.5	
Approach LOS		C			D			D			D	

Intersection Summary

Area Type: Other	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green	
Natural Cycle: 90	
Control Type: Pretimed	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 40.8	Intersection LOS: D
Intersection Capacity Utilization 95.0%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 7: Cherry Ave & Speedway Blvd

HCM 2010 Signalized Intersection Capacity Analysis
7: Cherry Ave & Speedway Blvd

08/29/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	408	1179	166	72	1854	507	52	90	41	155	76	88
Future Volume (veh/h)	408	1179	166	72	1854	507	52	90	41	155	76	88
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	443	1282	180	78	2015	551	57	98	45	168	83	96
Adj No. of Lanes	1	3	0	1	3	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	459	3081	433	287	2044	532	213	310	264	209	310	264
HCM Platoon Ratio	1.00	1.00	1.00	0.33	0.33	0.33	1.00	1.00	1.00	1.00	1.00	1.00
Prop Arrive On Green	0.22	0.68	0.68	0.02	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Ln Grp Delay, s/veh	78.3	9.0	9.6	28.2	66.0	90.4	51.0	46.6	44.3	80.4	45.7	48.2
Ln Grp LOS	E	A	A	C	E	F	D	D	D	F	D	D
Approach Vol, veh/h		1905			2644			200			347	
Approach Delay, s/veh		25.2			73.0			47.3			63.2	
Approach LOS		C			E			D			E	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2	4	3		6	8	7
Case No		5.0	4.0	1.4		5.0	4.0	1.4
Phs Duration (G+Y+Rc), s		24.0	86.0	10.0		24.0	65.0	31.0
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green (Gmax), s		19.0	81.0	5.0		19.0	60.0	26.0
Max Allow Headway (MAH), s		4.5	5.3	3.8		4.5	5.3	3.8
Max Q Clear (g_c+I1), s		11.9	17.2	2.0		22.0	63.0	27.5
Green Ext Time (g_e), s		1.4	16.0	0.6		0.0	0.0	0.0
Prob of Phs Call (p_c)		1.00	1.00	1.00		1.00	1.00	1.00
Prob of Max Out (p_x)		0.00	0.00	0.00		0.00	0.00	0.00
Left-Turn Movement Data								
Assigned Mvmt		5		3		1		7
Mvmt Sat Flow, veh/h		1200		1774		1240		1774
Through Movement Data								
Assigned Mvmt		2	4			6	8	
Mvmt Sat Flow, veh/h		1863	4508			1863	4021	
Right-Turn Movement Data								
Assigned Mvmt		12	14			16	18	
Mvmt Sat Flow, veh/h		1583	633			1583	1047	
Left Lane Group Data								
Assigned Mvmt	0	5	0	3	0	1	0	7
Lane Assignment				(Pr/Pm)				(Pr/Pm)

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	57	0	78	0	168	0	443
Grp Sat Flow (s), veh/h/ln	0	1200	0	1774	0	1240	0	1774
Q Serve Time (g_s), s	0.0	5.2	0.0	0.0	0.0	14.4	0.0	25.5
Cycle Q Clear Time (g_c), s	0.0	9.9	0.0	0.0	0.0	20.0	0.0	25.5
Perm LT Sat Flow (s_l), veh/h/ln	0	1200	0	361	0	1240	0	122
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	20.0	0.0	61.0	0.0	20.0	0.0	58.0
Perm LT Serve Time (g_u), s	0.0	15.3	0.0	45.8	0.0	14.4	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	5.2	0.0	19.6	0.0	14.4	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	213	0	287	0	209	0	459
V/C Ratio (X)	0.00	0.27	0.00	0.27	0.00	0.80	0.00	0.96
Avail Cap (c_a), veh/h	0	213	0	287	0	209	0	459
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	47.9	0.0	25.8	0.0	53.6	0.0	44.2
Incr Delay (d2), s/veh	0.0	3.0	0.0	2.3	0.0	26.9	0.0	34.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	51.0	0.0	28.2	0.0	80.4	0.0	78.3
1st-Term Q (Q1), veh/ln	0.0	1.7	0.0	2.0	0.0	5.6	0.0	14.5
2nd-Term Q (Q2), veh/ln	0.0	0.2	0.0	0.2	0.0	1.6	0.0	4.3
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.9	0.0	2.1	0.0	7.1	0.0	18.9
%ile Storage Ratio (RQ%)	0.00	0.40	0.00	0.23	0.00	2.26	0.00	1.37
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	4	0	0	6	8	0
Lane Assignment		T	T			T	T	
Lanes in Grp	0	1	2	0	0	1	2	0
Grp Vol (v), veh/h	0	98	964	0	0	83	1683	0
Grp Sat Flow (s), veh/h/ln	0	1863	1695	0	0	1863	1695	0
Q Serve Time (g_s), s	0.0	5.6	15.1	0.0	0.0	4.7	59.3	0.0
Cycle Q Clear Time (g_c), s	0.0	5.6	15.1	0.0	0.0	4.7	59.3	0.0
Lane Grp Cap (c), veh/h	0	310	2317	0	0	310	1723	0
V/C Ratio (X)	0.00	0.32	0.42	0.00	0.00	0.27	0.98	0.00
Avail Cap (c_a), veh/h	0	310	2317	0	0	310	1723	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	44.0	8.4	0.0	0.0	43.6	49.2	0.0
Incr Delay (d2), s/veh	0.0	2.7	0.6	0.0	0.0	2.1	16.8	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	46.6	9.0	0.0	0.0	45.7	66.0	0.0
1st-Term Q (Q1), veh/ln	0.0	2.9	7.0	0.0	0.0	2.4	27.9	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.2	0.2	0.0	0.0	0.2	4.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	3.1	7.1	0.0	0.0	2.6	31.9	0.0
%ile Storage Ratio (RQ%)	0.00	0.11	0.08	0.00	0.00	0.17	2.32	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	14	0	0	16	18	0
Lane Assignment		R	T+R			R	T+R	
Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	45	498	0	0	96	883	0
Grp Sat Flow (s), veh/h/ln	0	1583	1751	0	0	1583	1678	0
Q Serve Time (g_s), s	0.0	2.9	15.2	0.0	0.0	6.5	61.0	0.0
Cycle Q Clear Time (g_c), s	0.0	2.9	15.2	0.0	0.0	6.5	61.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.36	0.00	0.00	1.00	0.62	0.00
Lane Grp Cap (c), veh/h	0	264	1197	0	0	264	853	0
V/C Ratio (X)	0.00	0.17	0.42	0.00	0.00	0.36	1.04	0.00
Avail Cap (c_a), veh/h	0	264	1197	0	0	264	853	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	42.9	8.5	0.0	0.0	44.4	50.0	0.0
Incr Delay (d2), s/veh	0.0	1.4	1.1	0.0	0.0	3.8	40.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	44.3	9.6	0.0	0.0	48.2	90.4	0.0
1st-Term Q (Q1), veh/ln	0.0	1.3	7.2	0.0	0.0	2.8	28.4	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.4	0.0	0.0	0.3	9.6	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.4	7.6	0.0	0.0	3.1	37.9	0.0
%ile Storage Ratio (RQ%)	0.00	0.44	0.08	0.00	0.00	0.99	2.75	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	7.6	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		53.5						
HCM 2010 LOS		D						

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	73	50	126	6	10	78
Future Volume (vph)	73	50	126	6	10	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.993		0.880	
Flt Protected		0.971			0.994	
Satd. Flow (prot)	0	1809	1850	0	1629	0
Flt Permitted		0.971			0.994	
Satd. Flow (perm)	0	1809	1850	0	1629	0
Link Speed (mph)		20	20		20	
Link Distance (ft)		450	402		475	
Travel Time (s)		15.3	13.7		16.2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	79	54	137	7	11	85
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	133	144	0	96	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary		
Area Type:	Other	
Control Type: Unsignalized		
Intersection Capacity Utilization 29.0%		ICU Level of Service A
Analysis Period (min) 15		

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	73	50	126	6	10	78
Future Vol, veh/h	73	50	126	6	10	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	79	54	137	7	11	85

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	143	0	-	0	353	140
Stage 1	-	-	-	-	140	-
Stage 2	-	-	-	-	213	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1440	-	-	-	645	908
Stage 1	-	-	-	-	887	-
Stage 2	-	-	-	-	823	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1440	-	-	-	608	908
Mov Cap-2 Maneuver	-	-	-	-	608	-
Stage 1	-	-	-	-	887	-
Stage 2	-	-	-	-	776	-

Approach	EB	WB	SB
HCM Control Delay, s	4.5	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1440	-	-	-	860
HCM Lane V/C Ratio	0.055	-	-	-	0.111
HCM Control Delay (s)	7.6	0	-	-	9.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	6	56	81	50	33	207	298	317	4	48	146
Future Volume (vph)	0	6	56	81	50	33	207	298	317	4	48	146
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.879			0.973			0.948			0.900	
Flt Protected					0.976			0.988			0.999	
Satd. Flow (prot)	0	1637	0	0	1769	0	0	1745	0	0	1675	0
Flt Permitted					0.976			0.988			0.999	
Satd. Flow (perm)	0	1637	0	0	1769	0	0	1745	0	0	1675	0
Link Speed (mph)		20			20			20			20	
Link Distance (ft)		927			464			473			486	
Travel Time (s)		31.6			15.8			16.1			16.6	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	7	61	88	54	36	225	324	345	4	52	159
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	68	0	0	178	0	0	894	0	0	215	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			6			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Sign Control		Stop			Stop			Free			Free	

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 84.0% ICU Level of Service E

Analysis Period (min) 15

Intersection

Int Delay, s/veh 24.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	6	56	81	50	33	207	298	317	4	48	146
Future Vol, veh/h	0	6	56	81	50	33	207	298	317	4	48	146
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	7	61	88	54	36	225	324	345	4	52	159

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1131	1258	132	1120	1166	496	211	0	0	668	0	0
Stage 1	140	140	-	946	946	-	-	-	-	-	-	-
Stage 2	991	1118	-	174	220	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	181	171	917	184	194	574	1360	-	-	922	-	-
Stage 1	863	781	-	314	340	-	-	-	-	-	-	-
Stage 2	296	282	-	828	721	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	94	123	917	129	139	574	1360	-	-	922	-	-
Mov Cap-2 Maneuver	94	123	-	129	139	-	-	-	-	-	-	-
Stage 1	621	777	-	226	245	-	-	-	-	-	-	-
Stage 2	155	203	-	763	717	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.2	170.8	2.1	0.2
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1360	-	-	564	157	922	-	-
HCM Lane V/C Ratio	0.165	-	-	0.119	1.135	0.005	-	-
HCM Control Delay (s)	8.2	0	-	12.2	170.8	8.9	0	-
HCM Lane LOS	A	A	-	B	F	A	A	-
HCM 95th %tile Q(veh)	0.6	-	-	0.4	9.6	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	553	132	250	65	29	80	135	1587	78	69	1335	76
Future Volume (veh/h)	553	132	250	65	29	80	135	1587	78	69	1335	76
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	601	143	272	71	32	87	147	1725	85	75	1451	83
Adj No. of Lanes	1	1	0	1	1	0	1	3	0	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	468	173	329	132	52	141	323	2281	112	188	1980	617
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
Prop Arrive On Green	0.22	0.30	0.28	0.04	0.12	0.10	0.12	0.46	0.45	0.05	0.39	0.39
Ln Grp Delay, s/veh	182.2	0.0	38.4	52.3	0.0	48.2	40.1	25.1	26.5	46.6	28.3	20.8
Ln Grp LOS	F		D	D		D	D	C	C	D	C	C
Approach Vol, veh/h		1016			190			1957			1609	
Approach Delay, s/veh		123.5			49.7			26.6			28.7	
Approach LOS		F			D			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	6	5	8	7
Case No	4.0	1.4	4.0	1.4	3.0	1.4	4.0	1.4
Phs Duration (G+Y+Rc), s	52.3	9.5	35.6	7.8	44.9	16.8	16.3	27.1
Change Period (Y+Rc), s	* 5.3	* 5.9	6.2	* 5	* 5.3	* 5.9	6.2	* 5
Max Green (Gmax), s	* 56	* 6.5	50.0	* 5	* 51	* 12	50.0	* 5
Max Allow Headway (MAH), s	5.3	3.8	5.6	3.9	5.2	3.8	5.6	3.9
Max Q Clear (g_c+I1), s	32.3	2.0	26.4	2.0	27.6	3.4	9.3	25.1
Green Ext Time (g_e), s	14.7	0.2	3.0	0.1	12.0	0.4	0.8	0.0
Prob of Phs Call (p_c)	1.00	0.89	1.00	0.87	1.00	0.99	1.00	1.00
Prob of Max Out (p_x)	0.52	0.60	0.01	1.00	0.35	0.03	0.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3		5		7
Mvmt Sat Flow, veh/h		1774		1774		1774		1774
Through Movement Data								
Assigned Mvmt	2		4		6		8	
Mvmt Sat Flow, veh/h	4965		575		5085		444	
Right-Turn Movement Data								
Assigned Mvmt	12		14		16		18	
Mvmt Sat Flow, veh/h	244		1094		1583		1206	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	0	5	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	75	0	71	0	147	0	601
Grp Sat Flow (s), veh/h/ln	0	1774	0	1774	0	1774	0	1774
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	1.4	0.0	23.1
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	1.4	0.0	23.1
Perm LT Sat Flow (s_l), veh/h/ln	0	258	0	967	0	337	0	1268
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	41.5	0.0	11.1	0.0	37.6	0.0	8.1
Perm LT Serve Time (g_u), s	0.0	11.2	0.0	0.0	0.0	12.0	0.0	0.8
Perm LT Q Serve Time (g_ps), s	0.0	11.2	0.0	0.0	0.0	12.0	0.0	0.8
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	188	0	132	0	323	0	468
V/C Ratio (X)	0.00	0.40	0.00	0.54	0.00	0.45	0.00	1.28
Avail Cap (c_a), veh/h	0	238	0	170	0	343	0	468
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	45.2	0.0	48.9	0.0	39.1	0.0	39.1
Incr Delay (d2), s/veh	0.0	1.4	0.0	3.4	0.0	1.0	0.0	143.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	46.6	0.0	52.3	0.0	40.1	0.0	182.2
1st-Term Q (Q1), veh/ln	0.0	2.1	0.0	2.0	0.0	3.8	0.0	13.5
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.1	0.0	0.1	0.0	18.6
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.1	0.0	2.1	0.0	3.9	0.0	32.1
%ile Storage Ratio (RQ%)	0.00	0.39	0.00	1.07	0.00	0.99	0.00	10.20
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.2
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T				T			
Lanes in Grp	2	0	0	0	3	0	0	0
Grp Vol (v), veh/h	1177	0	0	0	1451	0	0	0
Grp Sat Flow (s), veh/h/ln	1695	0	0	0	1695	0	0	0
Q Serve Time (g_s), s	30.2	0.0	0.0	0.0	25.6	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	30.2	0.0	0.0	0.0	25.6	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	1557	0	0	0	1980	0	0	0
V/C Ratio (X)	0.76	0.00	0.00	0.00	0.73	0.00	0.00	0.00
Avail Cap (c_a), veh/h	1851	0	0	0	2505	0	0	0
Upstream Filter (I)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	23.5	0.0	0.0	0.0	27.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	0.0	0.8	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	25.1	0.0	0.0	0.0	28.3	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	14.1	0.0	0.0	0.0	12.0	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	14.4	0.0	0.0	0.0	12.1	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.54	0.00	0.00	0.00	0.22	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Right Lane Group Data								
Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	T+R		T+R		R		T+R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	633	0	415	0	83	0	119	0
Grp Sat Flow (s), veh/h/ln	1820	0	1670	0	1583	0	1650	0
Q Serve Time (g_s), s	30.3	0.0	24.4	0.0	3.6	0.0	7.3	0.0
Cycle Q Clear Time (g_c), s	30.3	0.0	24.4	0.0	3.6	0.0	7.3	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.13	0.00	0.66	0.00	1.00	0.00	0.73	0.00
Lane Grp Cap (c), veh/h	836	0	502	0	617	0	192	0
V/C Ratio (X)	0.76	0.00	0.83	0.00	0.13	0.00	0.62	0.00
Avail Cap (c_a), veh/h	993	0	829	0	780	0	819	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	23.6	0.0	34.9	0.0	20.7	0.0	45.0	0.0
Incr Delay (d2), s/veh	2.8	0.0	3.5	0.0	0.1	0.0	3.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	26.5	0.0	38.4	0.0	20.8	0.0	48.2	0.0
1st-Term Q (Q1), veh/ln	15.1	0.0	11.2	0.0	1.5	0.0	3.3	0.0
2nd-Term Q (Q2), veh/ln	0.7	0.0	0.5	0.0	0.0	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	15.8	0.0	11.7	0.0	1.6	0.0	3.5	0.0
%ile Storage Ratio (RQ%)	0.59	0.00	1.19	0.00	0.03	0.00	0.13	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	48.9
HCM 2010 LOS	D

Notes
User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	132.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	0	120	0	0	17	96	1740	10	28	1642	18
Future Vol, veh/h	41	0	120	0	0	17	96	1740	10	28	1642	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	190	-	-	106	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	45	0	130	0	0	18	104	1891	11	30	1785	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2820	3966	902	2880	3970	951	1804	0	0	1902	0	0
Stage 1	1855	1855	-	2105	2105	-	-	-	-	-	-	-
Stage 2	965	2111	-	775	1865	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	~ 19	3	241	17	3	224	157	-	-	140	-	-
Stage 1	49	122	-	32	91	-	-	-	-	-	-	-
Stage 2	247	91	-	324	121	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 7	1	241	3	1	224	157	-	-	140	-	-
Mov Cap-2 Maneuver	~ 7	1	-	3	1	-	-	-	-	-	-	-
Stage 1	~ 17	96	-	11	31	-	-	-	-	-	-	-
Stage 2	77	31	-	117	95	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 3007.7	22.5	3.4	0.6
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	157	-	-	25	224	140	-	-
HCM Lane V/C Ratio	0.665	-	-	7	0.082	0.217	-	-
HCM Control Delay (s)	64.5	-	$ 3007.7		22.5	37.7	-	-
HCM Lane LOS	F	-	-	F	C	E	-	-
HCM 95th %tile Q(veh)	3.8	-	-	21.8	0.3	0.8	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 2010 TWSC
4: Campbell Ave & Helen St 08/29/2017

Intersection												
Int Delay, s/veh	53.7											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	426	0	0	25	0	1762	17	0	1603	99
Future Vol, veh/h	0	0	426	0	0	25	0	1762	17	0	1603	99
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	463	0	0	27	0	1915	18	0	1742	108

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	925	-	-	967	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	~ 233	0	0	218	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	~ 233	-	-	218	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 493.9	23.9	0	0
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	233	218	-	-
HCM Lane V/C Ratio	-	-	1.987	0.125	-	-
HCM Control Delay (s)	-	-	$ 493.9	23.9	-	-
HCM Lane LOS	-	-	F	C	-	-
HCM 95th %tile Q(veh)	-	-	33.9	0.4	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM 2010 Signalized Intersection Capacity Analysis
5: Campbell Ave & Speedway Blvd 08/29/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	399	1611	367	310	1297	223	442	1070	251	641	1229	209
Future Volume (veh/h)	399	1611	367	310	1297	223	442	1070	251	641	1229	209
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	434	1751	399	337	1410	242	480	1163	273	697	1336	227
Adj No. of Lanes	1	3	1	1	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	400	1695	528	311	1441	449	464	1229	383	636	1483	462
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
Prop Arrive On Green	0.19	0.33	0.33	0.14	0.28	0.28	0.10	0.24	0.24	0.15	0.29	0.29
Ln Grp Delay, s/veh	116.5	70.8	41.8	124.6	61.4	37.7	103.3	60.4	52.5	113.9	50.0	38.9
Ln Grp LOS	F	F	D	F	E	D	F	E	D	F	D	D
Approach Vol, veh/h		2584			1989			1916			2260	
Approach Delay, s/veh		74.0			69.2			70.0			68.6	
Approach LOS		E			E			E			E	
Timer:		1	2	3	4	5	6	7	8			
Assigned Phs		2	1	4	3	6	5	8	7			
Case No		3.0	1.4	3.0	1.4	3.0	1.4	3.0	1.4			
Phs Duration (G+Y+Rc), s		33.0	22.0	44.0	21.0	39.0	16.0	38.0	27.0			
Change Period (Y+Rc), s		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0			
Max Green (Gmax), s		28.0	17.0	39.0	16.0	34.0	11.0	33.0	22.0			
Max Allow Headway (MAH), s		5.0	3.8	5.0	3.8	5.1	3.8	5.1	3.8			
Max Q Clear (g_c+I1), s		29.0	20.0	42.0	19.0	32.3	14.0	35.0	25.0			
Green Ext Time (g_e), s		0.0	0.0	0.0	0.0	1.4	0.0	0.0	0.0			
Prob of Phs Call (p_c)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Prob of Max Out (p_x)		0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00			
Left-Turn Movement Data												
Assigned Mvmt			1		3		5		7			
Mvmt Sat Flow, veh/h			3442		1774		3442		1774			
Through Movement Data												
Assigned Mvmt		2		4		6		8				
Mvmt Sat Flow, veh/h		5085		5085		5085		5085				
Right-Turn Movement Data												
Assigned Mvmt		12		14		16		18				
Mvmt Sat Flow, veh/h		1583		1583		1583		1583				
Left Lane Group Data												
Assigned Mvmt		0	1	0	3	0	5	0	7			
Lane Assignment			(Pr/Pm)		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)			

Lanes in Grp	0	2	0	1	0	2	0	1
Grp Vol (v), veh/h	0	697	0	337	0	480	0	434
Grp Sat Flow (s), veh/h/ln	0	1721	0	1774	0	1721	0	1774
Q Serve Time (g_s), s	0.0	18.0	0.0	17.0	0.0	12.0	0.0	23.0
Cycle Q Clear Time (g_c), s	0.0	18.0	0.0	17.0	0.0	12.0	0.0	23.0
Perm LT Sat Flow (s_l), veh/h/ln	0	359	0	185	0	318	0	301
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	26.0	0.0	34.0	0.0	29.0	0.0	31.0
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	636	0	311	0	464	0	400
V/C Ratio (X)	0.00	1.10	0.00	1.08	0.00	1.03	0.00	1.08
Avail Cap (c_a), veh/h	0	636	0	311	0	464	0	400
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	49.3	0.0	49.9	0.0	52.4	0.0	46.8
Incr Delay (d2), s/veh	0.0	64.6	0.0	74.8	0.0	50.8	0.0	69.7
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	113.9	0.0	124.6	0.0	103.3	0.0	116.5
1st-Term Q (Q1), veh/ln	0.0	10.5	0.0	10.3	0.0	7.7	0.0	13.2
2nd-Term Q (Q2), veh/ln	0.0	5.7	0.0	6.5	0.0	3.3	0.0	7.7
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	16.2	0.0	16.8	0.0	10.9	0.0	21.0
%ile Storage Ratio (RQ%)	0.00	1.72	0.00	1.85	0.00	1.21	0.00	1.11
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	15.2	0.0	6.4	0.0	4.0	0.0	8.5
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.3	0.0	0.3	0.0	0.3	0.0	0.3
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	3	0	3	0	3	0	3	0
Grp Vol (v), veh/h	1163	0	1751	0	1336	0	1410	0
Grp Sat Flow (s), veh/h/ln	1695	0	1695	0	1695	0	1695	0
Q Serve Time (g_s), s	27.0	0.0	40.0	0.0	30.3	0.0	33.0	0.0
Cycle Q Clear Time (g_c), s	27.0	0.0	40.0	0.0	30.3	0.0	33.0	0.0
Lane Grp Cap (c), veh/h	1229	0	1695	0	1483	0	1441	0
V/C Ratio (X)	0.95	0.00	1.03	0.00	0.90	0.00	0.98	0.00
Avail Cap (c_a), veh/h	1229	0	1695	0	1483	0	1441	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	44.7	0.0	40.0	0.0	40.8	0.0	42.6	0.0
Incr Delay (d2), s/veh	15.7	0.0	30.8	0.0	9.1	0.0	18.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	60.4	0.0	70.8	0.0	50.0	0.0	61.4	0.0
1st-Term Q (Q1), veh/ln	12.6	0.0	18.7	0.0	14.1	0.0	15.4	0.0

2nd-Term Q (Q2), veh/ln	1.8	0.0	4.8	0.0	1.3	0.0	2.5	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	14.4	0.0	23.5	0.0	15.4	0.0	17.9	0.0
%ile Storage Ratio (RQ%)	0.18	0.00	0.79	0.00	1.06	0.00	0.28	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	14.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	273	0	399	0	227	0	242	0
Grp Sat Flow (s), veh/h/ln	1583	0	1583	0	1583	0	1583	0
Q Serve Time (g_s), s	19.0	0.0	27.0	0.0	14.2	0.0	15.5	0.0
Cycle Q Clear Time (g_c), s	19.0	0.0	27.0	0.0	14.2	0.0	15.5	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	383	0	528	0	462	0	449	0
V/C Ratio (X)	0.71	0.00	0.76	0.00	0.49	0.00	0.54	0.00
Avail Cap (c_a), veh/h	383	0	528	0	462	0	449	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	41.7	0.0	35.7	0.0	35.1	0.0	36.4	0.0
Incr Delay (d2), s/veh	10.8	0.0	6.2	0.0	3.7	0.0	1.3	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	52.5	0.0	41.8	0.0	38.9	0.0	37.7	0.0
1st-Term Q (Q1), veh/ln	8.3	0.0	11.7	0.0	6.2	0.0	6.8	0.0
2nd-Term Q (Q2), veh/ln	1.1	0.0	0.9	0.0	0.5	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	9.4	0.0	12.7	0.0	6.7	0.0	7.0	0.0
%ile Storage Ratio (RQ%)	3.42	0.00	1.96	0.00	2.44	0.00	2.68	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		70.6						
HCM 2010 LOS		E						

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2513	1761	81	0	167
Future Vol, veh/h	0	2513	1761	81	0	167
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2732	1914	88	0	182

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	1001
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	207
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	207
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	82
HCM LOS			F

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	207
HCM Lane V/C Ratio	-	-	-	0.877
HCM Control Delay (s)	-	-	-	82
HCM Lane LOS	-	-	-	F
HCM 95th %tile Q(veh)	-	-	-	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	1675	111	70	1703	117	172	90	159	588	89	247
Future Volume (veh/h)	175	1675	111	70	1703	117	172	90	159	588	89	247
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	190	1821	121	76	1851	127	187	98	173	639	97	268
Adj No. of Lanes	1	3	0	1	3	0	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	149	1787	118	134	1742	119	530	916	778	572	916	778
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
Prop Arrive On Green	0.05	0.37	0.36	0.04	0.36	0.35	0.49	0.49	0.49	0.49	0.49	0.49
Ln Grp Delay, s/veh	222.5	68.2	78.6	60.7	82.2	92.7	23.0	16.6	18.1	109.5	16.6	19.9
Ln Grp LOS	F	F	F	E	F	F	C	B	B	F	B	B
Approach Vol, veh/h		2132			2054			458			1004	
Approach Delay, s/veh		85.2			85.0			19.8			76.6	
Approach LOS		F			F			B			E	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs		2	4	3		6	8	7
Case No		5.0	4.0	1.4		5.0	4.0	1.4
Phs Duration (G+Y+Rc), s		63.0	48.0	9.0		63.0	47.0	10.0
Change Period (Y+Rc), s		5.0	5.0	5.0		5.0	5.0	5.0
Max Green (Gmax), s		58.0	43.0	4.0		58.0	42.0	5.0
Max Allow Headway (MAH), s		4.5	5.3	3.8		4.5	5.3	3.8
Max Q Clear (g_c+I1), s		19.9	46.0	2.9		61.0	45.0	8.0
Green Ext Time (g_e), s		8.5	0.0	0.1		0.0	0.0	0.0
Prob of Phs Call (p_c)		1.00	1.00	0.92		1.00	1.00	1.00
Prob of Max Out (p_x)		0.00	1.00	1.00		0.00	1.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		5		3		1		7
Mvmt Sat Flow, veh/h		1013		1774		1104		1774
Through Movement Data								
Assigned Mvmt		2	4			6	8	
Mvmt Sat Flow, veh/h		1863	4873			1863	4862	
Right-Turn Movement Data								
Assigned Mvmt		12	14			16	18	
Mvmt Sat Flow, veh/h		1583	323			1583	333	
Left Lane Group Data								
Assigned Mvmt	0	5	0	3	0	1	0	7
Lane Assignment				(Pr/Pm)				(Pr/Pm)

Lanes in Grp	0	1	0	1	0	1	0	1
Grp Vol (v), veh/h	0	187	0	76	0	639	0	190
Grp Sat Flow (s), veh/h/ln	0	1013	0	1774	0	1104	0	1774
Q Serve Time (g_s), s	0.0	14.6	0.0	0.9	0.0	55.6	0.0	6.0
Cycle Q Clear Time (g_c), s	0.0	17.9	0.0	0.9	0.0	59.0	0.0	6.0
Perm LT Sat Flow (s_l), veh/h/ln	0	1013	0	227	0	1104	0	219
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	59.0	0.0	43.0	0.0	59.0	0.0	43.0
Perm LT Serve Time (g_u), s	0.0	55.6	0.0	0.0	0.0	55.6	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	14.6	0.0	0.0	0.0	55.6	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	530	0	134	0	572	0	149
V/C Ratio (X)	0.00	0.35	0.00	0.57	0.00	1.12	0.00	1.28
Avail Cap (c_a), veh/h	0	530	0	134	0	572	0	149
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	21.2	0.0	55.2	0.0	35.1	0.0	55.8
Incr Delay (d2), s/veh	0.0	1.8	0.0	5.5	0.0	74.4	0.0	166.7
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	23.0	0.0	60.7	0.0	109.5	0.0	222.5
1st-Term Q (Q1), veh/ln	0.0	4.1	0.0	2.4	0.0	18.9	0.0	4.9
2nd-Term Q (Q2), veh/ln	0.0	0.3	0.0	0.2	0.0	11.8	0.0	6.9
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	4.3	0.0	2.6	0.0	30.7	0.0	11.8
%ile Storage Ratio (RQ%)	0.00	0.91	0.00	0.28	0.00	9.75	0.00	0.86
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	16.9	0.0	10.3
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.3
Middle Lane Group Data								
Assigned Mvmt	0	2	4	0	0	6	8	0
Lane Assignment		T	T			T	T	
Lanes in Grp	0	1	2	0	0	1	2	0
Grp Vol (v), veh/h	0	98	1266	0	0	97	1289	0
Grp Sat Flow (s), veh/h/ln	0	1863	1695	0	0	1863	1695	0
Q Serve Time (g_s), s	0.0	3.4	44.0	0.0	0.0	3.4	43.0	0.0
Cycle Q Clear Time (g_c), s	0.0	3.4	44.0	0.0	0.0	3.4	43.0	0.0
Lane Grp Cap (c), veh/h	0	916	1243	0	0	916	1215	0
V/C Ratio (X)	0.00	0.11	1.02	0.00	0.00	0.11	1.06	0.00
Avail Cap (c_a), veh/h	0	916	1243	0	0	916	1215	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	16.4	38.0	0.0	0.0	16.4	38.5	0.0
Incr Delay (d2), s/veh	0.0	0.2	30.2	0.0	0.0	0.2	43.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	16.6	68.2	0.0	0.0	16.6	82.2	0.0
1st-Term Q (Q1), veh/ln	0.0	1.7	20.5	0.0	0.0	1.7	20.1	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.1	5.2	0.0	0.0	0.1	7.4	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	1.8	25.8	0.0	0.0	1.8	27.5	0.0
%ile Storage Ratio (RQ%)	0.00	0.06	0.28	0.00	0.00	0.12	1.99	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	5.6	0.0	0.0	0.0	18.6	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	14	0	0	16	18	0
Lane Assignment		R	T+R			R	T+R	
Lanes in Grp	0	1	1	0	0	1	1	0
Grp Vol (v), veh/h	0	173	676	0	0	268	689	0
Grp Sat Flow (s), veh/h/ln	0	1583	1806	0	0	1583	1804	0
Q Serve Time (g_s), s	0.0	7.5	44.0	0.0	0.0	12.4	43.0	0.0
Cycle Q Clear Time (g_c), s	0.0	7.5	44.0	0.0	0.0	12.4	43.0	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	0.18	0.00	0.00	1.00	0.18	0.00
Lane Grp Cap (c), veh/h	0	778	662	0	0	778	646	0
V/C Ratio (X)	0.00	0.22	1.02	0.00	0.00	0.34	1.07	0.00
Avail Cap (c_a), veh/h	0	778	662	0	0	778	646	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	17.4	38.1	0.0	0.0	18.7	38.6	0.0
Incr Delay (d2), s/veh	0.0	0.7	40.5	0.0	0.0	1.2	54.1	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	18.1	78.6	0.0	0.0	19.9	92.7	0.0
1st-Term Q (Q1), veh/ln	0.0	3.3	21.9	0.0	0.0	5.4	21.4	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.1	7.5	0.0	0.0	0.3	9.7	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	3.4	29.3	0.0	0.0	5.7	31.1	0.0
%ile Storage Ratio (RQ%)	0.00	1.08	0.32	0.00	0.00	1.81	2.26	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	3.6	0.0	0.0	0.0	10.6	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.3	0.0	0.0	0.0	0.3	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		78.3						
HCM 2010 LOS		E						

Intersection						
Int Delay, s/veh	3.9					
Movement	**EBL**	**EBT**	**WBT**	**WBR**	**SBL**	**SBR**
Lane Configurations						
Traffic Vol, veh/h	142	197	40	5	12	61
Future Vol, veh/h	142	197	40	5	12	61
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	154	214	43	5	13	66
Major/Minor	**Major1**		**Major2**		**Minor2**	
Conflicting Flow All	49	0	-	0	569	46
Stage 1	-	-	-	-	46	-
Stage 2	-	-	-	-	523	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1558	-	-	-	484	1023
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	595	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1558	-	-	-	430	1023
Mov Cap-2 Maneuver	-	-	-	-	430	-
Stage 1	-	-	-	-	976	-
Stage 2	-	-	-	-	528	-

Approach	EB	WB	SB
HCM Control Delay, s	3.2	0	9.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1558	-	-	-	834
HCM Lane V/C Ratio	0.099	-	-	-	0.095
HCM Control Delay (s)	7.6	0	-	-	9.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.3	-	-	-	0.3

Intersection												
Int Delay, s/veh	72.4											
Movement	**EBL**	**EBT**	**EBR**	**WBL**	**WBT**	**WBR**	**NBL**	**NBT**	**NBR**	**SBL**	**SBT**	**SBR**
Lane Configurations												
Traffic Vol, veh/h	0	28	254	265	14	20	31	196	110	7	99	208
Future Vol, veh/h	0	28	254	265	14	20	31	196	110	7	99	208
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	30	276	288	15	22	34	213	120	8	108	226
Major/Minor	**Minor2**			**Minor1**			**Major1**			**Major2**		
Conflicting Flow All	595	636	221	729	689	273	334	0	0	333	0	0
Stage 1	236	236	-	340	340	-	-	-	-	-	-	-
Stage 2	359	400	-	389	349	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	416	395	819	338	369	766	1225	-	-	1226	-	-
Stage 1	767	710	-	675	639	-	-	-	-	-	-	-
Stage 2	659	602	-	635	633	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	378	378	819	~ 203	353	766	1225	-	-	1226	-	-
Mov Cap-2 Maneuver	378	378	-	~ 203	353	-	-	-	-	-	-	-
Stage 1	740	704	-	651	617	-	-	-	-	-	-	-
Stage 2	603	581	-	400	628	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	13.4	284.5	0.7	0.2
HCM LOS	B	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1225	-	-	734	218	1226	-	-
HCM Lane V/C Ratio	0.028	-	-	0.418	1.491	0.006	-	-
HCM Control Delay (s)	8	0	-	13.4	284.5	8	0	-
HCM Lane LOS	A	A	-	B	F	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	2.1	19.6	0	-	-

Notes
~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	142	29	103	114	97	38	233	978	26	69	1507	258
Future Volume (veh/h)	142	29	103	114	97	38	233	978	26	69	1507	258
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	154	32	112	124	105	41	253	1063	28	75	1638	280
Adj No. of Lanes	2	1	0	1	1	0	1	3	0	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	475	52	181	224	174	68	371	1638	43	655	2303	717
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
Prop Arrive On Green	0.06	0.14	0.12	0.05	0.14	0.11	0.16	0.32	0.31	0.30	0.45	0.45
Ln Grp Delay, s/veh	38.0	0.0	39.0	40.9	0.0	38.5	28.5	26.2	26.8	19.8	20.1	7.3
Ln Grp LOS	D		D	D		D	C	C	C	B	C	A
Approach Vol, veh/h		298			270			1344			1993	
Approach Delay, s/veh		38.4			39.6			26.9			18.3	
Approach LOS		D			D			C			B	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	5	6	8	7
Case No	4.0	1.3	4.0	1.4	1.2	3.0	4.0	1.4
Phs Duration (G+Y+Rc), s	32.3	30.5	16.5	8.7	18.4	44.4	16.0	9.2
Change Period (Y+Rc), s	* 5.3	* 5.9	6.2	* 5	* 5.9	* 5.9	6.2	* 5
Max Green (Gmax), s	* 57	* 6.5	49.0	* 5	* 17	* 47	50.0	* 4
Max Allow Headway (MAH), s	5.2	5.0	5.6	3.9	3.8	5.0	5.5	3.9
Max Q Clear (g_c+I1), s	17.8	2.0	9.3	2.0	12.2	24.9	8.8	2.0
Green Ext Time (g_e), s	9.2	3.8	1.0	0.1	0.3	13.7	1.0	0.2
Prob of Phs Call (p_c)	1.00	0.84	1.00	0.95	1.00	1.00	1.00	0.98
Prob of Max Out (p_x)	0.03	1.00	0.00	1.00	0.46	0.55	0.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3	5			7
Mvmt Sat Flow, veh/h		1774		1774	1774			3442
Through Movement Data								
Assigned Mvmt	2		4			6	8	
Mvmt Sat Flow, veh/h	5095		364			5085	1276	
Right-Turn Movement Data								
Assigned Mvmt	12		14			16	18	
Mvmt Sat Flow, veh/h	134		1274			1583	498	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	5	0	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)	(Pr/Pm)			(Pr/Pm)

Lanes in Grp	0	1	0	1	1	0	0	2
Grp Vol (v), veh/h	0	75	0	124	253	0	0	154
Grp Sat Flow (s), veh/h/ln	0	1774	0	1774	1774	0	0	1721
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	10.2	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	10.2	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	0	515	0	1239	232	0	0	1200
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	6.6	0.0	10.8	12.5	0.0	0.0	10.8
Perm LT Serve Time (g_u), s	0.0	6.6	0.0	3.4	0.0	0.0	0.0	3.9
Perm LT Q Serve Time (g_ps), s	0.0	6.6	0.0	3.4	0.0	0.0	0.0	3.9
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	655	0	224	371	0	0	475
V/C Ratio (X)	0.00	0.11	0.00	0.55	0.68	0.00	0.00	0.32
Avail Cap (c_a), veh/h	0	655	0	251	465	0	0	475
Upstream Filter (I)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	19.8	0.0	38.8	25.6	0.0	0.0	37.6
Incr Delay (d2), s/veh	0.0	0.1	0.0	2.1	2.9	0.0	0.0	0.4
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	19.8	0.0	40.9	28.5	0.0	0.0	38.0
1st-Term Q (Q1), veh/ln	0.0	1.3	0.0	2.9	4.9	0.0	0.0	1.8
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	1.3	0.0	3.0	5.2	0.0	0.0	1.8
%ile Storage Ratio (RQ%)	0.00	0.23	0.00	1.52	1.33	0.00	0.00	0.57
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	0	6	8	0
Lane Assignment	T					T		
Lanes in Grp	2	0	0	0	0	3	0	0
Grp Vol (v), veh/h	707	0	0	0	0	1638	0	0
Grp Sat Flow (s), veh/h/ln	1695	0	0	0	0	1695	0	0
Q Serve Time (g_s), s	15.7	0.0	0.0	0.0	0.0	22.9	0.0	0.0
Cycle Q Clear Time (g_c), s	15.7	0.0	0.0	0.0	0.0	22.9	0.0	0.0
Lane Grp Cap (c), veh/h	1090	0	0	0	0	2303	0	0
V/C Ratio (X)	0.65	0.00	0.00	0.00	0.00	0.71	0.00	0.00
Avail Cap (c_a), veh/h	2250	0	0	0	0	2762	0	0
Upstream Filter (I)	1.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d1), s/veh	25.6	0.0	0.0	0.0	0.0	19.4	0.0	0.0
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.0	0.0	0.7	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	26.2	0.0	0.0	0.0	0.0	20.1	0.0	0.0
1st-Term Q (Q1), veh/ln	7.4	0.0	0.0	0.0	0.0	10.6	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	7.5	0.0	0.0	0.0	0.0	10.8	0.0	0.0
%ile Storage Ratio (RQ%)	0.28	0.00	0.00	0.00	0.00	0.19	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	12	0	14	0	0	16	18	0
Lane Assignment	T+R		T+R			R	T+R	
Lanes in Grp	1	0	1	0	0	1	1	0
Grp Vol (v), veh/h	384	0	144	0	0	280	146	0
Grp Sat Flow (s), veh/h/ln	1839	0	1638	0	0	1583	1775	0
Q Serve Time (g_s), s	15.8	0.0	7.3	0.0	0.0	6.8	6.8	0.0
Cycle Q Clear Time (g_c), s	15.8	0.0	7.3	0.0	0.0	6.8	6.8	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.07	0.00	0.78	0.00	0.00	1.00	0.28	0.00
Lane Grp Cap (c), veh/h	591	0	233	0	0	717	242	0
V/C Ratio (X)	0.65	0.00	0.62	0.00	0.00	0.39	0.60	0.00
Avail Cap (c_a), veh/h	1220	0	953	0	0	860	1053	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	25.6	0.0	36.3	0.0	0.0	7.0	36.1	0.0
Incr Delay (d2), s/veh	1.2	0.0	2.6	0.0	0.0	0.3	2.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	26.8	0.0	39.0	0.0	0.0	7.3	38.5	0.0
1st-Term Q (Q1), veh/ln	8.0	0.0	3.3	0.0	0.0	2.9	3.3	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.2	0.0	0.0	0.1	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	8.2	0.0	3.5	0.0	0.0	3.0	3.5	0.0
%ile Storage Ratio (RQ%)	0.31	0.00	0.35	0.00	0.00	0.05	0.13	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	24.3
HCM 2010 LOS	C

Notes
User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	22.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	40	0	21	0	0	4	194	1395	40	19	1745	108
Future Vol, veh/h	40	0	21	0	0	4	194	1395	40	19	1745	108
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	190	-	-	106	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	43	0	23	0	0	4	211	1516	43	21	1897	117

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	3025	3979	1007	2760	4015	780	2014	0	0	1560	0	0
Stage 1	1997	1997	-	1960	1960	-	-	-	-	-	-	-
Stage 2	1028	1982	-	800	2055	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	~ 14	3	205	21	3	290	~ 123	-	-	208	-	-
Stage 1	~ 39	104	-	41	108	-	-	-	-	-	-	-
Stage 2	226	105	-	313	97	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	0	205	-	0	290	~ 123	-	-	208	-	-
Mov Cap-2 Maneuver	-	0	-	-	0	-	-	-	-	-	-	-
Stage 1	~ 39	94	-	41	0	-	-	-	-	-	-	-
Stage 2	-	0	-	250	87	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			49.4	0.2
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	~ 123	-	-	-	-	208	-	-
HCM Lane V/C Ratio	1.714	-	-	-	-	0.099	-	-
HCM Control Delay (s)	$ 415	-	-	-	-	24.2	-	-
HCM Lane LOS	F	-	-	-	-	C	-	-
HCM 95th %tile Q(veh)	15.9	-	-	-	-	0.3	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	100	0	0	11	0	1575	29	0	1450	216
Future Vol, veh/h	0	0	100	0	0	11	0	1575	29	0	1450	216
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	109	0	0	12	0	1712	32	0	1576	235

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	905	-	-	872	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	240	0	0	252	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	240	-	-	252	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.8	20	0	0
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	240	252	-	-
HCM Lane V/C Ratio	-	-	0.453	0.047	-	-
HCM Control Delay (s)	-	-	31.8	20	-	-
HCM Lane LOS	-	-	D	C	-	-
HCM 95th %tile Q(veh)	-	-	2.2	0.1	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	827	211	364	1655	275	664	1042	129	313	1041	319
Future Volume (veh/h)	207	827	211	364	1655	275	664	1042	129	313	1041	319
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	225	899	229	396	1799	299	722	1133	140	340	1132	347
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	263	1227	382	773	1904	593	775	1695	528	587	1356	422
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
Prop Arrive On Green	0.04	0.24	0.24	0.17	0.37	0.37	0.18	0.33	0.33	0.12	0.27	0.27
Ln Grp Delay, s/veh	78.8	43.2	41.9	42.2	46.7	29.6	63.9	36.4	30.5	48.1	47.7	57.7
Ln Grp LOS	E	D	D	D	D	C	E	D	C	D	D	E
Approach Vol, veh/h		1353			2494			1995			1819	
Approach Delay, s/veh		48.9			44.0			46.0			49.7	
Approach LOS		D			D			D			D	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	6	5	8	7
Case No	3.0	1.4	3.0	1.4	3.0	1.4	3.0	1.4
Phs Duration (G+Y+Rc), s	44.0	18.1	32.9	25.0	36.0	26.1	48.9	9.0
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green (Gmax), s	39.0	13.0	37.0	11.0	31.0	21.0	44.0	4.0
Max Allow Headway (MAH), s	5.1	3.8	5.0	3.8	5.0	3.8	5.1	3.8
Max Q Clear (g_c+I1), s	24.9	6.5	21.6	8.1	27.2	21.7	43.1	5.6
Green Ext Time (g_e), s	7.2	2.4	6.4	0.7	2.8	0.0	0.8	0.0
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prob of Max Out (p_x)	0.00	0.53	0.30	1.00	0.00	1.00	1.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3		5		7
Mvmt Sat Flow, veh/h		3442		3442		3442		3442
Through Movement Data								
Assigned Mvmt	2		4		6		8	
Mvmt Sat Flow, veh/h	5085		5085		5085		5085	
Right-Turn Movement Data								
Assigned Mvmt	12		14		16		18	
Mvmt Sat Flow, veh/h	1583		1583		1583		1583	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	0	5	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)

Lanes in Grp	0	2	0	2	0	2	0	2
Grp Vol (v), veh/h	0	340	0	396	0	722	0	225
Grp Sat Flow (s), veh/h/ln	0	1721	0	1721	0	1721	0	1721
Q Serve Time (g_s), s	0.0	4.5	0.0	6.1	0.0	19.7	0.0	3.6
Cycle Q Clear Time (g_c), s	0.0	4.5	0.0	6.1	0.0	19.7	0.0	3.6
Perm LT Sat Flow (s_l), veh/h/ln	0	420	0	482	0	345	0	189
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	32.0	0.0	25.9	0.0	29.0	0.0	28.9
Perm LT Serve Time (g_u), s	0.0	9.1	0.0	6.4	0.0	3.8	0.0	0.0
Perm LT Q Serve Time (g_ps), s	0.0	9.1	0.0	6.4	0.0	3.8	0.0	0.0
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	587	0	773	0	775	0	263
V/C Ratio (X)	0.00	0.58	0.00	0.51	0.00	0.93	0.00	0.85
Avail Cap (c_a), veh/h	0	587	0	773	0	775	0	263
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	46.7	0.0	41.6	0.0	46.0	0.0	55.9
Incr Delay (d2), s/veh	0.0	1.4	0.0	0.6	0.0	17.9	0.0	22.9
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	48.1	0.0	42.2	0.0	63.9	0.0	78.8
1st-Term Q (Q1), veh/ln	0.0	5.2	0.0	5.8	0.0	11.7	0.0	3.7
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.1	0.0	1.9	0.0	0.8
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	5.3	0.0	5.8	0.0	13.7	0.0	4.5
%ile Storage Ratio (RQ%)	0.00	0.56	0.00	0.64	0.00	1.51	0.00	0.24
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T		T		T		T	
Lanes in Grp	3	0	3	0	3	0	3	0
Grp Vol (v), veh/h	1133	0	899	0	1132	0	1799	0
Grp Sat Flow (s), veh/h/ln	1695	0	1695	0	1695	0	1695	0
Q Serve Time (g_s), s	22.9	0.0	19.6	0.0	25.2	0.0	41.1	0.0
Cycle Q Clear Time (g_c), s	22.9	0.0	19.6	0.0	25.2	0.0	41.1	0.0
Lane Grp Cap (c), veh/h	1695	0	1227	0	1356	0	1904	0
V/C Ratio (X)	0.67	0.00	0.73	0.00	0.83	0.00	0.94	0.00
Avail Cap (c_a), veh/h	1695	0	1610	0	1356	0	1907	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	34.3	0.0	42.0	0.0	41.5	0.0	36.3	0.0
Incr Delay (d2), s/veh	2.1	0.0	1.2	0.0	6.2	0.0	10.4	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	36.4	0.0	43.2	0.0	47.7	0.0	46.7	0.0
1st-Term Q (Q1), veh/ln	10.7	0.0	9.2	0.0	11.7	0.0	19.2	0.0

2nd-Term Q (Q2), veh/ln	0.3	0.0	0.1	0.0	0.8	0.0	1.8	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	11.0	0.0	9.3	0.0	12.5	0.0	21.0	0.0
%ile Storage Ratio (RQ%)	0.14	0.00	0.31	0.00	0.87	0.00	0.33	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	R		R		R		R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	140	0	229	0	347	0	299	0
Grp Sat Flow (s), veh/h/ln	1583	0	1583	0	1583	0	1583	0
Q Serve Time (g_s), s	7.8	0.0	15.4	0.0	24.7	0.0	17.5	0.0
Cycle Q Clear Time (g_c), s	7.8	0.0	15.4	0.0	24.7	0.0	17.5	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	528	0	382	0	422	0	593	0
V/C Ratio (X)	0.27	0.00	0.60	0.00	0.82	0.00	0.50	0.00
Avail Cap (c_a), veh/h	528	0	501	0	422	0	594	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	29.3	0.0	40.4	0.0	41.3	0.0	28.9	0.0
Incr Delay (d2), s/veh	1.2	0.0	1.5	0.0	16.3	0.0	0.7	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	30.5	0.0	41.9	0.0	57.7	0.0	29.6	0.0
1st-Term Q (Q1), veh/ln	3.4	0.0	6.7	0.0	10.8	0.0	7.6	0.0
2nd-Term Q (Q2), veh/ln	0.2	0.0	0.2	0.0	1.9	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	3.6	0.0	6.9	0.0	12.7	0.0	7.8	0.0
%ile Storage Ratio (RQ%)	1.29	0.00	1.07	0.00	4.61	0.00	2.99	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		46.7						
HCM 2010 LOS		D						

HCM 2010 TWSC
6: Speedway Blvd & Warren Ave

08/29/2017

Intersection							
Int Delay, s/veh	0.7						

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑↑	↑↑↑↱			↱
Traffic Vol, veh/h	0	1384	2358	117	0	49
Future Vol, veh/h	0	1384	2358	117	0	49
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	1504	2563	127	0	53

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	1345
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	121
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	121
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	56.3
HCM LOS			F

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	121
HCM Lane V/C Ratio	-	-	-	0.44
HCM Control Delay (s)	-	-	-	56.3
HCM Lane LOS	-	-	-	F
HCM 95th %tile Q(veh)	-	-	-	1.9

Total AM (Improvements) 08/15/2012 Total AM (Improvements)

Synchro 9 Report
Page 9

HCM 2010 Signalized Intersection Capacity Analysis
7: Cherry Ave & Speedway Blvd

08/29/2017

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↰	↑↑↑↱		↰	↑↑↑↱		↰	↑	↱	↰↰	↑	↱
Traffic Volume (veh/h)	408	1179	166	72	1854	507	52	90	41	155	76	88
Future Volume (veh/h)	408	1179	166	72	1854	507	52	90	41	155	76	88
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	443	1282	180	78	2015	551	57	98	45	168	83	96
Adj No. of Lanes	2	3	0	1	3	0	1	1	1	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	565	2967	417	297	2324	605	156	212	181	372	361	307
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
Prop Arrive On Green	0.12	0.66	0.65	0.04	0.58	0.57	0.11	0.11	0.11	0.04	0.19	0.19
Ln Grp Delay, s/veh	52.0	9.8	10.5	19.7	25.0	35.5	51.8	48.1	46.1	51.0	38.6	39.5
Ln Grp LOS	D	A	B	B	C	D	D	D	D	D	D	D
Approach Vol, veh/h		1905			2644			200			347	
Approach Delay, s/veh		19.8			28.4			48.7			44.9	
Approach LOS		B			C			D			D	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3		6	8	7
Case No	5.4	1.4	4.0	1.4		3.0	4.0	1.4
Phs Duration (G+Y+Rc), s	16.8	9.0	78.0	8.7		25.8	69.0	17.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Max Green (Gmax), s	18.0	4.0	73.0	5.0		27.0	64.0	14.0
Max Allow Headway (MAH), s	4.7	4.2	5.3	3.8		4.2	5.3	3.8
Max Q Clear (g_c+I1), s	11.4	2.0	17.4	2.0		7.9	54.9	11.1
Green Ext Time (g_e), s	0.4	0.3	15.6	0.6		1.3	8.5	0.6
Prob of Phs Call (p_c)	1.00	0.99	1.00	0.91		1.00	1.00	1.00
Prob of Max Out (p_x)	0.32	1.00	0.00	1.00		0.00	0.00	1.00
Left-Turn Movement Data								
Assigned Mvmt	5	1		3				7
Mvmt Sat Flow, veh/h	1200	3442		1774				3442
Through Movement Data								
Assigned Mvmt	2		4			6	8	
Mvmt Sat Flow, veh/h	1863		4508			1863	4021	
Right-Turn Movement Data								
Assigned Mvmt	12		14			16	18	
Mvmt Sat Flow, veh/h	1583		633			1583	1047	
Left Lane Group Data								
Assigned Mvmt	5	1	0	3	0	0	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)				(Pr/Pm)

Total AM (Improvements) 08/15/2012 Total AM (Improvements)

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Lanes in Grp	1	2	0	1	0	0	0	2
Grp Vol (v), veh/h	57	168	0	78	0	0	0	443
Grp Sat Flow (s), veh/h/ln	1200	1721	0	1774	0	0	0	1721
Q Serve Time (g_s), s	5.2	0.0	0.0	0.0	0.0	0.0	0.0	9.1
Cycle Q Clear Time (g_c), s	9.4	0.0	0.0	0.0	0.0	0.0	0.0	9.1
Perm LT Sat Flow (s_l), veh/h/ln	1200	1203	0	361	0	0	0	119
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	12.8	9.8	0.0	65.0	0.0	0.0	0.0	62.0
Perm LT Serve Time (g_u), s	8.6	4.3	0.0	49.6	0.0	0.0	0.0	9.1
Perm LT Q Serve Time (g_ps), s	5.2	4.3	0.0	16.0	0.0	0.0	0.0	9.1
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	156	372	0	297	0	0	0	565
V/C Ratio (X)	0.37	0.45	0.00	0.26	0.00	0.00	0.00	0.78
Avail Cap (c_a), veh/h	222	373	0	318	0	0	0	606
Upstream Filter (I)	1.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	50.3	50.2	0.0	19.2	0.0	0.0	0.0	45.7
Incr Delay (d2), s/veh	1.4	0.9	0.0	0.5	0.0	0.0	0.0	6.3
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	51.8	51.0	0.0	19.7	0.0	0.0	0.0	52.0
1st-Term Q (Q1), veh/ln	1.7	2.5	0.0	1.6	0.0	0.0	0.0	6.6
2nd-Term Q (Q2), veh/ln	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.5
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	1.8	2.5	0.0	1.6	0.0	0.0	0.0	7.1
%ile Storage Ratio (RQ%)	0.38	0.26	0.00	0.17	0.00	0.00	0.00	0.51
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	0	6	8	0
Lane Assignment	T		T			T	T	
Lanes in Grp	1	0	2	0	0	1	2	0
Grp Vol (v), veh/h	98	0	964	0	0	83	1683	0
Grp Sat Flow (s), veh/h/ln	1863	0	1695	0	0	1863	1695	0
Q Serve Time (g_s), s	5.5	0.0	15.3	0.0	0.0	4.2	46.8	0.0
Cycle Q Clear Time (g_c), s	5.5	0.0	15.3	0.0	0.0	4.2	46.8	0.0
Lane Grp Cap (c), veh/h	212	0	2231	0	0	361	1960	0
V/C Ratio (X)	0.46	0.00	0.43	0.00	0.00	0.23	0.86	0.00
Avail Cap (c_a), veh/h	315	0	2231	0	0	464	1960	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	46.6	0.0	9.2	0.0	0.0	38.2	19.9	0.0
Incr Delay (d2), s/veh	1.6	0.0	0.6	0.0	0.0	0.3	5.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	48.1	0.0	9.8	0.0	0.0	38.6	25.0	0.0
1st-Term Q (Q1), veh/ln	2.9	0.0	7.1	0.0	0.0	2.2	21.7	0.0

2nd-Term Q (Q2), veh/ln	0.1	0.0	0.2	0.0	0.0	0.0	1.4	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	3.0	0.0	7.3	0.0	0.0	2.2	23.1	0.0
%ile Storage Ratio (RQ%)	0.10	0.00	0.08	0.00	0.00	0.15	1.73	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	12	0	14	0	0	16	18	0
Lane Assignment	R		T+R			R	T+R	
Lanes in Grp	1	0	1	0	0	1	1	0
Grp Vol (v), veh/h	45	0	498	0	0	96	883	0
Grp Sat Flow (s), veh/h/ln	1583	0	1751	0	0	1583	1678	0
Q Serve Time (g_s), s	2.9	0.0	15.4	0.0	0.0	5.9	52.9	0.0
Cycle Q Clear Time (g_c), s	2.9	0.0	15.4	0.0	0.0	5.9	52.9	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	1.00	0.00	0.36	0.00	0.00	1.00	0.62	0.00
Lane Grp Cap (c), veh/h	181	0	1152	0	0	307	970	0
V/C Ratio (X)	0.25	0.00	0.43	0.00	0.00	0.31	0.91	0.00
Avail Cap (c_a), veh/h	268	0	1152	0	0	394	970	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	45.4	0.0	9.3	0.0	0.0	38.9	21.4	0.0
Incr Delay (d2), s/veh	0.7	0.0	1.2	0.0	0.0	0.6	14.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	46.1	0.0	10.5	0.0	0.0	39.5	35.5	0.0
1st-Term Q (Q1), veh/ln	1.3	0.0	7.4	0.0	0.0	2.6	24.3	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.0	0.4	0.0	0.0	0.0	3.8	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
%ile Back of Q (50%), veh/ln	1.3	0.0	7.7	0.0	0.0	2.6	28.1	0.0
%ile Storage Ratio (RQ%)	0.41	0.00	0.08	0.00	0.00	0.83	2.10	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		27.1						
HCM 2010 LOS		C						

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	73	50	126	6	10	78
Future Vol, veh/h	73	50	126	6	10	78
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	79	54	137	7	11	85

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	143	0	-	0	353	140
Stage 1	-	-	-	-	140	-
Stage 2	-	-	-	-	213	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1440	-	-	-	645	908
Stage 1	-	-	-	-	887	-
Stage 2	-	-	-	-	823	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1440	-	-	-	608	908
Mov Cap-2 Maneuver	-	-	-	-	608	-
Stage 1	-	-	-	-	887	-
Stage 2	-	-	-	-	776	-

Approach	EB	WB	SB
HCM Control Delay, s	4.5	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1440	-	-	-	860
HCM Lane V/C Ratio	0.055	-	-	-	0.111
HCM Control Delay (s)	7.6	0	-	-	9.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.4

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	6	56	81	50	33	207	298	317	4	48	146
Future Vol, veh/h	0	6	56	81	50	33	207	298	317	4	48	146
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	7	61	88	54	36	225	324	345	4	52	159

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	959	914	132	948	994	324	211	0	0	324	0	0
Stage 1	140	140	-	774	774	-	-	-	-	-	-	-
Stage 2	819	774	-	174	220	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	237	273	917	241	245	717	1360	-	-	1236	-	-
Stage 1	863	781	-	391	408	-	-	-	-	-	-	-
Stage 2	369	408	-	828	721	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	136	196	917	172	176	717	1360	-	-	1236	-	-
Mov Cap-2 Maneuver	136	196	-	172	176	-	-	-	-	-	-	-
Stage 1	621	778	-	282	294	-	-	-	-	-	-	-
Stage 2	206	294	-	763	718	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.9	37.1	2.1	0.2
HCM LOS	B	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1360	-	-	676	172	226	1236	-	-
HCM Lane V/C Ratio	0.165	-	-	0.1	0.341	0.529	0.004	-	-
HCM Control Delay (s)	8.2	0	-	10.9	36.4	37.5	7.9	0	-
HCM Lane LOS	A	A	-	B	E	E	A	A	-
HCM 95th %tile Q(veh)	0.6	-	-	0.3	1.4	2.8	0	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	553	132	250	65	29	80	135	1587	78	69	1335	76
Future Volume (veh/h)	553	132	250	65	29	80	135	1587	78	69	1335	76
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1863
Adj Flow Rate, veh/h	601	143	272	71	32	87	147	1725	85	75	1451	83
Adj No. of Lanes	2	1	0	1	1	0	1	3	0	1	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	912	173	329	131	52	141	323	2282	112	188	1981	617
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
Prop Arrive On Green	0.22	0.30	0.28	0.04	0.12	0.10	0.12	0.46	0.45	0.05	0.39	0.39
Ln Grp Delay, s/veh	36.8	0.0	38.4	52.3	0.0	48.2	40.0	25.0	26.4	46.5	28.2	20.8
Ln Grp LOS	D		D	D		D	D	C	C	D	C	C
Approach Vol, veh/h		1016			190			1957			1609	
Approach Delay, s/veh		37.4			49.7			26.6			28.7	
Approach LOS		D			D			C			C	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3	6	5	8	7
Case No	4.0	1.4	4.0	1.4	3.0	1.4	4.0	1.4
Phs Duration (G+Y+Rc), s	52.3	9.5	35.6	7.7	44.9	16.8	16.3	27.1
Change Period (Y+Rc), s	* 5.3	* 5.9	6.2	* 5	* 5.3	* 5.9	6.2	* 5
Max Green (Gmax), s	* 56	* 6.5	50.0	* 5	* 51	* 12	50.0	* 5
Max Allow Headway (MAH), s	5.3	3.8	5.6	3.9	5.2	3.8	5.6	3.9
Max Q Clear (g_c+I1), s	32.3	2.0	26.4	2.0	27.6	3.4	9.3	13.6
Green Ext Time (g_e), s	14.7	0.2	3.0	0.1	12.0	0.4	0.8	0.0
Prob of Phs Call (p_c)	1.00	0.89	1.00	0.87	1.00	0.99	1.00	1.00
Prob of Max Out (p_x)	0.52	0.60	0.01	1.00	0.35	0.03	0.00	1.00
Left-Turn Movement Data								
Assigned Mvmt		1		3		5		7
Mvmt Sat Flow, veh/h		1774		1774		1774		3442
Through Movement Data								
Assigned Mvmt	2		4		6		8	
Mvmt Sat Flow, veh/h	4965		575		5085		444	
Right-Turn Movement Data								
Assigned Mvmt	12		14		16		18	
Mvmt Sat Flow, veh/h	244		1094		1583		1206	
Left Lane Group Data								
Assigned Mvmt	0	1	0	3	0	5	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)		(Pr/Pm)

Lanes in Grp	0	1	0	1	0	1	0	2
Grp Vol (v), veh/h	0	75	0	71	0	147	0	601
Grp Sat Flow (s), veh/h/ln	0	1774	0	1774	0	1774	0	1721
Q Serve Time (g_s), s	0.0	0.0	0.0	0.0	0.0	1.4	0.0	11.6
Cycle Q Clear Time (g_c), s	0.0	0.0	0.0	0.0	0.0	1.4	0.0	11.6
Perm LT Sat Flow (s_l), veh/h/ln	0	258	0	967	0	337	0	1230
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	0.0	41.5	0.0	11.1	0.0	37.6	0.0	8.1
Perm LT Serve Time (g_u), s	0.0	11.2	0.0	0.0	0.0	12.0	0.0	0.8
Perm LT Q Serve Time (g_ps), s	0.0	11.2	0.0	0.0	0.0	12.0	0.0	0.8
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	0	188	0	131	0	323	0	912
V/C Ratio (X)	0.00	0.40	0.00	0.54	0.00	0.45	0.00	0.66
Avail Cap (c_a), veh/h	0	238	0	170	0	343	0	912
Upstream Filter (I)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	0.0	45.2	0.0	48.9	0.0	39.0	0.0	35.0
Incr Delay (d2), s/veh	0.0	1.4	0.0	3.4	0.0	1.0	0.0	1.8
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	46.5	0.0	52.3	0.0	40.0	0.0	36.8
1st-Term Q (Q1), veh/ln	0.0	2.1	0.0	2.0	0.0	3.8	0.0	7.8
2nd-Term Q (Q2), veh/ln	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.2
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	0.0	2.1	0.0	2.1	0.0	3.9	0.0	8.0
%ile Storage Ratio (RQ%)	0.00	0.39	0.00	1.08	0.00	0.99	0.00	2.54
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	6	0	8	0
Lane Assignment	T				T			
Lanes in Grp	2	0	0	0	3	0	0	0
Grp Vol (v), veh/h	1177	0	0	0	1451	0	0	0
Grp Sat Flow (s), veh/h/ln	1695	0	0	0	1695	0	0	0
Q Serve Time (g_s), s	30.2	0.0	0.0	0.0	25.6	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	30.2	0.0	0.0	0.0	25.6	0.0	0.0	0.0
Lane Grp Cap (c), veh/h	1558	0	0	0	1981	0	0	0
V/C Ratio (X)	0.76	0.00	0.00	0.00	0.73	0.00	0.00	0.00
Avail Cap (c_a), veh/h	1852	0	0	0	2507	0	0	0
Upstream Filter (I)	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
Uniform Delay (d1), s/veh	23.5	0.0	0.0	0.0	27.4	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	0.0	0.0	0.8	0.0	0.0	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	25.0	0.0	0.0	0.0	28.2	0.0	0.0	0.0
1st-Term Q (Q1), veh/ln	14.1	0.0	0.0	0.0	12.0	0.0	0.0	0.0

2nd-Term Q (Q2), veh/ln	0.3	0.0	0.0	0.0	0.2	0.0	0.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	14.4	0.0	0.0	0.0	12.1	0.0	0.0	0.0
%ile Storage Ratio (RQ%)	0.54	0.00	0.00	0.00	0.22	0.00	0.00	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	12	0	14	0	16	0	18	0
Lane Assignment	T+R		T+R		R		T+R	
Lanes in Grp	1	0	1	0	1	0	1	0
Grp Vol (v), veh/h	633	0	415	0	83	0	119	0
Grp Sat Flow (s), veh/h/ln	1820	0	1670	0	1583	0	1650	0
Q Serve Time (g_s), s	30.3	0.0	24.4	0.0	3.5	0.0	7.3	0.0
Cycle Q Clear Time (g_c), s	30.3	0.0	24.4	0.0	3.5	0.0	7.3	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.13	0.00	0.66	0.00	1.00	0.00	0.73	0.00
Lane Grp Cap (c), veh/h	836	0	502	0	617	0	193	0
V/C Ratio (X)	0.76	0.00	0.83	0.00	0.13	0.00	0.62	0.00
Avail Cap (c_a), veh/h	994	0	829	0	780	0	820	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	23.6	0.0	34.9	0.0	20.7	0.0	45.0	0.0
Incr Delay (d2), s/veh	2.8	0.0	3.5	0.0	0.1	0.0	3.2	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	26.4	0.0	38.4	0.0	20.8	0.0	48.2	0.0
1st-Term Q (Q1), veh/ln	15.1	0.0	11.2	0.0	1.5	0.0	3.3	0.0
2nd-Term Q (Q2), veh/ln	0.7	0.0	0.5	0.0	0.0	0.0	0.2	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	15.8	0.0	11.7	0.0	1.6	0.0	3.5	0.0
%ile Storage Ratio (RQ%)	0.59	0.00	1.19	0.00	0.03	0.00	0.13	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Intersection Summary	
HCM 2010 Ctrl Delay	30.5
HCM 2010 LOS	C

Notes

User approved pedestrian interval to be less than phase max green.
* HCM 2010 computational engine requires equal clearance times for the phases crossing the barrier.

Intersection	
Int Delay, s/veh	132.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	41	0	120	0	0	17	96	1740	10	28	1642	18
Future Vol, veh/h	41	0	120	0	0	17	96	1740	10	28	1642	18
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	190	-	-	106	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	45	0	130	0	0	18	104	1891	11	30	1785	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2820	3966	902	2880	3970	951	1804	0	0	1902	0	0
Stage 1	1855	1855	-	2105	2105	-	-	-	-	-	-	-
Stage 2	965	2111	-	775	1865	-	-	-	-	-	-	-
Critical Hdwy	6.44	6.54	7.14	6.44	6.54	7.14	5.34	-	-	5.34	-	-
Critical Hdwy Stg 1	7.34	5.54	-	7.34	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.74	5.54	-	6.74	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.82	4.02	3.92	3.82	4.02	3.92	3.12	-	-	3.12	-	-
Pot Cap-1 Maneuver	~ 19	3	241	17	3	224	157	-	-	140	-	-
Stage 1	49	122	-	32	91	-	-	-	-	-	-	-
Stage 2	247	91	-	324	121	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 7	1	241	3	1	224	157	-	-	140	-	-
Mov Cap-2 Maneuver	~ 7	1	-	3	1	-	-	-	-	-	-	-
Stage 1	~ 17	96	-	11	31	-	-	-	-	-	-	-
Stage 2	77	31	-	117	95	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 3007.7	22.5	3.4	0.6
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	157	-	-	25	224	140	-	-
HCM Lane V/C Ratio	0.665	-	-	7	0.082	0.217	-	-
HCM Control Delay (s)	64.5	-		$ 3007.7	22.5	37.7	-	-
HCM Lane LOS	F	-	-	F	C	E	-	-
HCM 95th %tile Q(veh)	3.8	-	-	21.8	0.3	0.8	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	53.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	426	0	0	25	0	1762	17	0	1603	99
Future Vol, veh/h	0	0	426	0	0	25	0	1762	17	0	1603	99
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	463	0	0	27	0	1915	18	0	1742	108

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	-	-	925	-	-	967	-	0	0	-	-	0
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	7.14	-	-	7.14	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.92	-	-	3.92	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	~ 233	0	0	218	0	-	-	0	-	-
Stage 1	0	0	-	0	0	-	0	-	-	0	-	-
Stage 2	0	0	-	0	0	-	0	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	-	~ 233	-	-	218	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 493.9	23.9	0	0
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	-	-	233	218	-	-
HCM Lane V/C Ratio	-	-	1.987	0.125	-	-
HCM Control Delay (s)	-	-	$ 493.9	23.9	-	-
HCM Lane LOS	-	-	F	C	-	-
HCM 95th %tile Q(veh)	-	-	33.9	0.4	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	399	1611	367	310	1297	223	442	1070	251	641	1229	209
Future Volume (veh/h)	399	1611	367	310	1297	223	442	1070	251	641	1229	209
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	434	1751	399	337	1410	242	480	1163	273	697	1336	227
Adj No. of Lanes	2	3	1	2	3	1	2	3	1	2	3	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	524	1822	567	349	1583	493	581	1356	422	722	1610	501
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
Prop Arrive On Green	0.11	0.36	0.36	0.07	0.31	0.31	0.13	0.27	0.27	0.17	0.32	0.32
Ln Grp Delay, s/veh	60.6	50.8	36.9	93.1	46.0	13.9	58.4	49.0	32.1	63.0	43.1	35.6
Ln Grp LOS	E	D	D	F	D	B	E	D	C	E	D	D
Approach Vol, veh/h		2584			1989			1916			2260	
Approach Delay, s/veh		50.3			50.0			49.0			48.5	
Approach LOS		D			D			D			D	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	1	2	4	3	6	5	8	7
Case No	1.2	3.0	3.0	1.4	3.0	1.3	3.0	1.4
Phs Duration (G+Y+Rc), s	25.0	36.0	47.0	12.0	42.0	19.0	41.3	17.7
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Max Green (Gmax), s	20.0	31.0	42.0	7.0	37.0	14.0	37.0	12.0
Max Allow Headway (MAH), s	3.8	4.7	5.0	3.8	5.1	4.7	5.1	3.8
Max Q Clear (g_c+I1), s	23.0	28.1	42.4	9.5	31.2	12.9	33.7	12.0
Green Ext Time (g_e), s	0.0	2.4	0.0	0.0	4.2	0.9	2.6	0.0
Prob of Phs Call (p_c)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Prob of Max Out (p_x)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00
Left-Turn Movement Data								
Assigned Mvmt	1			3		5		7
Mvmt Sat Flow, veh/h	3442			3442		3442		3442
Through Movement Data								
Assigned Mvmt		2	4		6		8	
Mvmt Sat Flow, veh/h		5085	5085		5085		5085	
Right-Turn Movement Data								
Assigned Mvmt		12	14		16		18	
Mvmt Sat Flow, veh/h		1583	1583		1583		1583	
Left Lane Group Data								
Assigned Mvmt	1	0	0	3	0	5	0	7
Lane Assignment	(Pr/Pm)			(Pr/Pm)		(Pr/Pm)		(Pr/Pm)

Lanes in Grp	2	0	0	2	0	2	0	2
Grp Vol (v), veh/h	697	0	0	337	0	480	0	434
Grp Sat Flow (s), veh/h/ln	1721	0	0	1721	0	1721	0	1721
Q Serve Time (g_s), s	21.0	0.0	0.0	7.5	0.0	10.9	0.0	10.0
Cycle Q Clear Time (g_c), s	21.0	0.0	0.0	7.5	0.0	10.9	0.0	10.0
Perm LT Sat Flow (s_l), veh/h/ln	359	0	0	179	0	318	0	292
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	15.0	0.0	0.0	37.3	0.0	10.0	0.0	34.3
Perm LT Serve Time (g_u), s	0.0	0.0	0.0	0.0	0.0	5.8	0.0	2.6
Perm LT Q Serve Time (g_ps), s	0.0	0.0	0.0	0.0	0.0	5.8	0.0	2.6
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Lane Grp Cap (c), veh/h	722	0	0	349	0	581	0	524
V/C Ratio (X)	0.96	0.00	0.00	0.96	0.00	0.83	0.00	0.83
Avail Cap (c_a), veh/h	722	0	0	349	0	581	0	524
Upstream Filter (I)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
Uniform Delay (d1), s/veh	38.0	0.0	0.0	54.4	0.0	48.8	0.0	50.0
Incr Delay (d2), s/veh	25.1	0.0	0.0	38.6	0.0	9.6	0.0	10.6
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	63.0	0.0	0.0	93.1	0.0	58.4	0.0	60.6
1st-Term Q (Q1), veh/ln	1.6	0.0	0.0	5.6	0.0	7.7	0.0	7.0
2nd-Term Q (Q2), veh/ln	2.5	0.0	0.0	1.9	0.0	0.8	0.0	0.8
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00
%ile Back of Q (50%), veh/ln	4.1	0.0	0.0	7.4	0.0	8.4	0.0	7.8
%ile Storage Ratio (RQ%)	0.43	0.00	0.00	0.82	0.00	0.93	0.00	0.41
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Middle Lane Group Data								
Assigned Mvmt	0	2	4	0	6	0	8	0
Lane Assignment		T	T		T		T	
Lanes in Grp	0	3	3	0	3	0	3	0
Grp Vol (v), veh/h	0	1163	1751	0	1336	0	1410	0
Grp Sat Flow (s), veh/h/ln	0	1695	1695	0	1695	0	1695	0
Q Serve Time (g_s), s	0.0	26.1	40.4	0.0	29.2	0.0	31.7	0.0
Cycle Q Clear Time (g_c), s	0.0	26.1	40.4	0.0	29.2	0.0	31.7	0.0
Lane Grp Cap (c), veh/h	0	1356	1822	0	1610	0	1583	0
V/C Ratio (X)	0.00	0.86	0.96	0.00	0.83	0.00	0.89	0.00
Avail Cap (c_a), veh/h	0	1356	1822	0	1610	0	1610	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	41.8	37.7	0.0	38.0	0.0	39.4	0.0
Incr Delay (d2), s/veh	0.0	7.2	13.1	0.0	5.1	0.0	6.6	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	49.0	50.8	0.0	43.1	0.0	46.0	0.0
1st-Term Q (Q1), veh/ln	0.0	12.2	18.8	0.0	13.6	0.0	14.9	0.0

2nd-Term Q (Q2), veh/ln	0.0	0.9	2.2	0.0	0.8	0.0	1.0	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	13.1	21.0	0.0	14.4	0.0	15.8	0.0
%ile Storage Ratio (RQ%)	0.00	0.16	0.71	0.00	1.00	0.00	0.25	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Right Lane Group Data								
Assigned Mvmt	0	12	14	0	16	0	18	0
Lane Assignment		R	R		R		R	
Lanes in Grp	0	1	1	0	1	0	1	0
Grp Vol (v), veh/h	0	273	399	0	227	0	242	0
Grp Sat Flow (s), veh/h/ln	0	1583	1583	0	1583	0	1583	0
Q Serve Time (g_s), s	0.0	14.6	25.9	0.0	13.7	0.0	9.3	0.0
Cycle Q Clear Time (g_c), s	0.0	14.6	25.9	0.0	13.7	0.0	9.3	0.0
Prot RT Sat Flow (s_R), veh/h/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prot RT Eff Green (g_R), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop RT Outside Lane (P_R)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00
Lane Grp Cap (c), veh/h	0	422	567	0	501	0	493	0
V/C Ratio (X)	0.00	0.65	0.70	0.00	0.45	0.00	0.49	0.00
Avail Cap (c_a), veh/h	0	422	567	0	501	0	501	0
Upstream Filter (I)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00
Uniform Delay (d1), s/veh	0.0	24.7	33.0	0.0	32.7	0.0	13.1	0.0
Incr Delay (d2), s/veh	0.0	7.5	3.9	0.0	2.9	0.0	0.8	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	0.0	32.1	36.9	0.0	35.6	0.0	13.9	0.0
1st-Term Q (Q1), veh/ln	0.0	6.4	11.3	0.0	6.0	0.0	4.1	0.0
2nd-Term Q (Q2), veh/ln	0.0	0.9	0.6	0.0	0.4	0.0	0.1	0.0
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	0.00	1.00	1.00	0.00	1.00	0.00	1.00	0.00
%ile Back of Q (50%), veh/ln	0.0	7.2	11.9	0.0	6.4	0.0	4.2	0.0
%ile Storage Ratio (RQ%)	0.00	2.63	1.85	0.00	2.32	0.00	1.61	0.00
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Intersection Summary								
HCM 2010 Ctrl Delay		49.5						
HCM 2010 LOS		D						

Intersection						
Int Delay, s/veh	3					

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	0	2513	1761	81	0	167
Future Vol, veh/h	0	2513	1761	81	0	167
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	-	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	2732	1914	88	0	182

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	-	1001
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	7.14
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	3.92
Pot Cap-1 Maneuver	0	-	-	-	0	207
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	-	-	-	-	-	207
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	0	0	82
HCM LOS			F

Minor Lane/Major Mvmt	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	-	-	-	207
HCM Lane V/C Ratio	-	-	-	0.877
HCM Control Delay (s)	-	-	-	82
HCM Lane LOS	-	-	-	F
HCM 95th %tile Q(veh)	-	-	-	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	175	1675	111	70	1703	117	172	90	159	588	89	247
Future Volume (veh/h)	175	1675	111	70	1703	117	172	90	159	588	89	247
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q, veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj (A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/h/ln	1863	1863	1900	1863	1863	1900	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	190	1821	121	76	1851	127	187	98	173	639	97	268
Adj No. of Lanes	2	3	0	1	3	0	1	1	1	2	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Opposing Right Turn Influence	Yes			Yes			Yes			Yes		
Cap, veh/h	372	2399	159	179	2350	161	281	464	394	770	668	568
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
Prop Arrive On Green	0.05	0.49	0.48	0.04	0.48	0.47	0.25	0.25	0.25	0.07	0.36	0.36
Ln Grp Delay, s/veh	48.1	26.2	29.2	47.6	27.9	31.4	46.7	33.5	36.1	47.9	24.3	28.3
Ln Grp LOS	D	C	C	D	C	C	D	C	D	D	C	C
Approach Vol, veh/h		2132			2054			458			1004	
Approach Delay, s/veh		29.1			29.8			39.9			40.4	
Approach LOS		C			C			D			D	

Timer:	1	2	3	4	5	6	7	8
Assigned Phs	2	1	4	3		6	8	7
Case No	5.4	1.4	4.0	1.4		3.0	4.0	1.4
Phs Duration (G+Y+Rc), s	31.8	12.3	59.0	8.6		44.1	58.0	9.6
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Max Green (Gmax), s	31.0	11.0	54.0	4.0		47.0	53.0	5.0
Max Allow Headway (MAH), s	4.6	4.0	5.3	3.8		4.0	5.3	3.8
Max Q Clear (g_c+I1), s	25.8	5.1	36.0	2.0		16.6	37.7	2.0
Green Ext Time (g_e), s	1.0	2.2	12.9	0.2		4.3	11.6	0.3
Prob of Phs Call (p_c)	1.00	1.00	1.00	0.91		1.00	1.00	1.00
Prob of Max Out (p_x)	0.82	0.65	0.00	1.00		0.00	0.00	1.00
Left-Turn Movement Data								
Assigned Mvmt	5	1		3				7
Mvmt Sat Flow, veh/h	1013	3442		1774				3442
Through Movement Data								
Assigned Mvmt	2		4			6	8	
Mvmt Sat Flow, veh/h	1863		4873			1863	4862	
Right-Turn Movement Data								
Assigned Mvmt	12		14			16	18	
Mvmt Sat Flow, veh/h	1583		323			1583	333	
Left Lane Group Data								
Assigned Mvmt	5	1	0	3	0	0	0	7
Lane Assignment		(Pr/Pm)		(Pr/Pm)				(Pr/Pm)

Lanes in Grp	1	2	0	1	0	0	0	2
Grp Vol (v), veh/h	187	639	0	76	0	0	0	190
Grp Sat Flow (s), veh/h/ln	1013	1721	0	1774	0	0	0	1721
Q Serve Time (g_s), s	19.9	3.1	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear Time (g_c), s	23.8	3.1	0.0	0.0	0.0	0.0	0.0	0.0
Perm LT Sat Flow (s_l), veh/h/ln	1013	1071	0	227	0	0	0	213
Shared LT Sat Flow (s_sh), veh/h/ln	0	0	0	0	0	0	0	0
Perm LT Eff Green (g_p), s	27.8	24.8	0.0	54.0	0.0	0.0	0.0	54.0
Perm LT Serve Time (g_u), s	23.9	20.1	0.0	20.0	0.0	0.0	0.0	18.3
Perm LT Q Serve Time (g_ps), s	19.9	20.1	0.0	20.0	0.0	0.0	0.0	18.3
Time to First Blk (g_f), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Serve Time pre Blk (g_fs), s	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop LT Inside Lane (P_L)	1.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
Lane Grp Cap (c), veh/h	281	770	0	179	0	0	0	372
V/C Ratio (X)	0.67	0.83	0.00	0.43	0.00	0.00	0.00	0.51
Avail Cap (c_a), veh/h	319	885	0	185	0	0	0	384
Upstream Filter (I)	1.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
Uniform Delay (d1), s/veh	42.4	42.0	0.0	46.0	0.0	0.0	0.0	47.0
Incr Delay (d2), s/veh	4.4	6.0	0.0	1.6	0.0	0.0	0.0	1.1
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	46.7	47.9	0.0	47.6	0.0	0.0	0.0	48.1
1st-Term Q (Q1), veh/ln	5.6	9.4	0.0	2.3	0.0	0.0	0.0	2.8
2nd-Term Q (Q2), veh/ln	0.3	0.6	0.0	0.1	0.0	0.0	0.0	0.1
3rd-Term Q (Q3), veh/ln	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile Back of Q Factor (f_B%)	1.00	1.00	0.00	1.00	0.00	0.00	0.00	1.00
%ile Back of Q (50%), veh/ln	5.9	10.0	0.0	2.3	0.0	0.0	0.0	2.9
%ile Storage Ratio (RQ%)	1.25	3.19	0.00	0.25	0.00	0.00	0.00	0.21
Initial Q (Qb), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Final (Residual) Q (Qe), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Delay (ds), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Q (Qs), veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sat Cap (cs), veh/h	0	0	0	0	0	0	0	0
Initial Q Clear Time (tc), h	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Middle Lane Group Data								
Assigned Mvmt	2	0	4	0	0	6	8	0
Lane Assignment	T		T			T	T	
Lanes in Grp	1	0	2	0	0	1	2	0
Grp Vol (v), veh/h	98	0	1266	0	0	97	1289	0
Grp Sat Flow (s), veh/h/ln	1863	0	1695	0	0	1863	1695	0
Q Serve Time (g_s), s	4.7	0.0	33.8	0.0	0.0	3.9	35.4	0.0
Cycle Q Clear Time (g_c), s	4.7	0.0	33.8	0.0	0.0	3.9	35.4	0.0
Lane Grp Cap (c), veh/h	464	0	1669	0	0	668	1639	0
V/C Ratio (X)	0.21	0.00	0.76	0.00	0.00	0.15	0.79	0.00
Avail Cap (c_a), veh/h	534	0	1669	0	0	800	1639	0
Upstream Filter (I)	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
Uniform Delay (d1), s/veh	33.3	0.0	23.0	0.0	0.0	24.2	24.0	0.0
Incr Delay (d2), s/veh	0.2	0.0	3.3	0.0	0.0	0.1	3.9	0.0
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Delay (d), s/veh	33.5	0.0	26.2	0.0	0.0	24.3	27.9	0.0
1st-Term Q (Q1), veh/ln	2.4	0.0	15.6	0.0	0.0	2.0	16.5	0.0

Appendix E | Summary of Neighborhood Liaison Group (NLG) Meetings

The Neighborhood Liaison Group ("NLG") is a working group of neighborhood leaders formed to provide guidance on the Speedway + Campbell Gateway Project ("Project") Planned Area Development (the "PAD"). The University Area Plan ("UAP") established the NLG as part of the Helen-Warren Station Area ("HWSA") policies to ensure neighborhood input and feedback throughout the Project's design and rezoning process. The HWSA identifies several areas where the developer and the NLG will work in mutual good faith to assess:

- The Project's viewshed impacts and illustrate its post-development visibility from the surrounding neighborhoods;
- Privacy considerations for the neighborhoods based on outward views from the Project's high-rise element;
- Sun-reflection and shade/shadow impacts on the surrounding neighborhoods;
- Impacts of Project's height on helicopter flight paths to/from Banner-University Medical Center, along with how the Project's height will modify the noise from those helicopters;
- How the Project will impact drainage, if at all, on downstream neighborhoods.
- The above five items collectively comprise the Project's "Special Studies" as prescribed by the UAP.
- In addition, the HWSA required an analysis of the traffic and transportation impacts the Project will have on the surrounding area.

The NLG members represent the Project's surrounding neighborhoods, as well as several nearby neighborhoods, as follows:

NEIGHBORHOOD / ORGANIZATION	REPRESENTATIVE(S)
Blenman Elm	Alice Roe
Catalina Vista	Dan Schnoll and/or Alison Hughes
Campus Farms	Bonnie Poulos
Feldman's	Diana Lett
Jefferson Park	Minette Burgess and/or Joan Hall
Miramonte	Ruth Beeker
North University	Grace Rich
Sam Hughes	Bill Craig
West University	Chris Gans and/or Richard Mayer

Beginning in August 2017, the Project team initiated formal meetings with the NLG to discuss the Project and the content of its PAD. Below are summaries of each meeting, including date/time, location, and NLG and Project team attendees. In addition to the NLG meetings, the Project team will hold a formal neighborhood meeting and present at neighborhood association meetings upon request.

NLG Meeting One

Date/Time: August 15, 2017, beginning at 6:05pm

Location: Home of Mr. Richard Shenkarow | 2049 E. Elm Street

NLG Attendees: Alice Roe (Blenman-Elm); Bill Craig (Sam Hughes); Bonnie Poulos (Campus Farms); Chris Gans (WUNA); Diana Lett (Feldman's); Minette Burgess (Jefferson Park); Richard Mayers (WUNA); Ruth Beeker (Miramonte). Also in attendance were Councilmember Steve Kozachik and Alison Miller from the Ward 6 Council office.

Project Team: Richard Shenkarow and John Galen (Shenkarow Realty Advisors); Jim Portner (Projects International); Keri Silvyn and Rory Juneman (Lazarus, Silvyn & Bangs); Philipp Neher and Colby Ritter (Rick Joy Architects); and Vince Catalano (Kimley Horn).

Meeting Synopsis: The initial NLG meeting began with a welcome from Richard Shenkarow. Keri Silvyn gave a review of the UAP amendment process, and the purpose of the NLG, including reviewing the Special Studies required by the UAP/HWSA. Ms. Silvyn also discussed how feedback from the NLG would be incorporated into the PAD as it goes through the City's pre-formal review process.

Jim Portner provided an overview of the project (e.g., site plan, massing), and the traffic and transportation considerations. He explained the Project's allowed heights and our desire to maintain flexibility for the heights during the design phase. He then provided an explanation of the methodology and results from each of the Special Studies prepared by the Project team and consultants.

Philipp Neher concluded the formal presentation with an overview of the Project's architecture and design, including environmental design considerations specific to the desert southwest. Mr. Neher detailed the

Project's double façade with outer louvers, which provides both aesthetic and functional benefits to the Project (e.g., creates shade to help cool the interior building and fosters various energy-efficiency and sustainability benefits).

The NLG members asked questions throughout the presentation, as detailed below. After all questions, Ms. Silvyn stated that the desire is to time the next NLG meeting when the City's first round of pre-review comments become available, mostly likely in early October. Until then, NLG members are encouraged to contact the Project team with any questions or concerns. The meeting ended at 8:05pm.

NLG Questions & Project Team Answers:

1.Relating to the traffic impacts, will there be a light installed at Mabel and Campbell? (Roe)

Answer: *A traffic signal at Mabel and Campbell would benefit the Project by allowing easier egress, but would not improve the street system's overall circulation. A signal here also will likely disrupt the green-light signal timing along Campbell, which TDOT would likely oppose.*

2.How will the Project impact Helen St. and Cherry Ave., and how will this area accommodate the new traffic? (Burgess)

Answer: *The Project's Traffic Impact Analysis (TIA) defines all of the traffic volumes and stacking in the streets around the Project, including Helen and Cherry. The TIA recommends widening of several intersections/turn lanes, but does not recommend widening of any streets, including Helen and Cherry. The TIA is summarized in the PAD (currently pp. 103-14), and the full TIA document is also included as an appendix to the PAD.*

3. How does the Arizona Board of Regents' ("ABOR" or "University") control of some of the surrounding streets impact the Project? (Roe)

Answer: *All of the streets adjacent to the Project are City owned. The University-owned streets that are near the Project provide public access, so the fact they are owned by ABOR is not a practical issue. We will coordinate with the University regarding any improvements in these instances.*

4. For southbound Campbell traffic at Speedway, is there a back-up option if the Project has underestimated the traffic? (Craig)

Answer: *The TIA's background traffic volumes incorporate the future traffic generated by the new Banner-University Medical Center hospital and clinics, as well as that from the buildings currently under construction within the Arizona Health Sciences Center. The TIA's assessment of the Speedway/Campbell intersection – including the Project's impact and that from the aforementioned future background traffic – found adequate capacity for southbound Campbell turn lanes at Speedway. The TIA also recommends adding double-left turns on east-and-west bound Speedway at Campbell.*

5.Adding double-left turns on Speedway will make it more difficult for pedestrians to make it across Speedway safely. Also, a lot of people cross Campbell at Helen. How will these be addressed? (Mayer)

Answer: *The Project team acknowledged these concerns and the pedestrian difficulties that inherently arise from 6-lane intersections. At the Speedway crossings, there will be pedestrian refuge at the median. This intersection also has been identified by TDOT as a test location for a protected left-turn, which improves pedestrian safety without slowing down traffic volumes. The Project team agreed to coordinate with TDOT to review the pedestrian crossings at Speedway and those that occur at Helen.*

6.Regarding the shadow study, what is the farthest distance shown on the study? (Roe)

Answer: *The maximum distance for any shade from the building is ½ mile, and the duration of shadows at that furthest distance was approximately one minute over the course of the entire day. The Project team also clarified that the shadow study assumed a wholly flat topography, and did not take into any consideration of intervening objects such as buildings or trees that will cast their own shadows.*

7. Regarding the noise reflectivity study, how was the noise reflecting off the building considered? (Roe)

Answer: *The study analyzed noise as if the building was a flat glass/steel surface (i.e., a perfectly reflective surface). The noise study found that even with this conservative approach, the Project will only increase helicopter noise by 1.1 decibels in the worst-case condition, which is imperceptible to the human ear. Note: Ms. Roe indicated that the current alternate fly-friendly helicopter paths to and from B-UMCT may become the permanent flight paths. The Project team clarified that the noise study considered both the standard and alternate flight paths; the study analyzed the path most proximate to the neighborhoods, since it possessed the greatest potential impact.*

8. The Project's potential to create updrafts from its elevated green space could endanger birds of prey by attracting them to the building and creating possible helicopter hazards. Have you thought about this? (Lett)

Answer: *We have not looked at this possibility, and will investigate further. Participants acknowledged that this area does not have a high population of these types of birds.*

9. Clarify the heights at the Project's edges, and the courtyard dimensions. (Beeker)

Answer: *The courtyard, as currently designed, is approximately 60 ft. wide and more than 100 ft. deep. The PAD is written to require the central courtyard to be a minimum of 7,500 square feet in area.*

Regarding building heights, the UAP allows the Campbell frontage 10 stories and up to 130 feet in height. On Speedway, the UAP allows heights of 12 stories, up to 154 feet. For the high-rise portion, the UAP allows up to 20 stories and a maximum height of 250 feet. This height is limited to: 1) no more than 33 percent of the envelope shown on the HWSA Exhibit 3.G.2, and 2) no more than 25 percent of the entire property's ground area.

The Project team's preference is for the high-rise element to be essentially at its center, with lower heights around the perimeters, creating a balanced, attractive design and appropriate height transition. Ultimately the mix of uses will determine the Project's height, in that any reduction in height of the high-rise will require raising the perimeter buildings to accommodate the Project's need for square footage, creating a less appealing and more "boxy" design.

10. Will furniture be permanent or moveable, as there is a concern with crime and homeless people in this area?

Answer: *The furniture will likely be a combination of permanent and movable. Regarding restricting accessibility and managing the homeless issue, the Project will be private property that is open to the public. Private security will be an on-going part of the Project program so as to address these issues.*

11. Some in Sam Hughes would like to cap Project's height at 10 stories. (Craig)

Answer: *With the UAP Amendment, the allowed height came with the obligation to provide studies showing the impact of the height. We have completed these studies, which were presented here tonight and which are also documented in the PAD. They demonstrate that the proposed height has very little impact on the surrounding neighborhoods. The Project team is happy to come to any neighborhood meeting to present the studies and further discuss the Project.*

12. Will the exterior louvers be fixed or movable? (Gans)

Answer: *We are too early in the design to have made that decision, although it would be optimal to allow for some movement, as long as the cost-benefit factors make economic sense. Note: Mr. Gans commented that he likes the idea of a tall building that is thoughtfully and uniquely designed, and he feels this design sets a higher standard for other projects.*

13. Is there any indication of the types of tenants that will be included in the Project? (Burgess)

Answer: *Our goal and vision for the Project is to include higher-end tenants, similar to the tenant mix at Casas Adobes Plaza. Note: Ms. Beeker complimented the elegance of the Project's architecture and hoped the mix of uses would reflect that design.*

14. Will there be ample, adequate accessible parking close to the grocery/shopping area?

Answer: *Yes. Our initial design places the accessible parking spaces next to the elevators and escalators within the parking structures.*

NLG Meeting Two

Date/Time: November 13, 2017 beginning at 6:00pm

Location: Home of Mr. Richard Shenkarow | 2049 E. Elm Street

NLG Attendees: Alice Roe (Blenman-Elm); Bill Craig (Sam Hughes); Chris Gans (WUNA); Richard Mayers (WUNA); Alison Hughes (Catalina Vista); Dan Schnoll (Catalina Vista); Ruth Beeker (Miramonte). Also in attendance were Councilmember Steve Kozachik and Ann Charles from the Ward 6 Council office.

Project Team: Richard Shenkarow and John Galen (Shenkarow Realty Advisors); Jim Portner (Projects International); Keri Silvyn (Lazarus, Silvyn & Bangs); Philipp Neher and Colby Ritter (Rick Joy Architects).

Meeting Synopsis: Richard Shenkarow opened the meeting welcoming the NLG and thanking them for their time on the project.

Keri Silvyn reminded the NLG that the last meeting was an in-depth discussion of all of the special studies relative to the height that are in the draft PAD. The project team wanted to find out if there were any questions relative to those studies that need to be addressed. There were none.

Jim Portner then gave a summary of the City's first round of comments and the modifications made to the PAD document in response to those comments. The NLG was emailed a link to the red-lined PAD that was resubmitted to the City capturing those modifications. Most of the comments from the City required basic clarification and additional detail; there were no substantive changes. Mr. Portner highlighted a set of comments from a City staff person who did not understand the commitments made by Banner relative to capturing drainage within this water basin. Once the City internally explained the work being accomplished by Banner to handle the drainage/water run-off, those comments were retracted as not necessary for this project.

Keri Silvyn then reminded everyone of the PAD process and timing, which includes an official neighborhood meeting in early 2018, a Zoning Examiner hearing in March/April and targeted City Council in May. The project team also reiterated the desire to speak to individual neighborhood associations throughout the process to understand concerns and address those concerns. The team has spoken already to Blenman Elm NA, Catalina Vista NA Board and is scheduled to speak at the Catalina Vista NA annual meeting.

NLG Questions & Project Team Answers:

1. Is the UA willing to sell or otherwise incorporate the eastern property sliver into the project?

Answer: *Palm Shadows has been meeting with the UA as the adjacent owner on this rezoning to keep them informed. Those discussions have included dialogue about the eastern parcel. While we don't know where those conversations will land, they are very productive.*

2. At what point in the process will we know how many living units will be in the building?

Answer: *At this point, we have estimated approximately 100 living units in order to complete the studies (Traffic Impact Analysis ("TIA"), etc.) We have language in the PAD that indicates that if the mix of uses increases the traffic by a certain percentage (once the mix of uses is finalized), then a new TIA and other reports may be required. The actual mix of uses will be determined once zoning entitlements are complete and contracts signed with other uses within the building. Project costs and marketability of uses are all factors to create a successful mix of uses. All of this will be determined after the zoning entitlements are in place.*

3. What is the condominium/living space pricing? Are they so high-end that people won't be able to afford to buy/lease?

Answer: *Obviously we need to ensure that the units are priced within the Tucson market. These will not be rented by the bed and will not be marketed to students. The goal is to find the "sweet spot" on price where it is not too high for the market and is attracting a certain age demographic and maturity.*

4. There is still a lot of concern about traffic and parking in this area and this development making congestion and traffic issues worse.

Answer: *We understand the existing traffic concerns. This project has prepared a TIA that analyzed the existing conditions and the conditions after the project. Certain improvements are necessary as a direct result of the project. There are other traffic issues that exist today and will continue after the project. This project is not responsible for those issues; however, this project will pay significant transportation impact fees that can be targeted to use in this immediate area.*

In addition, this project is meant to be Transit Oriented Development ("TOD"), which means it should attract people who want to use the significant amount of public transit available at or near the project site. The goal is to create a place where people can work, live and play all without needing to rely on the automobile for transportation. We would never suggest this project will reduce automobile traffic, but the hope is that it reduces daily trips for those who live, work and play in the immediate area due to access to amenities and public transit.

5. Is the City Council comfortable with the height request? (This question caused the development team to ask what the NLG is hearing about height concerns and a good discussion summarized below about the need to set appropriate context for height at this corner.)

Answer: *The City Council, when adopting the UAP amendment, certainly acknowledged that this is an area of the City that makes sense to densify and encourage TOD. The studies required within the UAP amendment for the high-rise building were a direct result of the neighborhood and City Council concerns with the height being requested at that time. We have now accomplished those studies, and believe demonstrated that the concerns about unintended consequences of the height are unfounded. That being said, we have not presented these findings nor had further discussions with the City Council members at this time.*

Keri Silvyn then asked the NLG to share what they are hearing about the height. NLG members indicated there is concern about the height simply being out of context with the way Tucson has grown, and concern in setting precedent for the other three corners.

- NLG and project team members discussed the fact that this is meant to create a new and different growth pattern in the Tucson region – up instead of out – which is more sustainable. Everyone understands that this change will feel scary to some people, but it is both bold and necessary.

- NLG members also discussed the difference between this corner and the other corners of Speedway and Campbell. This corner is surrounded by University uses, other commercial uses, two large rights-of-way and Banner Hospital. The neighborhoods are on the other sides of these uses. The other corners do not have this significant buffer between the corner uses and the neighborhoods.

- It was suggested that whenever this project is presented, the context of this corner as compared to others and the vision of the TOD and new (more sustainable) growth patters should be discussed. More than 20 minutes is really necessary within individual NA meetings to appropriately explain this project.